

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 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

**REPLY COMMENTS OF THE SATELLITE INDUSTRY ASSOCIATION**

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## **SUMMARY**

The record here reinforces SIA's concerns regarding the adverse impact that introduction of CBRS operations in the 3.5 GHz band could have on current and future FSS earth station operations, both in that band and in adjacent spectrum, that are critical to the nation's infrastructure. Many proponents of allowing CBRS entry appear unwilling to engage in true sharing – instead, they want maximum flexibility to use additional spectrum without taking into account the constraints necessary to prevent disruption of primary FSS and federal radar systems. The Commission, however, must ensure that before a single CBRS device is authorized to transmit, a fully tested and effective framework is in place to protect primary services.

Specifically, protection zones must be established to prevent both in-band and adjacent-band interference to FSS earth stations. As SIA has shown, these zones must be based on ITU interference criteria and take into account the aggregate effect of multiple CBRS devices. The necessary size of these zones will depend on technical parameters for CBRS operations – in particular, power density levels and out-of-band emissions limits – and these remain the subject of significant dispute, with many parties ignoring the fact that increasing power or relaxing the limits will necessarily increase required separation distances.

Just as important as devising the protection zones will be ensuring compliance with them. The comments regarding geo-location reporting are particularly troubling on this front. SIA objected to the Notice's proposal for a lengthy 60 second interval for location reporting. However, many commenters argue that position determination will take much longer and will not be able to achieve the required accuracy, casting doubt on whether the protection zones can be effectively enforced. Security matters are also of paramount importance. The Commission must take steps to ensure that devices cannot be modified to permit unauthorized

operations and that communications between the SAS database and all CBRS devices are protected from improper access.

The proposal of some parties that the SAS be permitted to dynamically assign spectrum and power levels to CBRS devices located inside the protection zones must be rejected as infeasible. The comments make clear that existing technology does not provide the ability for an SAS to perform the complicated calculations of aggregate interference in real time in an environment where the number and location of active CBRS devices would be constantly changing. Even if these technical obstacles could be overcome, such an approach would require the SAS to dictate CBRS operational parameters, which many CBRS proponents oppose.

Consistent with the primary status of FSS networks in this spectrum, the Commission should lift the freeze on new earth stations in the 3.5 GHz band. Such a change is necessary to prevent stranded investment and provide much-needed flexibility to FSS operators. Furthermore, CBRS networks should be able to adjust their operations to accommodate new earth station deployments, which are likely to be few in number.

The CBRS framework should be limited to the 3.5 GHz band and should not be extended to adjacent spectrum at 3650-3700 MHz or used as a model for other frequency bands or in international discussions. The comments demonstrate that attempting to impose the CBRS regime would disrupt operations at 3650-3700 MHz that serve important public interest objectives, including smart grid networks for utilities and broadband communications to rural and underserved communities.

Finally, although SIA continues to support the use of a multi-shareholder group to advise the Commission on technical matters relating to the 3.5 GHz band, any such group must fairly represent all parties. In particular, FSS operators and other primary service providers must have full participation.

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**REPLY COMMENTS OF THE SATELLITE INDUSTRY ASSOCIATION**

The Satellite Industry Association (“SIA”) hereby submits its reply to the comments of other parties in response to the Commission’s Further Notice of Proposed Rulemaking in the above-captioned proceeding, which seeks additional input regarding the feasibility of new terrestrial services in the 3550-3650 MHz band (“3.5 GHz band”).<sup>1</sup> The satellite industry has been delivering vital services as part of the nation’s communications infrastructure using a portion of the 3.5 GHz band (3600-3650 MHz) and adjacent frequencies (3650-4200 MHz) for over four decades. The Commission and some commenting parties appropriately recognize that primary Fixed-Satellite Service (“FSS”) operations in this spectrum (not just federal radar systems) must be protected from interference that could result from the proposed Citizens Broadband Radio Service (“CBRS”).<sup>2</sup> Yet much work still remains to be done to ensure that practical and reliable mechanisms are in place to achieve that requirement.

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<sup>1</sup> *Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Further Notice of Proposed Rulemaking and Order, GN Docket No. 12-354, FCC 14-49 (rel. Apr. 23, 2014) (“Notice” or “FNPRM”).

<sup>2</sup> *See id.* at ¶ 5; Comments of Wi-Fi Alliance filed July 14, 2014 (“Wi-Fi Alliance FNPRM Comments”) at 12 (“Wi-Fi Alliance understands the need to protect incumbent operations in the 3.5 GHz band”); Comments of the Wireless Innovation Forum filed July 10, 2014 (“Wireless

## I. INTRODUCTION

The record in this proceeding suggests that many CBRS proponents want the benefits of spectrum “sharing” but are unrealistic about its feasibility and unwilling to accept the required sacrifices. They expressly acknowledge the need to prevent harmful interference to primary FSS and federal operations, while at the same time arguing against the reasonable protections necessary to accomplish that goal. For example, several commenters claim that protection zones can be reduced or eliminated, but simultaneously seek higher power limits for CBRS devices that will only increase the required separation distances.

Some suggest that the envisioned Spectrum Access System (“SAS”) can be relied on to dynamically assign spectrum and set power levels. However, they ignore questions about the technical feasibility of such a complex database system. Others would like access to the spectrum but do not want to relinquish control of their networks to an SAS. In short, they want access to additional spectrum and to dictate the terms on which access is granted – all without accepting the trade-offs required to “share” spectrum in a manner that does not disrupt primary operations.

The Commission cannot base its spectrum access decisions on such unrealistic thinking. It can authorize CBRS operations in the 3.5 GHz band if and only if the means for preventing harmful interference to primary networks are first developed and validated, and even then only after the requisite accompanying enforcement mechanisms are in place.

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Innovation Forum FNPRM Comments”) at 3 (“a basic principle of spectrum sharing [is] that new entrants should accommodate the existing transmissions of incumbent systems”).

In particular, the Commission will need to establish protection zones to prevent both in-band and adjacent-band interference to FSS earth stations from CBRS devices.<sup>3</sup> A secure, robust SAS will be needed to enforce those zones. The record, however, does not support relying on a database approach to permit real-time, dynamic frequency and power level assignments for CBRS operations within the protection zones. The Commission should also lift the freeze to permit new primary FSS earth stations to be deployed in order to avoid stranding investment. The Commission should not extend the untested CBRS framework to the 3650-3700 MHz band or use it as a model in other spectrum bands. Finally, the Commission must ensure that any multi-stakeholder group it relies on for technical assistance fairly represents all interested parties.

