

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

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

To: The Commission

**OPPOSITION OF  
THE WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION**

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## Summary

The Wireless Internet Service Providers Association (“WISPA”) hereby opposes and comments on the petitions for reconsideration of the Commission’s *Report and Order* adopting rules for the Citizens Broadband Radio Service.

As proposed by the Wireless Innovation Forum (“WInnForum”) and others, the Commission should increase to 600 seconds the allowable time in which Citizens Broadband Radio Service Devices (“CBSDs”) must reconfigure their operations. Petitioners demonstrate that it is not realistic to expect response times to be fast enough to communicate, process, command, implement and confirm frequency changes across a broad and geographically dispersed network of networks – the Spectrum Access System (“SAS”) and the associated CBSDs under its control. SIA’s request to shorten the response time is unattainable and thus should be rejected.

WISPA opposes the increase in maximum power limits proposed by WInnForum and others because such changes would make the interference environment more severe and therefore more difficult to manage, thus reducing spectral efficiency. The Commission also should not impose a HAAT limit for Category B CBSDs, as SIA suggests, and instead allow the SAS to incorporate HAAT data into the frequency management process. Because there is no current way for the SAS to accurately determine height above ground within  $\pm 3$  meters, the existing rule should be retained to enable height above ground to be accurately communicated to the SAS by the professional installer. WISPA supports those petitions that seek to relax the out-of-band emission limits and to use average (as opposed to peak) power measurements.

WISPA also opposes WInnForum’s request to substitute licensee-defined protection areas for the Commission’s -80 dBm Priority Access License (“PAL”) protection criteria.

Rather, the Commission should adopt WISPA's proposal to require the SAS to automatically calculate coverage areas and to log and monitor co-channel CBSD packet error rates at regular intervals to determine and to mitigate interference between co-channel CBSDs. As co-channel CBSD packet error rates increase simultaneously, the SAS would assign one or the other of the CBSDs to different frequencies. This approach is more spectrally efficient and reliable than either the Commission's rule or the WinnForum proposal, which would overprotect incumbent operations and foreclose spectrum use by others.

The Commission should reject requests by NAB and SIA that seek to eliminate professional installation. Neither points to any legitimate interest of their members or any past instances of harmful interference. Rather, they attempt to impute perceived defects in the separate TV white space database to an evolving CBRS regulatory regime that will be much more robust and sophisticated. Instead of seeking the demise of professional installation – and apparently all Category B installations along with it – NAB and SIA should participate in the development of the SAS so that any of their legitimate concerns can be addressed.

The Commission also should reject CTIA's request to lengthen the PAL license term and to grant a renewal expectancy. WISPA disagrees that there will be little incentive to invest, especially as licensed operations become more and more congested and demand for additional spectrum increases. The Commission should, however, grant a PAL where there is only one applicant for the licensed area. The Commission should not substitute its business judgment for those of private parties merely because only one party applies for a PAL.

The Commission should retain its FSS reporting requirements to ensure that the SAS has accurate and current information about earth station locations and operating parameters to better protect FSS facilities from potential interference.

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The Wireless Internet Service Providers Association (“WISPA”), pursuant to Section 1.429(f) of the Commission’s Rules, hereby opposes certain arguments in the petitions for reconsideration of the Commission’s *Report and Order* adopted in the above-captioned proceeding, and offers supporting comments on other proposals.<sup>1</sup>

WISPA supports retaining rules governing the maximum EIRP and the elevation reporting requirement for Citizens Broadband Radio Service Devices (“CBSDs”). WISPA agrees with the Wireless Innovation Forum (“WInnForum”) that the protection criteria for Priority Access Licenses (“PALs”) is problematic, but its proposal to mandate licensee-defined protection zones creates new concerns.<sup>2</sup> The flaws in both the rules and the WInnForum approach can be addressed first by allowing the Spectrum Access System (“SAS”) to automatically determine coverage areas and protection zones, and second by allowing the SAS to monitor CBSD packet error rates to identify and correct instances of interference consistent with

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<sup>1</sup> *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, Report and Order and Second Further Notice of Proposed Rulemaking*, 30 FCC Rcd 3959 (2015) (“*Report and Order*”).

<sup>2</sup> See WInnForum Petition for Reconsideration, GN Docket No. 12-354 (filed July 22, 2015) (“WInnForum Petition”).

WISPA's previous proposal.<sup>3</sup> WISPA further supports petitions that seek to increase the allowable reconfiguration response time and relax the out-of-band emission ("OOBE") limits.

The Commission should reject attempts by NAB and SIA to eliminate the professional installation requirements for CBSDs, a drastic and irresponsible proposal that, if adopted, will substantially increase the occurrence of interference.<sup>4</sup>

The Commission should maintain its carefully balanced three-year licensing Priority Access License ("PAL") term and not adopt CTIA's proposal for five-year license terms with renewal expectancies.<sup>5</sup> Finally, earth station licensees should not be relieved of reporting obligations that enable the SAS to readily incorporate accurate and current information about their operations.