## **II. THE COMMISSION MUST ENSURE THAT THE REGULATORY AND TECHNOLOGICAL FRAMEWORK FOR CBRS PREVENTS INTERFERENCE TO FSS EARTH STATIONS**

As SIA has previously shown, earth stations in the extended and conventional C-band provide critical services that must be protected from harmful interference resulting from the introduction of CBRS devices in the 3.5 GHz band.<sup>4</sup> The record indicates that establishing

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<sup>3</sup> As Motorola Mobility observes, the Notice defines “Citizens Broadband Service Device” and “CBSD” to exclude end user devices. *See* Comments of Motorola Mobility LLC filed July 14, 2014 (“Motorola Mobility FNPRM Comments”) at 8, *citing* proposed Section 96.3 in Appendix A of the Notice. It is unclear if all commenters realized this distinction. SIA hereby clarifies that when using these terms in its previous comments, SIA intended to refer to both base stations and end user devices. Primary services – both FSS earth stations and federal radar systems – must be protected from aggregate interference from all devices operating in the CBRS, regardless of whether it emanates from base stations or end user devices. As a result, the rules for the protection of FSS earth stations that apply to CBSDs must also be applied to end user devices in all cases.

<sup>4</sup> *See* Comments of the Satellite Industry Association filed Feb. 20, 2013; Reply Comments of the Satellite Industry Association filed Apr. 5, 2013; SIA Written *Ex Parte* Presentation filed Aug. 20, 2013; Comments of the Satellite Industry Association on Licensing Models and Technical Requirements filed Dec. 5, 2013 (“SIA December 2013 Comments”); Reply Comments of the Satellite Industry Association on Licensing Models and Technical

protection zones will be necessary to prevent both in-band and adjacent-band interference, but determining appropriate zones will depend on the ultimate technical characteristics for CBRS, which are still a matter of significant debate. In addition, the Commission will need to ensure that the zones can be reliably enforced and that robust security measures are in place to prevent unauthorized transmissions.

**A. Most Commenters Recognize that Protection Zones Will Be Necessary to Protect In-Band FSS Earth Stations from Harmful Interference**

In its comments on the Notice, SIA provided a detailed technical analysis regarding the measures necessary to ensure that CBRS transmissions do not disrupt signal reception at 3.5 GHz FSS earth stations.<sup>5</sup> SIA demonstrated that based on well-established ITU standards, the appropriate aggregate interference criteria for protection of in-band FSS earth stations are as follows:

Long Term I/N=-13 dB, not to be exceeded for more than 20% of the time

Short Term I/N=-1.3 dB, not to be exceeded for more than 0.001667% of the time<sup>6</sup>

Using the power levels for two illustrative types of terminals proposed in the Notice, SIA's consultants at RKF Engineering calculated single-entry protection areas necessary to meet these long-term and short-term interference criteria for each of the currently licensed 3.5 GHz FSS earth station sites.<sup>7</sup> SIA argued that within these zones, the Commission should not issue Priority Access Licenses ("PALs") or authorizations for Contained Access Facilities ("CAFs") and the SAS should be required to block transmissions by General Authorized Access

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Requirements filed Dec. 5, 2013 ("SIA December 2013 Reply Comments"); SIA Written *Ex Parte* Presentation filed Feb. 1, 2014; Comments of the Satellite Industry Association filed July 14, 2014 ("SIA FNPRM Comments").

<sup>5</sup> SIA FNPRM Comments at 3-15 & attached report of RKF Engineering ("RKF Report").

<sup>6</sup> *Id.* at 4-6 & RKF Report at 1.

<sup>7</sup> *Id.* at 6-7 & RKF Report at 3-8.

(“GAA”) devices.<sup>8</sup> SIA emphasized, however, that even these areas may be insufficient if densely-deployed CBRS devices (including CBSDs and end user CBRS devices) outside the single-entry protection zones cause the aggregate interference thresholds to be exceeded.<sup>9</sup> SIA argued that unless the Commission is prepared to periodically revisit and enlarge the protection zones to address this issue, it will need to either set deployment density constraints or build in a significant margin in calculating protection zones to account for aggregate interference.<sup>10</sup>

No other commenter performed a similar technical analysis of protection areas required for in-band FSS earth station operations, but a number of parties recognize the need to establish protection zones. For example, Ericsson endorses an “exclusion-based methodology” for protecting FSS networks, stating that such an approach “has been shown to be effective in protecting incumbents in [TV White Space] operation thus far.”<sup>11</sup> Similarly, InterDigital states that “the baseline approach to protect [in-band] FSS earth stations should be to have a sufficient exclusion zone around each station, in which the portions of the band that are used by the FSS earth station are not used by CBSDs.”<sup>12</sup>

Google recognizes that protection zones will be needed to protect FSS earth stations from in-band interference, but argues that such zones should be based on specific look

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<sup>8</sup> SIA FNPRM Comments at 6.

<sup>9</sup> *Id.* at 7-8 & RKF Report at 8-11.

<sup>10</sup> SIA FNPRM Comments at 8.

<sup>11</sup> Comments of Ericsson filed July 14, 2014 (“Ericsson FNPRM Comments”) at 20. *See also* Comments of the Wireless Internet Service Providers Association filed July 14, 2014 (“WISPA FNPRM Comments”) at 20 (agreeing that “the SAS can and should enforce operational restrictions to prevent interference to grandfathered FSS earth stations”).

<sup>12</sup> Comments of InterDigital, Inc. filed July 14, 2014 (“InterDigital FNPRM Comments”) at 13.

angles and channels each FSS earth station is using.<sup>13</sup> This, of course, would place an additional burden on FSS operators to report changes in these variables.<sup>14</sup> Yet as Federated Wireless observes, a “general principle of spectrum sharing is that the burden . . . should be minimized to incumbent systems.”<sup>15</sup>

Moreover, defining exclusion zones based on a snapshot of earth station technical characteristics would also create the possibility that established CBRS operations would have to be modified or terminated altogether if an FSS earth station is repointed to communicate with a different satellite and/or shifts to different frequencies. Such repointings and frequency shifting occur routinely, often on short notice, and are essential to a satellite network’s ability to effectively serve its customers. If the Commission wishes to avoid the risk that CBRS operations may have to be abruptly changed or terminated, it should establish protection zones based on the full authorized range of earth station frequencies and look angles.

The record also supports SIA’s claims regarding the need to consider aggregate interference to ensure protection of FSS earth stations. Sony Electronics confirms that “without taking into account aggregate interference, FSS Earth Stations cannot be protected from the

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<sup>13</sup> Comments of Google Inc. filed July 14, 2014 (“Google FNPRM Comments”) at 24. *See also* Comments of Motorola Solutions, Inc. filed July 20, 2014 (“Motorola Solutions FNPRM Comments”) at 10 (FSS receiver look angles should be used to compute interference effects for CBSD transmissions); Wi-Fi Alliance FNPRM Comments at 13.

<sup>14</sup> Google FNPRM Comments at 24 (“Earth station operators should be required to register operating parameters with the Commission”).

<sup>15</sup> Comments of Federated Wireless, Inc. filed July 14, 2014 (“Federated Wireless FNPRM Comments”) at 15. Furthermore, the Commission has previously rejected a new proposed use of spectrum on a secondary basis based in part on concerns that managing the interference environment could involve “imposing new obligations or constraints on the primary users of the band.” *Utilities Telecom Council and Winchester Cator, LLC Petition for Rulemaking to Establish Rules Governing Critical Infrastructure Industry Fixed Service Operations in the 14.0-14.5 GHz Band*, Order, 28 FCC Rcd 7051, 7054-55 (¶ 10) (OET, WTB and IB 2013).

harmful interference of multiple CBSDs.”<sup>16</sup> Sony attached an analysis calculating aggregate interference to FSS earth stations,<sup>17</sup> using a methodology comparable to that employed by SIA.<sup>18</sup> Sony, however, used different channel bandwidths, interference protection criteria, and other input parameters, including assuming a 40 degree FSS elevation angle. Sony purported to show that its proposed method to account for aggregate interference could result in higher operating power levels for CBRS devices.<sup>19</sup> Sony’s parameter choices tend to unrealistically downplay the interference susceptibility of FSS earth stations. Its calculations assume a relatively low level of CBRS deployment (50 devices), best case FSS operating parameters such as elevation angles, and arbitrary protection distances of 3, 6, and 9 km. As the SIA analysis showed, however, even a single CBRS device at the Commission-proposed power levels could cause interference at larger distances than 9 km.<sup>20</sup> Moreover, the expected level of deployment will likely be significantly larger than 50 devices,<sup>21</sup> and thus the power levels calculated by Sony would need to be much lower to account for the larger number of devices.

Nokia suggests that the Commission should allow for negotiation between CBRS users and FSS earth station licensees to individually coordinate operations within protection zones.<sup>22</sup> SIA does not agree. It is not clear how or even whether such an option would work as a

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<sup>16</sup> Comments of Sony Electronics Inc. filed July 14, 2014 (“Sony FNPRM Comments”) at 5. *See also* Motorola Solutions FNPRM Comments at 10 (recognizing the need to “compute the combined interference effects on incumbent [FSS] receivers . . . from multiple CBSDs”).

<sup>17</sup> *See* Annex to Sony FNPRM Comments.

<sup>18</sup> *See* RKF Report at 8-11.

<sup>19</sup> *See* Annex to Sony FNPRM Comments at 1.

<sup>20</sup> *See* RKF Report at 3-8.

<sup>21</sup> RKF Report, Appendix, Section 2.

<sup>22</sup> Comments of Nokia Solutions and Networks US LLC filed July 14, 2014 (“Nokia FNPRM Comments”) at 11. *See also* WISPA FNPRM Comments at 20.

practical matter when it comes to large numbers of mobile CBRS devices, or how such agreements would be incorporated into an SAS.

The Wi-Fi Alliance expresses concern about “excessive protection” of FSS earth stations,<sup>23</sup> but mischaracterizes the regulatory situation. Specifically, the Alliance argues that 3.5 GHz earth stations should be entitled to protection only if they are for intercontinental use.<sup>24</sup> But the requirement for intercontinental operation is a licensing eligibility requirement for an earth station in this band, so all the identified FSS earth stations either meet this limitation or have had this restriction waived for good cause shown.<sup>25</sup> Given the Commission’s stated goal to protect incumbent operations, there is no good reason to remove protection for earth stations for which a waiver of the intercontinental operations requirement has been granted. Nor is there reason to preclude grant of a future waiver provided good cause is shown.

A few parties suggest that rather than establishing fixed protection zones, the Commission should rely on the SAS to determine whether, and at what power level, an individual CBRS device should be permitted to transmit.<sup>26</sup> However, as discussed below in Section III, the record establishes that significant work remains to be done to develop and validate such a complicated database functionality. An SAS using existing technology would not be capable of making such determinations.

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<sup>23</sup> Wi-Fi Alliance FNPRM Comments at 12.

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

<sup>25</sup> *See, e.g., Comsat Corp. d/b/a COMSAT Mobile Communications et al.*, Memorandum Opinion, Order and Authorization, 16 FCC Rcd 21661, 21706, ¶ 91 (2001) (waiving the international requirement for certain extended C-band earth stations communicating with Inmarsat satellites).

<sup>26</sup> *See* Comments of Pierre de Vries filed July 14, 2014, corrected July 29, 2014 (“Pierre de Vries FNPRM Comments”) at 4; Wireless Innovation Forum FNPRM Comments at 5-7.

**B. Commenters Recognize the Need for Protection Zones to Prevent Harmful Adjacent Band Interference**

The SIA comments also provided a technical analysis regarding protection of FSS earth stations, including the thousands of facilities operating in the conventional C-band, from adjacent-band interference.<sup>27</sup> SIA explained that the dominant adjacent-band interference issue is out-of-band emissions (“OOBE”) from CBRS transmitters, which cannot be ameliorated by filters installed on the FSS earth station receiver.<sup>28</sup> SIA demonstrated that a combination of protection zones and OOBE limits would be necessary to prevent such interference, and that the stricter the OOBE limit is, the smaller the separation distances needed to prevent interference will be.<sup>29</sup>

Other parties agree that effective adjacent-band interference protection is essential. The National Cable & Telecommunications Association (“NCTA”), for example, explains that conventional C-band satellite networks “are an essential component of the infrastructure used by the cable industry to distribute programming to the tens of millions of cable customers in the United States.”<sup>30</sup> Similarly, National Public Radio, Inc. (“NPR”) notes that “public radio is completely dependent upon access to C-band spectrum for the distribution of programming,” and preventing interference from CBRS is therefore “absolutely essential to avoid disruption to public radio broadcast services on which millions of listeners rely each day.”<sup>31</sup> To prevent interference to conventional C-band operations, NCTA calls on the Commission to rigorously

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<sup>27</sup> SIA FNPRM Comments at 15-19 & RKF Report at 11-12.

<sup>28</sup> SIA FNPRM Comments at 15.

<sup>29</sup> *Id.* at 15-17.

<sup>30</sup> Comments of the National Cable & Telecommunications Association filed July 14, 2014 (“NCTA FNPRM Comments”) at 3.

<sup>31</sup> Comments of National Public Radio, Inc. filed July 14, 2014 (“NPR FNPRM Comments”) at i.

analyze the technical studies that have been submitted in this proceeding to ensure “that undesirable technical characteristics resulting from any new operations in the 3.5 GHz band (e.g., out-of-band and spurious emissions, undue spectral density, and excessive output power in combination with transmitting antenna directional gain) can be appropriately limited, thereby protecting incumbents from harmful interference.”<sup>32</sup>

NPR confirms SIA’s showing that the critical problem is OOBE – not C-band FSS earth station receivers impermissibly listening outside their authorized band<sup>33</sup> – and that OOBE cannot be solved by FSS earth station filters.<sup>34</sup> Thus, the suggestion of some parties that changing FSS receivers will help address interference issues<sup>35</sup> is groundless. Instead, NPR agrees with the SIA premise that preventing adjacent-band interference requires a “combination of appropriate mask emission limits from [CBRS] devices and geographic separation based on a conservative estimate of path-loss between the [CBRS] devices and an earth station.”<sup>36</sup>

As with in-band interference, some parties suggest that adjacent-band interference can be managed by the SAS on a real-time, dynamic basis.<sup>37</sup> Again, however, the record does not demonstrate that such an approach is feasible, as discussed below.