## **Discussion**

### **I. THE COMMISSION SHOULD GENERALLY RETAIN ITS TECHNICAL RULES, WITH SOME MODIFICATIONS**

#### **A. The Commission Should Increase The Allowable CBSD Reconfiguration Response Time**

A number of petitioners ask the Commission to increase the allowable CBSD reconfiguration response time from 60 seconds to 600 seconds,<sup>6</sup> while SIA argues that the

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<sup>3</sup> See "Desired Technical Aspects of the SAS System," presented by WISPA, GN Docket No. 12-354 (filed Jan. 3, 2014) ("WISPA Technical Paper") at 5-6. For convenience, a copy is attached as Exhibit 1 hereto.

<sup>4</sup> See Petition for Reconsideration of the National Association of Broadcasters, GN Docket No. 12-354 (filed July 23, 2015) ("NAB Petition"); Petition for Reconsideration of the Satellite Industry Association, GN Docket No. 12-354 (filed July 23, 2015) ("SIA Petition").

<sup>5</sup> See Petition for Reconsideration of CTIA – The Wireless Association®, GN Docket No. 12-354 (filed July 23, 2015) ("CTIA Petition").

<sup>6</sup> See WinnForum Petition at 3-5; Petition for Reconsideration by Nokia Networks, GN Docket No. 12-354 (filed July 23, 2015) ("Nokia Petition") at 4-6; Petition for Reconsideration of

Commission should “significantly reduce” the response time.<sup>7</sup> WinnForum explains in some detail the process by which multiple SAS administrators will need to undertake to effectuate reconfiguration of a CBSD and estimates that a majority of CBSDs can be relocated from a channel within 300 seconds.<sup>8</sup> It therefore “support[s] increased response time requirements with a more probabilistic and attainable approach.”<sup>9</sup> WISPA agrees with Winnforum that the response time is “both too low and in need of greater nuance given the complex system of systems characterizing the Part 96 environment.”<sup>10</sup>

Although SIA acknowledges the complexity of inter-SAS communications and the time it will take to reconfigure,<sup>11</sup> its request for an unspecified but faster-than 60-second response time would force all CBSDs to respond faster than the networked system is technically capable of communicating, processing, commanding, implementing and confirming frequency changes. Given that the SAS/ESC system will be a heavily-trafficked network consisting of many geographically-distributed server and client computers, the record demonstrates that it is unrealistic to expect that response times throughout the network will be fast enough in the aggregate to reliably implement frequency changes for all CBSDs within 60 seconds. The

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Motorola Solutions Inc., GN Docket No. 12-354 (filed July 23, 2015) (“MSI Petition”) at 3. The rule sections at issue are Sections 96.15(a)(4) for Category A CBSDs and 96.15(b)(4) for Category B CBSDs.

<sup>7</sup> See SIA Petition at 11-13.

<sup>8</sup> See WinnForum Petition at 4.

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

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

<sup>11</sup> See SIA Petition at 12.

Commission's rules should include requirements that can reasonably be met, not those that will be technically unattainable.

SIA also makes the absurd request that a CBRS device must shut off automatically if it loses contact with the SAS.<sup>12</sup> This is illogical because losing contact with the SAS does not convert a non-interfering CBSD into an interfering CBSD. An operating, non-interfering CBSD should remain operating on the same non-interfering channel if it loses contact with the SAS. Automatically shutting down serves no constructive purpose and provides no additional interference protection.

**B. The Commission Should Maintain The Maximum Power Limit And Not Impose Height Restrictions For Category B CBSDs**

A number of petitioners ask the Commission to increase the maximum EIRP for CBSDs.<sup>13</sup> WISPA takes no position on proposals to increase the maximum power level for *indoor* CBSDs, but believes the Commission should retain the existing power limit for Category B non-rural and rural CBSDs.<sup>14</sup>

Petitioners arguing for an increase in the maximum power limits in outdoor environments generally assert that the levels adopted by the Commission are too low for “practical”<sup>15</sup> or “appreciable outdoor coverage without the use of high gain, sectorized, directional antennas.”<sup>16</sup>

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<sup>12</sup> *See id.* at 12-13. As discussed in Part II, *infra*, WISPA disagrees with SIA's proposal to require all CBRS devices – CBSDs as well as end user devices – to communicate with the SAS.

<sup>13</sup> *See* WinnForum Petition at 5-9; CTIA Petition at 7-8; Nokia Petition at 7-9; Verizon Petition for Reconsideration, GN Docket No. 12-354 (filed July 23, 2015) at 3-5.

<sup>14</sup> *See* 47 C.F.R. § 96.41(b).

<sup>15</sup> Nokia Petition at 8.

<sup>16</sup> WinnForum Petition at 6. *See also* CTIA Petition at 7.

In WISPA’s view, however, best practices to minimize interference and maximize spectral efficiency and re-use in the deployment of an *outdoor* wide-area network like a WISP network or, in this case, a cellular macrocellular network, dictate the use of high gain, sectorized antennas. Petitioners appear to be planning to deploy spectrum-inefficient, interference-prone high-power CBSD networks using omnidirectional antennas. The Commission should reject requests to increase the allowable EIRP for outdoor CBSDs. The Commission also should reject SIA’s suggestion to decrease the maximum EIRP for non-rural Category B CBSDs.<sup>17</sup> WISPA believes the Commission struck the appropriate balance when it adopted the current EIRP levels for Category B CBSDs.