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<sup>32</sup> NCTA FNPRM Comments at 4.

<sup>33</sup> NPR FNPRM Comments at 3-4 & n.5 (making clear that the “interference concerns expressed by NPR are not dependent on access to spectrum beyond the C-Band allocation for the United States”).

<sup>34</sup> *Id.* at 4 (“NPR’s experience and empirical testing do not support” a claim that C-band earth stations can effectively mitigate interference from CBRS operations by using filters); *see also id.* at 5 (low noise block filters “are ineffective in preventing” interference resulting from spurious CBRS emissions that “fall within the frequency range on which a satellite transponder is received by the C-Band earth station”).

<sup>35</sup> *See* Wireless Innovation Forum FNPRM Comments at 55; Comments of xG Technology, Inc. filed July 14, 2014 at 6.

<sup>36</sup> NPR FNPRM Comments at 5.

<sup>37</sup> *See, e.g.*, Google FNPRM Comments at 24.

**C. Until Disputed Technical Issues Are Resolved, the Size of the Required Protection Zones Cannot Be Determined**

The SIA comments provided illustrative, single-entry protection zone calculations to prevent in-band interference to FSS earth stations based on the power levels proposed in the Notice.<sup>38</sup> SIA also demonstrated that the separation distances needed to prevent single-entry, adjacent-band interference to FSS earth stations will be highly dependent on the OOB limits applicable to CBRS operations.<sup>39</sup> These factors are critical to establishing the ultimate required size of protection zones, but they are still very much in dispute.

A number of parties suggest that higher power density levels than those proposed in the Notice should be permitted.<sup>40</sup> Ericsson argues that the Commission should permit macro cells in the 3.5 GHz band<sup>41</sup> and observes that the “current proposed power limits are too low” to accommodate such operations.<sup>42</sup> Other parties complain that the proposed power limits are too

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<sup>38</sup> SIA FNPRM Comments at 7-8 & RKF Report at 3-8.

<sup>39</sup> SIA FNPRM Comments at 16-18 & RKF Report at 11-12.

<sup>40</sup> *See, e.g.*, Comments of Alcatel-Lucent filed July 14, 2014 (“Alcatel-Lucent FNPRM Comments”) at 12; Comments of CTIA – The Wireless Association® filed July 14, 2014 (“CTIA FNPRM Comments”) at 9; Google FNPRM Comments at 25-26; Motorola Mobility FNPRM Comments at 8-9; Motorola Solutions FNPRM Comments at 5; Pierre de Vries FNPRM Comments at 5; Comments of T-Mobile USA, Inc. filed July 14, 2014 (“T-Mobile FNPRM Comments”) at 12; Wireless Innovation Forum FNPRM Comments at 56.

<sup>41</sup> Ericsson FNPRM Comments at 10 (“the Commission should support a number of use cases including small cells, backhaul, and, where appropriate, macrocells”). *See also* Comments of 4G Americas filed July 14, 2014 (“4G Americas FNPRM Comments”) at 1 & 8.

<sup>42</sup> Ericsson FNPRM Comments at 10.

low to support rural operations<sup>43</sup> or outdoor base stations<sup>44</sup> or that the power limits should be increased to match applicable limits in other spectrum.<sup>45</sup>

These commenters simply ignore the logical consequences of higher permissible power levels: a greater likelihood of interference to federal radar and FSS earth station operations and increased separation distances needed to prevent such interference. As Sprint correctly observes, “[w]hile some parties have called for higher power levels under Part 96, the trade-off is likely even larger exclusion zones, something that would make the 3.5 GHz band even less usable.”<sup>46</sup> Similarly, QUALCOMM recognizes that in coastal areas, even the currently proposed rural power limit of 47 dBm EIRP “could cause interference to incumbent systems and should not be allowed.”<sup>47</sup>

A similar disconnect is evident with regard to OOB limitations. Many CBRS proponents oppose strict OOB limits but fail to recognize that relaxed OOB standards will necessitate larger separation distances to prevent adjacent-band interference both to FSS earth stations in the conventional and extended C-band as well as to sensitive Department of Defense radar systems. AT&T, ENTELEC, Motorola Mobility, and Motorola Solutions all endorse the typical OOB limit of  $43 + 10 \log(P)$ , claiming that more stringent limits are unnecessary.<sup>48</sup>

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<sup>43</sup> WISPA FNPRM Comments at 10.

<sup>44</sup> Verizon Comments filed July 14, 2014 (“Verizon FNPRM Comments”) at 7-8.

<sup>45</sup> Nokia FNPRM Comments at 17 (CBRS transmit power limits should align with the requirements for 3GPP bands 42 and 43); Comments of the Telecommunications Industry Association filed July 14, 2014 (“TIA FNPRM Comments”) at 6.

<sup>46</sup> Comments of Sprint Corporation filed July 14, 2014 (“Sprint FNPRM Comments”) at 5 n.14.

<sup>47</sup> Comments of QUALCOMM Incorporated filed July 14, 2014 (“QUALCOMM FNPRM Comments”) at 13.

<sup>48</sup> Comments of AT&T filed July 14, 2014 (“AT&T FNPRM Comments”) at 47; Comments of ENTELEC filed July 11, 2014 (“ENTELEC FNPRM Comments”) at 13-14; Motorola Mobility FNPRM Comments at 9; Motorola Solutions FNPRM Comments at 7.

But as Alcatel-Lucent points out, experience in other bands highlights the disadvantages of lax emission standards. Specifically, Alcatel-Lucent notes that Wi-Fi devices in the ISM and U-NII bands have widely varying spectral mask compliance, and the “often low-cost designs of these devices results in transmit signals with emission spectra that pollute many channels adjacent to [the] channel of operation.”<sup>49</sup>

As NPR correctly emphasizes, the moving-target nature of the technical proposals in this proceeding makes it impossible for concerned parties to accurately assess the interference risks they may face and evaluate appropriate mitigation strategies.<sup>50</sup> In this regard, SIA observes that many of the core questions about the protection of Department of Defense radar systems through exclusion zones and frequency offsets are not proposed directly to be answered in the Notice.<sup>51</sup> It is imperative that these technical issues be resolved successfully, and that the resulting conclusions be taken into appropriate account in any final resolution of the protection issues for FSS earth stations.