Contrary to SIA’s view, WISPA agrees with the Commission’s decision to not impose a HAAT limit on Category B CBSDs.<sup>18</sup> While it is true that height “is an important component of the interference assessment,”<sup>19</sup> HAAT data will be incorporated into the SAS to ensure that FSS operations are protected. Service providers may want to place CBSDs on tall buildings or tall hills to cover large areas with less infrastructure costs instead of deploying multiple CBSDs at lower elevations. Imposing an arbitrary HAAT restriction would restrict deployment options and is unnecessary given the SAS’s interference-mitigation capabilities.

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<sup>17</sup> See SIA Petition at 6-7.

<sup>18</sup> See *id.* at 7.

<sup>19</sup> *Id.* (citations omitted).

### **C. The Commission Should Not Amend Its Elevation Reporting Rule**

WinnForum, Nokia and MSI ask the Commission to eliminate the requirement for CBSDs to report elevation information and instead have the SAS calculate that data.<sup>20</sup> WISPA disagrees with this approach for the simple reason that there is no current way for either a CBSD or the SAS to determine the antenna height above ground of a CBSD within the  $\pm 3$  meter accuracy that Section 96.39 requires. Further, many outdoor CBSDs will be installed with external (i.e., connectorized) antenna systems. Therefore, the elevation of the CBSD itself becomes irrelevant with regard to coverage area or interference mitigation. Coverage and interference calculations depend only on the elevation above ground of the CBSD's antenna system. The only way for the CBSD antenna system elevation to be accurately ascertained and entered into the SAS is by the action of the professional installer at the time of installation.

### **D. The Commission Should Relax The Out-Of-Band Emission Limits And Adopt CTIA's Proposal To Use An RMS Detector To Measure Emission Levels**

CTIA and Nokia ask the Commission to relax the OOB limits of Section 96.41(e),<sup>21</sup> while SIA argues that the limits are too lenient and were adopted without proper notice.<sup>22</sup> CTIA observes that the OOB limits will require power reduction that "likely will prevent operators from deploying 20 MHz LTE channels in the 3.5 GHz Band."<sup>23</sup> Nokia explains that the Commission's rule is not harmonized with the 3GPP Band 42 and Band 43 standard for

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<sup>20</sup> See WinnForum Petition at 9-11; Nokia Petition at 14-16; MSI Petition at 4.

<sup>21</sup> See CTIA Petition at 5-7; Nokia Petition at 10-12.

<sup>22</sup> SIA Petition at 3-6.

<sup>23</sup> CTIA Petition at 5.

LTE.<sup>24</sup> Ignoring the Commission’s statement that “these emission limits are more stringent than what we proposed in the *FNPRM*,”<sup>25</sup> SIA contends that C-band satellite operations could be at risk of receiving interference.<sup>26</sup> WISPA supports a relaxation of the OOB limits and again notes that SIA’s concerns can be addressed by the SAS.

WISPA agrees with CTIA that the Commission should amend Section 96.41(e)(3)(iv) so that OOB power measurements are performed using an RMS (average power) detector rather than a peak detector.<sup>27</sup> Not only would measuring at peak power require mobile operations to operate at significantly less power, but this would similarly impinge upon the ability of fixed providers to operate at the maximum authorized power. WISPA supports the requested change.

**E. The Commission Should Reject WinnForum’s Proposal For Licensee-Defined Protection Areas And Should Instead Use the SAS To Calculate Coverage Areas And Monitor Co-Channel Packet Error Rates To Identify And Mitigate Interference**

WinnForum identifies five problems with the -80 dBm PAL protection criteria in Section 96.41(d).<sup>28</sup> To address these issues, WinnForum proposes that “the SAS be able to protect PAL deployments using a *licensee-defined protection area* in place of the protection criteria currently in the Commission’s rules.”<sup>29</sup> It then outlines criteria to govern the limits of the protected area.

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<sup>24</sup> See Nokia Petition at 10-11.

<sup>25</sup> *Report and Order* at 4018.

<sup>26</sup> SIA Petition at 4.

<sup>27</sup> See CTIA Petition at 6.

<sup>28</sup> See WinnForum Petition at 11-17.

<sup>29</sup> *Id.* at 17 (emphasis added).

WISPA agrees that the -80 dBm criterion is inadequate for the reasons Winnforum explains. However, WinnForum's solution would deprecate the role of the SAS to mitigate interference and instead delegate too much control over protected areas to licensees, who would benefit most from overprotection, thus precluding GAA use. Further, a process requiring licensees to self-define protected areas is not an engineering-based approach, but rather an unjustified delegation of privilege to operators.

WISPA instead reiterates its proposal under which the SAS would at regular intervals log and monitor CBSD packet error rates and use that data to determine if and when interference between co-channel CBSDs is present.<sup>30</sup> If the SAS detects increasing error rates between co-channel CBSDs, it would re-assign one of the CBSDs to a different, non-interfering channel.<sup>31</sup> WISPA estimates that, in 95 percent or more of interference cases, increasing co-channel error rates will be the result of mutual interference, making this method very reliable and more spectrally efficient than any licensee-defined protection-area approach that would undoubtedly overprotect PAL holders. In addition, WISPA's approach enables the SAS to perform interference avoidance and mitigation functions in an unbiased, automatic manner.

## **II. THE COMMISSION SHOULD CONTINUE TO REQUIRE CBSDs TO BE PROFESSIONALLY INSTALLED**

NAB and SIA seek to eliminate the ability of professional installers to determine the location of CBSDs as an alternative to automated geolocation.<sup>32</sup> These parties fail to

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<sup>30</sup> See Exhibit 1, WISPA Technical Paper at 5-6.