Ultimately, supporters of 3.5 GHz CBRS simply cannot have it both ways. Their calls for increases in the allowed power density and for relaxation of OOB limits are fundamentally at odds with their stated desire to shrink the protection zones needed to protect federal radar systems and FSS earth station receivers.

#### **D. Significant Questions Remain Concerning Protection Zone Enforcement**

SIA has repeatedly emphasized that devising appropriate protection zones is only part of the solution to avoiding harmful interference to FSS earth stations – the Commission

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<sup>49</sup> Alcatel-Lucent FNPRM Comments at 13.

<sup>50</sup> NPR FNPRM Comments at 9.

<sup>51</sup> *See, e.g.*, Notice at ¶¶ 139-141 and proposal for new footnote US433.

must also have in place reliable mechanisms to enforce those zones.<sup>52</sup> The record in response to the FNPRM reinforces SIA's concern with respect to these issues.

In particular, SIA observed that to prevent a CBRS device from transmitting while it is inside a protection zone, the SAS needs to have detailed, accurate, and near-real-time information regarding the position of the CBRS device.<sup>53</sup> Because the Commission proposes to allow mobile CBRS devices, SIA noted that positions can change rapidly within a short period of time.<sup>54</sup> Accordingly, SIA opposed the Commission's proposals to require CBRS devices (both base stations and end user devices) to report their location only at 60 second intervals and to permit another 60 seconds for a device to respond to an SAS command to terminate transmissions or switch frequencies if it has crossed the line into a protection zone.<sup>55</sup>

The comments suggest, however, that even the geo-location standards and timing proposed in the FNPRM are not achievable. AT&T, for example, states that it "is unaware of any feasible technology to meet the horizontal and vertical accuracy requirements proposed in Section 96.36(a)."<sup>56</sup> Furthermore, AT&T alleges that even if an indoor CBRS "device can obtain a GPS location fix, AT&T believes that in many cases this would take longer than the 60 seconds proposed by the FCC."<sup>57</sup> To the contrary, AT&T explains that "[i]n enterprise environments, that could include urban canyons or other difficult locations for GPS functionality,

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<sup>52</sup> *See, e.g.*, SIA FNPRM Comments at 7.

<sup>53</sup> *Id.*

<sup>54</sup> *Id.* at 8 & n.24.

<sup>55</sup> *Id.* at 8 & 10.

<sup>56</sup> AT&T FNPRM Comments at 40. *See also* CTIA FNPRM Comments at 10 (the Commission's "proposed geo-location reporting accuracy standards for 3.5 GHz devices are not feasible"); Motorola Solutions FNPRM Comments at 4-5 ("the proposed elevation accuracy of +/- 3 meters exceeds the capability of many GPS solutions"); T-Mobile FNPRM Comments at 15 (the "+/- 3 meters elevation requirement is simply not consistent with current technology").

<sup>57</sup> AT&T FNPRM Comments at 40.

AT&T's experience has shown that GPS location fixes can take even longer than 5 minutes.”<sup>58</sup>

AT&T also expresses concern about how CBSDs will know that their location has changed, arguing that requiring CBSDs to continually poll GPS would raise additional implementation issues: “For mobile CBSDs, the number of consistent GPS location fixes will greatly reduce battery life and, given the amount of time it generally takes to get a location fix, may still not provide the level of accuracy sought by the Commission in any event.”<sup>59</sup>

AT&T, however, fails to recognize that the inadequacy of existing geo-location technology makes it impossible to rely on geo-location to enforce protection zones for FSS earth stations and Defense Department radar receivers. AT&T argues that the Commission should adopt geo-location requirements “based on currently available technology and not future capabilities that have not been shown to be commercially feasible.”<sup>60</sup> For the time being, AT&T contends that the Commission should “require that there be geo-location and reporting, but defer on specifics.”<sup>61</sup> Such a toothless approach, however, would completely defeat the purpose of having geo-location accuracy and reporting requirements and place FSS earth stations and other incumbent services at an unacceptable risk of suffering service-threatening interference. As SIA has shown, even under the standards proposed in the Notice, a mobile CBRS device could travel a significant distance without reporting its location change to the SAS.<sup>62</sup> If the proposed standards cannot be achieved, the Commission must determine another method for protecting primary services – it cannot simply defer or ignore the issue.

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<sup>58</sup> *Id.* at 41.

<sup>59</sup> *Id.*

<sup>60</sup> *Id.*

<sup>61</sup> *Id.* at 42.

<sup>62</sup> SIA FNPRM Comments at 8 n.24 (observing that a mobile CBSD in a car travelling at 65 miles per hour would move over a mile in a minute).

Another commenter, iPosi, claims that it has developed a technology to permit accurate location determination, even for CBRS devices located indoors, but states that “obtaining a final position of greatest accuracy may take *several hours*.”<sup>63</sup> It goes on to recommend that “nomadically deployed CBSDs that are moved from the initial installation simply be allowed any amount of time necessary to re-register” with an estimated new location before being allowed to transmit.<sup>64</sup> But that does not solve the problem of a CBRS device that begins moving – possibly at a high rate of speed – when it has already been authorized by the SAS to transmit at its previous location. Based on the record regarding geo-location technology, it is unclear how the Commission believes that its proposed SAS could adequately protect incumbent users from experiencing harmful interference. In fact, the lack of geo-location accuracy calls into question whether an SAS can effectively manage interference among CBRS devices in the same or in different tiers.

In addition to issues surrounding geo-location determination and reporting, there are also more basic enforcement issues that must be resolved. AT&T, for example, expresses concern that the Commission is underestimating the difficulty of reporting and resolving interference if it occurs.<sup>65</sup> Similarly, Pierre de Vries argues that issues relating to enforcing protection criteria need more work.<sup>66</sup>

The Commission must also bear in mind transborder issues. As the Notice recognizes, the SAS must be able to enforce international coordination agreements involving

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<sup>63</sup> See Comments of iPosi, Inc. filed July 14, 2014 at 8 (emphasis added).

<sup>64</sup> *Id.*

<sup>65</sup> AT&T FNPRM Comments at 44; *see also id.* at 5.

<sup>66</sup> Pierre de Vries FNPRM Comments at 18.

earth stations in Canada and Mexico.<sup>67</sup> Yet there is no discussion of how as a practical matter the SAS would be able to prevent harmful in-band and adjacent-band interference to foreign earth stations whose parameters are not specified in the Commission’s licensing database. Furthermore, HKT Limited and UK Broadband Limited observe that end users may bring equipment to the U.S. from abroad capable of operating in the 3.5 GHz band that does not comply with the Commission’s regulatory framework.<sup>68</sup> Conversely, a U.S. CBRS device may be taken outside the U.S. Before authorizing CBRS operations, the Commission will need to determine how to prevent such migratory devices from creating harmful interference to authorized 3.5 GHz operations outside their country of operation, and how to enforce its protections when such interference occurs.