<sup>31</sup> See *id.*

<sup>32</sup> See NAB Petition at 1; SIA Petition at 15. Category A antennas do not need to be professionally installed unless location information cannot be automatically reported by the CBSD. See *Report and Order* at 4025. Category B CBSDs must be professionally installed. See 47 C.F.R § 96.45(a).

demonstrate how, if at all, existing 3650-3700 MHz Service licensees (much less any new users in the 3550-3650 MHz band) can cause harmful interference to adjacent C-band satellite operations, nor do they appreciate the public interest benefits of professional installation in environments where geolocation may not be possible.

As an initial matter, neither NAB nor SIA points to any legitimate interest they have in eliminating the professional installation option. Existing licensees in the 3650-3700 MHz band have co-existed with C-band and grandfathered FSS stations since the adoption of the Commission's Part 90, Subpart Z rules in 2007 without any documented cases of harmful interference. Through compliance with equipment certification rules, the manual Universal Licensing System registration process of Section 90.1307 and the cooperation requirements of Section 90.1319(d), licensees have managed to design and deploy fixed wireless networks that have not caused interference, whether in the adjacent C-band or in the same band. It is not enough to simply state, as NAB does, that many of its members use the adjacent band – substantial evidence of actual harm must be present.<sup>33</sup>

Instead of demonstrating any direct harm, NAB and SIA contrive a false fear by drawing comparisons to alleged inaccuracies in the TV white space database as a basis for their position.<sup>34</sup> The SAS being developed in WInnForum will be significantly more robust than the

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<sup>33</sup> See NAB Petition at 2.

<sup>34</sup> Even so, there have been no reported cases of interference to TV broadcast stations stemming from any alleged inaccuracies in the TV white space database. And, as the Commission is aware, database administrators, manufacturers and interested parties – including NAB – are undertaking an effort to make the TV white space database more reliable. Further, the Commission has announced that it will commence a proceeding by the end of the year to address NAB's petition regarding the TV white space database. See *Amendment of Part 15 of the Commission's Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37*, FCC 15-99, ET Docket No. 14-165 and GN Docket No. 12-268 (rel. Aug. 11, 2015) at 10 n.37.

TV white space database, and may incorporate requirements for professional installation such as completion of a professional installation program and/or identification and authentication of professional installers that would suffer adverse consequences for false or inaccurate location reporting.<sup>35</sup> So at best, any perceived issues with professional installation are premature.

Even so, NAB and SIA ignore the benefits of professional installation. First, there are many environments where GPS and other forms of geolocation may not work – outdoor locations on towers, inside buildings and areas where devices must be shielded from weather are just a few examples. Second, as stated above, in order to meet the elevation location requirements, professional installation of CBSDs may be the only way for device users to meet the requirements of the Commission’s rules.

Apparently unwilling to acknowledge these benefits or otherwise cooperate, NAB argues that under the TV white space rules, professional installers must be authorized by the manufacturer and that “[p]rofessional installation cannot be tweaked or legitimized by multi-stakeholder fora.”<sup>36</sup> NAB thus blindly leaps to the conclusion that the professional installation regime for an entirely different band will become the *de facto* standard for CBRS deployments. But even if NAB’s arguments are credible, its presumption cannot be imputed to the CBRS. Consistent with the Commission’s acknowledgement about the importance of developing accurate and reliable professional installation requirements,<sup>37</sup> WISPA encourages NAB and SIA

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<sup>35</sup> SIA acknowledges that WISPA has proposed a framework for a professional installation certification program. *See* SIA Petition at 15, n.40. WISPA looks forward to contributions by trade associations, consumer and enterprise device manufacturers, SAS administrators, operators and others – including SIA and NAB – to further develop this framework, and expects that other certification programs will emerge as well.

<sup>36</sup> NAB Petition at 6.

<sup>37</sup> *Report and Order* at 4028 (“we strongly encourage the SAS and user community, through multi-stakeholder fora or industry associations, to develop programs for accrediting professional

to participate constructively in WinnForum so that any legitimate concerns and recommendations they may have can be heard. But simply throwing in the towel based on future predictions makes them part of the alleged “problem,” not the solution.

The Commission also must reject SIA’s suggestion that geolocation be incorporated into End User Devices in the absence of “worst-case” FSS protection assumptions.<sup>38</sup> The cost to incorporate geolocation capability into every End User Device – small cell, rural broadband deployment, consumer device – is unjustified and unnecessary. The Commission correctly requires End User Devices to “positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.”<sup>39</sup> WinnForum is working to develop the protocols that will enable this capability, and any device to be certified by the Commission must meet these requirements. SIA’s argument is without merit.

### **III. THE COMMISSION SHOULD RETAIN THE THREE-YEAR LICENSE TERM FOR PALs, BUT MODIFY OTHER LICENSING RULES**

#### **A. The Commission Should Not Lengthen The PAL License Term Or Adopt A Renewal Expectancy**

CTIA asks the Commission to increase the PAL license term to at least five years and to adopt a renewal expectancy.<sup>40</sup> CTIA argues that the three-year term the Commission adopted “does not provide sufficient time or assurance for operators to be able to realize a return on

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installers who receive training in the relevant Part 96 rules and associated technical best practices. We note that industry-led professional accreditation processes have proven successful in other similar situations”).