**E. The Comments Confirm that Sophisticated Database, Device, and Communications Security Measures Will Be Essential**

SIA also emphasized that proven, effective security of both CBRS devices and their communications with the SAS is of the utmost importance.<sup>69</sup> For example, SIA noted that the Commission must take steps to prevent “spoofing” of the SAS as well as ensuring that user devices cannot be altered to circumvent constraints on their operations.<sup>70</sup> Interactions between

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<sup>67</sup> Notice at ¶ 40 & proposed Section 96.19.

<sup>68</sup> Comments of HKT Limited dated July 14, 2014 (“HKT FNPRM Comments”) at 7 (noting that “arrangements would need to be made to make sure” that user equipment brought into the U.S. from Europe or elsewhere “would remain quiet and not send . . . connection requests that will interfere with other users”); Comments of UK Broadband Ltd dated July 14, 2014 (“UK Broadband FNPRM Comments”) at 7 (same). SIA notes that this issue would appear to be a concern not only for the Commission, but also for any eventual CBRS users (to the extent that the international devices are designed to operate in different technical environments and under potentially inconsistent constraints and conditions).

<sup>69</sup> SIA FNPRM Comments at 13-15.

<sup>70</sup> *Id.* at 14.

devices and the SAS must be secure and comprehensive, and all CBRS devices (including end user devices) must receive instructions directly from the SAS.<sup>71</sup>

Other parties raise similar concerns regarding the critical nature of device and communications security. Verizon, for example, explains that there “are numerous examples in the U.S. and elsewhere of devices whose software or firmware has been altered so that they can disregard the regulatory limitations imposed on their uses.”<sup>72</sup> The Wireless Innovation Forum catalogues the possible threats that must be addressed, ranging “from overt attacks on the physical components to insider attempts to subvert the operational software controlling the components of the systems.”<sup>73</sup> CTIA observes that security technologies must be developed to prevent “rogue or unauthorized emissions” by CBRS devices.<sup>74</sup>

AT&T notes that the SAS will need to have sensitive information regarding federal operations, making data security of key importance.<sup>75</sup> Other commenters express concern about relying on the Internet for communications with the SAS given the risk of hacking and other security issues.<sup>76</sup> Sony notes that if there are to be multiple SASs, communications among the various SAS databases will also need to be secure.<sup>77</sup>

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<sup>71</sup> *Id.* at 13-14.

<sup>72</sup> Verizon FNPRM Comments at 17. *See also* Comments of Cantor Telecom Services, L.P. filed July 14, 2014 at 13 (supporting “the implementation of rigorous security protocols and certification to ensure a secure spectrum environment”).

<sup>73</sup> Wireless Innovation Forum FNPRM Comments at 11.

<sup>74</sup> CTIA FNPRM Comments at 3.

<sup>75</sup> AT&T FNPRM Comments at 32.

<sup>76</sup> Comments of the American Petroleum Institute filed July 14, 2014 (“API FNPRM Comments”) at 11 (a reliable Internet connection simply does not exist in some remote areas served by the energy industry, and in any event “use of the Internet brings inherent cyber security risks that are unacceptable in certain applications”); ENTELEC FNPRM Comments at 5 (“internet connectivity is not an option or convenient in many remote areas” and even “if the requirement can be facilitated, it would add cost, complexity, and IT security concerns that may render the

Several parties suggest that end user devices should not be required to register directly with the SAS but instead should be permitted to interface with an intermediate proxy,<sup>78</sup> but that is simply adding yet another layer of interaction that may be vulnerable to breaches. Instead, the Commission should refrain from relying on a daisy chain of interaction and require all CBRS equipment to register and communicate directly with the SAS via a secure channel that is not in the band governed by the SAS.

### **III. THE RECORD DEMONSTRATES THAT RELYING ON AN SAS TO PERFORM REAL-TIME SPECTRUM AND POWER ASSIGNMENTS IS INFEASIBLE**

While it will be difficult enough to create an SAS that is capable of enforcing static, pre-defined protection zones, it will be even more difficult to create a complex SAS that can dynamically calculate and enforce separation distances in real-time for individual CBRS devices given the constantly-changing aggregate interference environment and the complications posed by in-motion CBRS devices. Other commenters agree that the functionalities required for such an approach to interference management cannot be implemented at this time.

#### **A. The Required Technology for a Complex SAS Database Is Not Ripe**

Several commenters emphasize the impracticality of relying on the SAS to comprehensively manage the interference environment. For example, AT&T observes that:

it appears that the SAS would not be able to perform real-time interference-mitigation functions that the Commission envisions. Because of high user mobility, to manage

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band ineffective for many use cases”). In contrast, Ericsson suggests that it will be sufficient to rely on “standard Internet security procedures,” Ericsson FNPRM Comments at 22, but does not address the issues of Internet availability and hacking.

<sup>77</sup> Sony FNPRM Comments at 4.

<sup>78</sup> Ericsson FNPRM Comments at 17 (in a “managed network scenario, the SAS should interact at the network management function level within the mobile broadband network instead of at the level of the individual CBSDs”); Google FNPRM Comments at 27; WhiteSpace Alliance FNPRM Comments at 3.

interference, the SAS would need to control and/or determine the operating power and frequency of all the systems in the environment. Because AT&T does not see how all of those parameters could be provided to the SAS within the necessary time constraints, the SAS will not be able to manage interference and therefore could not dynamically provide frequency assignments.<sup>79</sup>

Mobile Future explains that as contemplated by the Commission, the SAS

is a complex spectrum management system, requiring the development and testing of a sophisticated database, the selection of one or more administrators for the system and, eventually, real-world deployment. While the SAS will be similar to the existing (but still nascent) TV White Spaces databases, the existing databases address only a small fraction of the requirements for the SAS. The SAS architectures, concepts, and implementation details must address a multitude of requirements, including: coordination among multiple, competing commercial SAS managing entities; interface definitions, database and protocol security; speed of channel allocation/reallocation; and effectively managing large numbers of GAA users.<sup>80</sup>

Microsoft agrees, noting that although conceptually, dynamic frequency assignment could make highly efficient use of the available spectrum, “there is much work that needs to be done with respect to standards development and other coexistence mechanisms to determine whether such an approach will be practical.”<sup>81</sup> Ericsson observes that “multi-tiered sharing will take considerable time to implement due to the need to solve numerous technical,

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<sup>79</sup> AT&T FNPRM Comments at 18-19 (footnote omitted). *See also id.* at 2 (expressing concern “about the complexity of the new and unprecedented” SAS licensing framework, which will “need to undergo extensive testing and refinement prior to deployment, a process that could be time-intensive given the documented technical challenges”).

<sup>80</sup> Comments of Mobile Future filed July 14, 2014 at 4 (footnotes omitted).