<sup>38</sup> SIA Petition at 15.

<sup>39</sup> 47 C.F.R. § 96.47(a).

<sup>40</sup> CTIA Petition at 2-3.

investment,” and that “six years is not a sufficient time period in which to both build a network and obtain the financial return an operator would need to justify making such investments.”<sup>41</sup>

The *Report and Order* reflects a compromise from those, like WISPA, that can make a business case for deployment and service with short-term licenses, and those like CTIA’s members that prefer longer terms.<sup>42</sup> Further, the mobile wireless industry has, in recent years, embraced investment in unlicensed spectrum and, as the Commission states, “we expect that Citizens Broadband Radio Service users will have similar incentives to invest under the GAA rules as unlicensed users in other bands.”<sup>43</sup> This is certainly the case with respect to WISPA’s members – it will not take them “several years”<sup>44</sup> to deploy a network to provide fixed wireless broadband services. With respect to larger mobile wireless carriers, the Commission anticipates that “the economics and upgrade cycles for the (predominant) small cell use case . . . may resemble those for enterprise and carrier Wi-Fi deployments rather than traditional macro cell deployments common to other bands.”<sup>45</sup> WISPA thus doubts that, as CTIA posits, “[o]perators may simply choose not to invest in the band without sufficient certainty that they will be able to obtain a return on investment before a PAL terms expires.”<sup>46</sup> Rather, the ability to deploy service in small-size markets to relieve congestion from licensed spectrum will be a powerful incentive for investment.

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<sup>41</sup> *Id.* at 3.

<sup>42</sup> *See Report and Order* at 3995-6.

<sup>43</sup> *Id.* at 3996.

<sup>44</sup> CTIA Petition at 3.

<sup>45</sup> *Report and Order* at 3996 (citations omitted).

<sup>46</sup> CTIA Petition at 3.

## **B. The Commission Should Reconsider Its Rule Preventing A Single Applicant From Obtaining A PAL**

Motorola Solutions (“MSI”) and Professor Jon Peha seek reconsideration of Section 96.29(d), which prevents the Commission from granting a PAL in a census tract for which only one application is filed.<sup>47</sup> As these petitioners point out, a PAL may be necessary for a provider serve rural hospitals, video surveillance, telemetry, monitoring and other services that require guaranteed quality of service.<sup>48</sup> WISPA supports these petitions and believes the public interest would be served by revising Section 96.29(d) as MSI proposes.

Although the Commission acknowledges that it has statutory authority to auction spectrum only if there are mutually exclusive applications, it offers no rationale for cancelling competitive bidding where only one party applies.<sup>49</sup> The Commission merely states that “the best way to discharge our statutory mandate to ‘encourage the larger and more effective use of radio in the public interest’ is to provide access to such spectrum via shared GAA use.”<sup>50</sup> This bare conclusion, however, substitutes the Commission’s business judgment about shared spectrum use over an applicant’s business decision that may favor exclusive spectrum use. The choice should be a marketplace decision, not a regulatory one predicated on the unrelated absence of other bidders.

The Commission’s decision also encourages gamesmanship. For example, a WISP that thinks it may be the only bidder for a rural census tract may “recruit” another bidder for the sole

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<sup>47</sup> MSI Petition at 5-7; Petition for Reconsideration on Auction Rules for Priority Access Licenses, GN Docket No. 12-354 (filed July 22, 2015) (“Peha Petition”).

<sup>48</sup> See MSI Petition at 6; Peha Petition at 2.

<sup>49</sup> See *Report and Order* at 4003. See also Peha Petition at 2.

<sup>50</sup> See *Report and Order* at 4003 (citation omitted).

purpose of creating mutual exclusivity to force competitive bidding. This form of permissible collusion (occurring before the Commission’s anti-collusion rules would normally be effective) should not be encouraged.

WISPA understands that there may be few instances where only one applicant will “check the box” for a particular census tract because it will take only two bidders to check the “all” markets box for the issue to disappear (assuming multiple census tracts are auctioned at the same time). But there is no policy reason to foreclose PALs altogether in those areas and allow PALs in other areas that happen to have competing applications. WISPA also appreciates that a single PAL holder should not get a free ride. As MSI suggests, the Commission can adopt a reasonable licensing or administrative fee – the reserve price is one example – and require payments to the SAS administrator.<sup>51</sup>

#### **IV. THE COMMISSION SHOULD RETAIN ITS REPORTING REQUIREMENTS FOR FIXED SATELLITE SERVICE EARTH STATIONS**

SIA requests reconsideration of Section 96.17(d), which requires Fixed Satellite Service (“FSS”) earth station licensees desiring Part 96 protection to report information concerning their facilities annually or upon making changes to the reported information.<sup>52</sup> Instead of ensuring that technical information about FSS operations is current and available to SAS administrators, SIA would prefer to have administrators rely on existing licensing information in the Commission’s database.

WISPA opposes SIA’s argument for the simple reason that reporting information on a regular basis and whenever critical technical information changes will provide current and

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<sup>51</sup> See MSI Petition at 7.

<sup>52</sup> See SIA Petition at 16-18. SIA characterizes the information as “detailed” and “unduly burdensome,” but in the next breath concedes that Section 96.17(d) seeks “basic operational information” that “is already on file with the Commission.” *Id.* at 16, 17.

accurate information to the SAS to ensure that FSS licensees do not suffer harmful interference from inaccurate or outdated information. Although licensees may loathe the regulatory creep of additional reporting obligations, SIA must understand that the modest obligation the Commission adopted, even if duplicative, is in its members' own best interest. That said, WISPA has no objection to eliminating the FSS reporting obligations in Section 96.17(d) if information on file in IBFS is accurate, will be updated to reflect then-current actual operating (i.e., not just licensing) parameters and will provide sufficient data for the SAS to provide interference protection, and if SAS administrators are agreeable.

SIA notes that the Commission did not adopt a similar reporting requirement for FSS earth stations in the 3650-3700 MHz band.<sup>53</sup> WISPA agrees that the reporting obligations for the FSS licensees in the 3600-3650 MHz, 3650-3700 MHz and 3700-4200 MHz bands should be harmonized so that the same information is reported in the same database such that SAS administrators need only gather information from one source.

WISPA agrees that the Commission should clarify certain terms in Section 96.21. For example, the Commission should make clear that the term "protection area defined for a particular grandfathered FSS earth station" refers to the existing 150 km circular zone as specified in Section 90.1331(a) and any change to that rule that the Commission may adopt.<sup>54</sup>

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<sup>53</sup> *See id.* at 18-19.

<sup>54</sup> This issue is the subject of the Second Further Notice of Proposed Rulemaking ("*Second FNPRM*") that is part of the same document as the *Report and Order*. *See Second FNPRM* at 4087-89.

## **Conclusion**

On reconsideration, the Commission should modify its rules to the extent described above. In particular, the Commission should increase the reconfiguration response time, modify PAL protection criteria and relax OOBE limits. The Commission should not, however, eliminate professional installation or eliminate the CBSD elevation reporting requirement. The Commission also should retain its three-year licensing term and allow a single applicant for a PAL in a given census tract to obtain a PAL. The Commission also should ensure that earth station licensees provide accurate and up-to-date information about their technical operations so that they can be appropriately protected by the SAS.

Respectfully submitted,

### **WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION**

October 19, 2015

By: */s/ Alex Phillips, President*  
*/s/ Mark Radabaugh, FCC Committee Chair*  
*/s/ Jack Unger, Technical Consultant*

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# Exhibit 1

# Desired Technical Aspects of the SAS System

Presented by the Wireless Internet Service Providers Association  
January 3, 2014

GN Docket No. 12-354

## Introduction

The Wireless Internet Service Providers Association (WISPA) commends the Federal Communications Commission (FCC) for proposing the use of an intelligent three-tiered Spectrum Access System (SAS) to enable Incumbent Access, Priority Access (PA) and opportunistic General Authorized Access (GAA) to spectrum in the 3550-3650 MHz band. WISPA believes that the use of a robust, automated online database that incorporates dynamic frequency assignment capability represents a significant step forward in the development of spectrum management technology that can enable and enforce spectrum access that will promote spectral efficiency, consumer welfare and economic growth. Further, WISPA believes that successful SAS deployment in the 3550-3650 MHz band will demonstrate the value of database-enabled spectrum management that will lead the way to similar opportunities in other frequency bands.

This paper discusses selected technical aspects of the proposed SAS for the 3.5 GHz band in response to the FCC's November 18, 2013 Call for Papers.<sup>1</sup> In this proceeding (GN Docket No. 12-354), WISPA has filed Comments and Reply Comments supporting the proposed three-tiered SAS database that builds on TV White Space (TVWS) database concepts but potentially offers additional, more advanced capabilities. It is our hope that this discussion will assist in the further development and implementation of a secure SAS that maximizes spectral efficiency in the 3550-3650 MHz range. WISPA's primary interest is in gaining access to spectrum that can deliver higher-power signals for fixed wireless broadband services in rural areas on both a PA and GAA basis. WISPA has proposed a licensing approach that balances the needs of consumers in rural areas with the desire for small cells in non-rural areas. By incorporating spectrum use variables and dynamic frequency assignment protocols, the SAS would protect Incumbent Access and Priority Access users from harmful interference, coordinate spectrum use between access tiers and within access tiers, differentiate between rural and non-rural areas and account for differences in power and other technical characteristics to promote co-existence among disparate users.

The Call for Papers divides the technical discussion into the following four main Focus Areas, each with several topics.

- (A) - General Responsibilities and Composition of SAS
- (B) - SAS Functional Requirements
- (C) - SAS Monitoring and Management of Spectrum Use
- (D) - Issues Related to Launch and Evolution of SAS and Band Planning

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<sup>1</sup> *Public Notice*, "Wireless Telecommunications Bureau and Office of Engineering and Technology Call for Papers on the Proposed Spectrum Access System for the 3.5 GHz Band, DA 13-2213 (Nov. 18, 2013).

WISPA addresses only those topics where we believe we can offer specific expertise. We intentionally do not address those areas where we believe others will offer their own specialized expertise. Some topics may be discussed or touched upon in more than one Focus Area.

### **Focus Area A.1. Scope of SAS Responsibilities for Enabling and De-conflicting Use of the 3.5 GHz Band**

(See also related discussions under topics B.1., B.2., B.4., B.5., C.1., and C.2.)