<sup>81</sup> Comments of Microsoft Corporation filed July 14, 2014 (“Microsoft FNPRM Comments”) at 14.

security, and other challenges.”<sup>82</sup> The Wireless Innovation Forum agrees that unlike “in the TV White Space, which was a relatively simple management problem, proper spectrum management of the Citizen’s Band is much more complex due to the multiple tiers of secondary users and the dynamic incumbents in this band.”<sup>83</sup> Southern Company emphasizes the need for a comprehensive approval process to give users of the band confidence “that interference will be avoided or mitigated appropriately.”<sup>84</sup>

One significant obstacle to having the SAS actively manage interference highlighted by SIA and other commenters is the difficulty (and expense) of maintaining accurate propagation models.<sup>85</sup> NPR, for example, notes that because of “re-radiation building clutter,” accurately predicting the interference susceptibility of earth stations is difficult in urban environments.<sup>86</sup> Federated Wireless agrees that developing models with the required accuracy, particularly when accounting for non-line-of-sight (“NLOS”) propagation, would be expensive.<sup>87</sup>

Furthermore, as SIA has repeatedly emphasized, the Commission cannot rely on sensing by CBRS devices to help the SAS protect FSS earth stations from harmful interference.<sup>88</sup>

InterDigital explains that:

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<sup>82</sup> Ericsson FNPRM Comments at i. *See also* 4G Americas FNPRM Comments at 4 (the role of the SAS as envisioned in the Notice “is complex and is unprecedented” and “will require significant development, extensive testing and refinement”); CTIA FNPRM Comments at 3.

<sup>83</sup> Wireless Innovation Forum FNPRM Comments at 9.

<sup>84</sup> Comments of Southern Company Services, Inc. filed July 14, 2014 (“Southern Company FNPRM Comments”) at 7.

<sup>85</sup> SIA FNPRM Comments at 10-22 & RKF Report at 2-3 (noting the difficulty of having up-to-date models of constantly-changing landscapes and the need to take into account multipath propagation in three dimensions to model non-line-of-sight environments).

<sup>86</sup> NPR FNPRM Comments at 8.

<sup>87</sup> Federated Wireless FNPRM Comments at 22 (using “detailed propagation models, particularly in urban NLOS environments” on a nationwide basis “will require a significant investment”).

<sup>88</sup> *See, e.g.*, SIA FNPRM Comments at 13.

Spectrum sensing cannot be used by the CBSDs to detect nearby FSS earth stations, as it is in practice not possible to sense the extremely low level satellite downlink signals with the relatively low gain antennas to be used in the foreseen CBSDs. Furthermore, the geographical coverage of the downlink FSS signals can be very large, and thus the presence of the signal would not necessarily be an indication of the presence of a FSS [earth station] in the neighborhood.<sup>89</sup>

Thus, the view of some commenters that sensing can help prevent interference to primary services<sup>90</sup> is unfounded with respect to FSS earth station receivers.

Authorizing multiple SAS databases, as a number of parties advocate,<sup>91</sup> would make administration of the CBRS framework even more complicated and less feasible. As Alcatel-Lucent notes, “having multiple SASs adds yet another layer of complexity to the Commission’s proposal that must be proven for the band to be successful.”<sup>92</sup> Furthermore, “[m]ultiple SASs attempting to allocate the same channels could easily create conflicts.”<sup>93</sup> Moreover, each database would have to go through a rigorous validation and approval process – both for independent validity and for cooperative validity.

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<sup>89</sup> InterDigital FNPRM Comments at 14.

<sup>90</sup> *See, e.g.*, Comments of Telcordia Technologies, Inc. d/b/a iconectiv filed July 14, 2014 (“iconectiv FNPRM Comments”) at 7; Comments of Shared Spectrum Company filed July 11, 2014 at 3; Comments of the WhiteSpace Alliance filed July 10, 2014 (“WhiteSpace Alliance FNPRM Comments”) at 2.

<sup>91</sup> *See, e.g.*, Ericsson FNPRM Comments at 16; Google FNPRM Comments at 32; iconectiv FNPRM Comments at 2; Microsoft FNPRM Comments at 12; Motorola Solutions FNPRM Comments at 8; Nokia FNPRM Comments at 16; Comments of Spectrum Bridge, Inc. filed July 14, 2014 (“Spectrum Bridge FNPRM Comments”) at 7; Verizon FNPRM Comments at 15; Wireless Innovation Forum FNPRM Comments at 45.

<sup>92</sup> Alcatel-Lucent FNPRM Comments at 11. *See also* Spectrum Bridge FNPRM Comments at 9 (“The concurrent operation of multiple SAS will add complexity that must be clearly addressed.”).

<sup>93</sup> Alcatel-Lucent FNPRM Comments at 11.

Given the long lead time necessary for development of a robust SAS, a number of parties suggest a transitional approach to introduction of CBRS in the 3.5 GHz band,<sup>94</sup> but the Commission should reject this proposal. If the database technology necessary for the SAS to manage interference protection among various tiers of CBRS users is inadequate, the Commission cannot rely on that technology for the protection of incumbent primary networks including FSS earth stations. Instead, the Commission should not allow any new CBRS devices to be deployed in the 3.5 GHz band until the SAS has been successfully tested and the necessary protections for incumbents are in place. Long-standing FSS and federal radar operations must not be placed at risk while CBRS proponents figure out how they are going to manage interference among themselves.

**B. Many Commenters Oppose Allowing the SAS to Assign Frequencies and Power Levels**

Even if the baseline technology issues discussed above could somehow be solved, there is another obstacle to relying on the SAS to comprehensively manage the interference environment in the 3.5 GHz band. Specifically, an essential element of such an approach is that the SAS must have the flexibility to assign spectrum and determine at what power levels CBRS devices can operate. Yet many CBRS proponents oppose giving the SAS that authority.

ENTELEC, for example, argues that allowing the SAS to dynamically administer frequencies “will detract from the use of this band, similar to why the use of the ‘TV Whitespace’ band has been limited.”<sup>95</sup> T-Mobile contends that “SAS management of licensed spectrum is

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<sup>94</sup> See, e.g., 4G Americas FNPRM Comments at 4; Alcatel-Lucent FNPRM Comments at 2; CTIA FNPRM Comments at 3-4; Ericsson FNPRM Comments at 4; Mobile Future FNPRM Comments at 3-4; QUALCOMM FNPRM Comments at 6; Verizon FNPRM Comments at 11.

<sup>95</sup> ENTELEC FNPRM Comments at 4.

inconsistent with a carrier's ability to control its network.”<sup>96</sup> A number of commenters suggest that allowing dynamic frequency assignment is incompatible with existing standards for LTE or WiMAX.<sup>97</sup>

Thus, it appears that even if the technology were available and verifiable, relying on the SAS to assign frequencies and power levels as contemplated in the Notice would be inconsistent with CBRS proponents' planned uses of the spectrum. Yet these parties do not explain how an SAS without such assignment authority could effectively prevent CBRS operations from interfering with primary services.