The SAS can automatically enable and de-conflict use of the band if it has the capability to (a) dynamically assign non-conflicting operating frequencies, (b) detect instances of actual interference, and (c) automatically re-assign (one or, if necessary, both) operating frequencies to resolve the interference. To implement this functionality, the SAS must include the following capabilities:

1. Know the geographic location of each network node. This requirement can be met by requiring each base station (BS) or access point (AP) to be GPS-enabled and to report its GPS coordinates to the SAS.
2. Be “census-tract aware”. This requirement can be met by incorporating a census tract map overlay into the SAS.
3. Be “terrain aware.” This requirement can be met by incorporating a terrain database into the SAS.
4. Be “obstruction aware.” This requirement can be met by incorporating an obstruction database into the SAS and updating it at regular intervals. NOTE: A simpler but possibly sufficient option would be to use an Irregular Terrain Model (Longley-Rice Model) to predict a line-of-sight (LOS) contour without tree loss, thereby providing a coverage “buffer.” Public domain source code is available at < <http://www.its.bldrdoc.gov/resources/radio-propagation-software/itm/itm.aspx>>.
5. Know the conducted power level and the channel width of each BS or AP at installation time. This requirement can be met by (a) automatically polling each new BS or AP transmitter, or (b) automatically “pushing” the data from each transmitter to the SAS database.
6. Know the antenna characteristics of each BS or AP transmitter antenna system (gain, polarization, horizontal and vertical beamwidth, HAAT, downtilt, etc.) at installation time. This requirement can be met (a) by each federal incumbent, licensee or technical contact person (in the case of a GAA operator) manually entering the antenna data into the SAS prior to full node activation, or (b) in the case of a low-power, integrated, certified transmitter with a permanently-attached antenna used indoors or at ground level, automatically pushing the antenna information to the SAS.
7. Know the receiver threshold level for each BS or AP receiver at the lowest modulation rate. This requirement can be met by (a) each licensee or technical contact person manually entering the data into the SAS prior to full node activation, or (b) automatically pushing the data to the SAS.

8. Know the coverage area (or contour) of each BS or AP transmitter. This requirement can be met by using the known transmitter and antenna system data and the known terrain and obstruction data to calculate the coverage area (or contour).
9. Assign non-conflicting operating frequencies (or channels) to each transmitter or network node. This requirement can be met by taking each coverage area (or contour) into account and selecting frequencies with coverage areas (or contours) that do not significantly overlap.

#### **Focus Area A.4. Interoperability**

Interoperability between multiple SAS vendors can be ensured using the same methods used to ensure interoperability between the multiple TVWS database vendors. These procedures and interfaces were developed by the tentatively selected database administrators and approved by the FCC.

Interoperability between multiple SASs and Authorized Users (AUs) can be ensured by requiring the use of a common AU interface for all SASs and all AUs. WISPA recommends that the same common development approach be adopted in this proceeding.

#### **Focus Area B.1. Minimum Set of Information (SAS-AU)**

The minimum set of information from SAS to AU must include the authorized operating frequency.

The minimum set of information from AU to SAS must include the following:

1. Geographic location (GPS lat/long, census tract)
2. User class (Incumbent Access, Priority Access and General Authorized Access)
3. AU make, model and unique ID
4. Unique identifying information for each Priority Access licensee
5. Unique identifying information for each GAA AP operator
6. Transmitter conducted power level
7. Channel width
8. Net antenna system gain
9. Antenna azimuth
10. Antenna polarization
11. Antenna horizontal and vertical beamwidth
12. Antenna HAAT
13. Antenna downtilt
14. AU technical contact person name and email address

#### **Focus Area B.2. Required SAS Obligations**

Required SAS obligations should include the following:

1. Initial AU frequency assignments
2. AU frequency change commands
3. Requests for AU management database or system administration statistical information

4. AU standby commands
5. Allowing authorized PA and GAA technical personnel to opt-in or sign up for access to an SAS history log describing technical information about the operation (for example, frequency changes) of their AU
6. Emailed requests to AU technical contact person to make contact

#### **Focus Area B.4. Required AU-Supplied Information**

The AU must supply the SAS with all the information included in the discussion regarding Focus Area B.2. (above) plus the following:

1. Operating frequency (or frequency change) confirmation
2. Transmitter conducted power (change) confirmation
3. Receiver threshold level at the lowest modulation rate
4. Uptime since last reset of management or system administration database statistics
5. Packet or frame retransmission percentage
6. Traffic level as indicated by the aggregate number of packets sent and received
7. Number of currently-connected client devices
8. Operating status (active, standby, booting up, shutting down)

#### **Focus Area B.5. Updates**

Updates from SAS to AUs or other network devices should be pushed out to the AUs as soon as they are available. Frequency change commands should also be pushed to AU(s) as soon as they are available.

Updates from AUs to SAS should be sent whenever an AU is polled by the SAS. To fulfill its network monitoring, logging and decision-making capabilities, the SAS will probably need to request AU management or system administration database information at regular intervals. Initially, sixty-minute intervals are suggested.

#### **Focus Area B.7. SAS Updates**

Information updates among SAS systems from different vendors could be handled using the same techniques used by the multiple TVWS databases.

#### **Focus Area C.1. AU Spectrum Usage Determination**

The relative success of the SAS depends on its ability to account for all four dimensions of spectrum – time, frequency, geography and power – and to dynamically assign (or re-assign) frequencies on the basis of these dimensions within and between the three spectrum access tiers. To maximize spectral efficiency and use spectrum to its fullest potential, frequencies should not be permanently and exclusively assigned. The SAS can act to detect whenever a specific frequency (PA or GAA ) has not been and is not currently in actual use and reassign that specific frequency within a specific area (census tract) to another user who has a current need to communicate. This is somewhat analogous to VHF and UHF

trunked radio systems where rather than have each user group (for example, the police department, fire department or water department) permanently and exclusively assigned to a specific frequency whether they are currently using it or not, all the available frequencies (for example, for an entire city) are used as a common frequency pool. When any user, irrespective of user group, wishes to transmit, the control station (or “site controller”) automatically assigns that user and all other users in that user group to an available, clear frequency from the common frequency pool. By pooling frequencies and dynamically assigning frequencies from within the pool, spectral efficiency is maximized. A trunked system can accommodate more users with a smaller common pool of frequencies compared to an untrunked (exclusive frequency) system. Of course, key to this functionality is knowing which frequencies are actually in use and which are available at any point in time.

The management or system administration database of virtually all modern wireless equipment collects statistics about traffic levels such as the number of packets exchanged and the number of connected client devices. By regularly and automatically polling AUs, the SAS can pull, log, monitor and report this usage data in near real time. By setting reasonable decision-criteria thresholds in the SAS, the SAS can differentiate between BSs or APs that are handling actual, real-world customer traffic and which BSs or APs are simply “idling” and not serving real, end-user needs. The object here is to prevent “gaming” the system, through the use of so-called “frequency-savers” designed to give the appearance that a BS or AP is in real-world use while it is in fact not actually serving end-users.

### **Focus Area C.2. Measuring and Mitigating Inter-AU Interference**

The SAS can automatically detect and mitigate interference by reassigning operating frequencies. WISPA recommends the following process to determine when AUs are interfering with each other:

1. At practical but regular intervals, the SAS polls each BS or AP to obtain the effective error rate. It logs and monitors this data. BS or AP transmitter **packet or frame retransmission percentage data** serves as an indicator of the effective error rate because packets are retransmitted only when there is no acknowledgement received from the first (or a subsequent) packet transmission attempt. The self-contained management or system administration database of virtually all modern wireless equipment logs and retains this retransmit data. For properly operating systems, error rates (retransmission percentages) of one-to-two percent are fairly typical while an error rate of ten percent could be considered abnormally high.
2. When the SAS detects that the error rates of adjacent (or nearby) BS or AP transmitters have simultaneously increased in the same time frame, it typically indicates that mutual interference is occurring between the two networks. This method should work even when/if the air interfaces between the two networks are different. Retransmission rates can also simultaneously increase for other reasons not necessarily related to mutual interference between the networks. For example, retransmission rates can increase due to transmitter, receiver or antenna system failures however, when this happens there will not be a simultaneous increase in retransmission rates in adjacent or nearby transmitters on different networks. WISPA believes that in 95 percent of the cases of a simultaneous, mutually-occurring increase in retransmission rates that the cause will be due to actual mutual interference

- between the affected transmitters. In the other 5 percent of the cases, the cause will be attributed to other environmental factors such as (a) the presence of a series of accidental or intentional transmissions from a non-SAS-coordinated transmitter, or (b) an area-wide power interruption, or c) some other region-wide environmental factors. In these “5 percent” cases, the SAS can not be expected to be able to mitigate the interference by reassigning frequencies.
3. When the SAS detects mutually-rising error rates for adjacent equipment, it re-assigns one of the AUs to change to a different, non-interfering frequency.
  4. If optionally selected by an AU technical contact person, the SAS could email the contact person a “frequency change complete” notice, including the new frequency information for the AU(s).

### **Focus Area C.3. Enforcement Mechanisms**

The SAS could also be used to disallow (or fail to authorize) the operation of any unauthorized or uncertified transmitters in the 3550-3650 MHz frequency range. To promote this end, it will be necessary to ensure that FCC equipment certification procedures effectively support the requirement that new equipment be designed and tested to standards that disallow software tampering designed to defeat SAS operation and control.

### **Focus Area D.1. Deployment Functions**

A phase-in of SAS technical functionality will likely prove helpful for all parties. One such example may be initially limiting allowable antenna parameters (discussed in Focus Area A.1.) to omnidirectional, 120-degree and 180-degree patterns. As successful SAS-mediated operation is demonstrated, additional antenna patterns can be added.

### **Conclusion**

WISPA is pleased to have the opportunity to contribute to the development of what we believe is a new era in intelligent spectrum management. As noted in the PCAST report, spectrum is an important national resource whose use must be made more valuable by allowing it to be used more efficiently. WISPA looks forward to continuing to dialogue with other industry stakeholders to assure the development of a dynamic, robust and effective Spectrum Access System.

Respectfully Submitted,

*/s/ Jack Unger*

WISPA Technical Consultant

## Your submission has been accepted

<b>ECFS Filing Receipt - Confirmation number: 201413921314</b>	
<b>Proceeding</b>	
<b>Name</b>	<b>Subject</b>
12-354	Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band
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