#### **IV. THE COMMISSION SHOULD LIFT THE FREEZE ON NEW PRIMARY EARTH STATIONS IN THE 3600-3700 MHz BAND**

In its comments, SIA reiterated the importance of permitting new primary earth station deployments in the 3600-3700 MHz band to allow satellite network operators the necessary flexibility to respond to changed circumstances or new customer demand and to avoid stranded investment in space station capacity.<sup>98</sup> Permitting new *primary* earth station deployments, which are not likely to be numerous or geographically intrusive to CBRS, would be consistent with the *primary* status of the FSS service and the Commission's stated intent of protecting incumbent operations. Any other treatment would confer less than equal status on FSS and inappropriately place the burden of accommodating the new service on the incumbent

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<sup>96</sup> T-Mobile FNPRM Comments at 14. *See also* Verizon FNPRM Comments at 9 (arguing that the “Commission should reject proposals under which operators (in particular, Priority Licensees) would be obligated to permit third party SAS Managers to dynamically manage their transmitter power levels or other radio parameters”); WISPA FNPRM Comments at 30 (WISPA “strongly opposes the Commission’s proposal to allow the SAS to adjust the maximum EIRP of CBSDs”).

<sup>97</sup> 4G Americas FNPRM Comments at 5-6; CTIA FNPRM Comments at 8; HKT FNPRM Comments at 4 (dynamic spectrum access as contemplated under the Notice is not a part of the current WiMAX and LTE-Advanced specifications); UK Broadband FNPRM Comments at 4 (same).

<sup>98</sup> SIA FNPRM Comments at 19-21.

rather than the new service. SIA noted that the CBRS framework should be able to accommodate new FSS operations given the Commission’s stated premise that incumbents and CBRS will “share” spectrum.<sup>99</sup>

Google similarly recognizes that the regulatory regime for CBRS should permit deployment of new facilities under existing primary spectrum allocations, either by federal radar systems or FSS earth station operators.<sup>100</sup> With regard to the latter, Google observes that “deployment of a new FSS ground station in close physical proximity to existing PAL or GAA operations might require PAL or GAA devices to use different frequencies, or even cease use altogether.”<sup>101</sup> In contrast, Motorola Mobility argues that the Commission should refrain from licensing new earth stations in the 3.5 GHz band in order to promote “more robust use of the 3.5 GHz band for CBRS.”<sup>102</sup> Neither Motorola Mobility nor the Commission, however, has provided a valid explanation why introducing a new service on a shared basis should block the future development of primary FSS networks, whose operators also desire a “robust use” of their spectrum. As a condition for their access to the 3.5 GHz band, CBRS users should be required to adapt to new FSS earth station deployments.

## **V. THE CBRS FRAMEWORK SHOULD NOT BE EXTENDED BEYOND THE 3.5 GHz BAND**

SIA has emphasized that the Commission should not assume that the approach it develops for the 3.5 GHz band would be suitable for application in other bands or in other countries. In particular, we have argued that the decisions in this proceeding should not affect

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<sup>99</sup> *Id.* at 20.

<sup>100</sup> Google FNPRM Comments at 30.

<sup>101</sup> *Id.*

<sup>102</sup> Motorola Mobility FNPRM Comments at 15-16.

the positions the Commission advocates for the U.S. to take at WRC-15 for the 3400-4200 MHz band.<sup>103</sup> In addition, we have opposed extending the CBRS approach to the adjacent 3650-3700 MHz spectrum.<sup>104</sup>

Other parties concur that the proposed rules for CBRS are not an appropriate model for other spectrum. The Telecommunications Industry Association cautions that:

although the Commission hopes the rules adopted here will provide a model that can “ultimately be expanded to other bands,” there is reason for pause. Every spectrum band – including the 3.5 GHz band – will present unique opportunities and challenges, and the set of rules proposed in the FNPRM is in many ways an open-ended experiment. TIA urges the Commission to approach spectrum sharing scenarios in any given band on a case-by-case basis.<sup>105</sup>

Because the factors affecting sharing feasibility differ significantly from band to band, the suggestion of some parties that the CBRS regime can be applied in other spectrum<sup>106</sup> is unfounded.

Most commenters addressing the issue also agree with SIA’s position that the Commission should not apply the CBRS framework to the 3650-3700 MHz band. These parties argue that imposing an untested regulatory regime would unnecessarily complicate the existing spectrum sharing structure in that band, strand investment by existing operators, and increase the potential for harmful adjacent-band interference to conventional C-band FSS earth stations.

The record indicates that a number of critical services and significant facility investments would be adversely affected if the Commission extends the CBRS regime to the

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<sup>103</sup> See, e.g., SIA FNPRM Comments at 21-22.

<sup>104</sup> *Id.*

<sup>105</sup> TIA FNPRM Comments at 8. See also Comments of EchoStar Satellite Operating Company and Hughes Network Systems, LLC filed July 14, 2014 at 1 & 3.

<sup>106</sup> See, e.g., InterDigital FNPRM Comments at 4; Microsoft FNPRM Comments at i; Nokia FNPRM Comments at 9; Wi-Fi Alliance FNPRM Comments at i.

3650-3700 MHz band. For example, energy industry commenters observe that implementation of smart grid technologies could be thwarted.<sup>107</sup> The American Petroleum Institute argues that the “Commission should not forget that its 3.5 GHz band proposal is largely an experiment,” and “should restrain the impulse to pull the rug out from licensees that invested in the already successful 3.65 GHz band in favor of an unproven technology.”<sup>108</sup> The Utilities Telecom Council agrees, contending that “the public interest in the safety and reliability of essential electric, gas and water services outweighs any marginal benefits that would be gained by merging the 3.65 GHz band with the 3.5 GHz band.”<sup>109</sup>

Providers of backhaul to wireless carriers emphasize that changing the regulatory scheme in the 3650-3700 MHz band would be disruptive to their operations.<sup>110</sup> Sacred Wind Communications explains that it serves as the telecommunications provider of last resort for many of its customers but that continuing to use the 3650-3700 MHz band to provide these services “would be untenable” under the CBRS framework.<sup>111</sup> Telrad notes that in many cases the deployment of telecommunications equipment in the 3650-3700 MHz band has been

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<sup>107</sup> *See, e.g.*, Comments of Great River Energy filed July 14, 2014 at 5; Comments of Oncor Electric Delivery Company LLC filed July 14, 2014 at 4.

<sup>108</sup> API FNPRM Comments at 6. *See also* Southern Company FNPRM Comments at 8-9 (opposing the proposal to reallocate the 3650-3700 MHz band for CBRS because it “would further reduce the amount and kind of spectrum available to utilities for mission critical services”).

<sup>109</sup> Comments of the Utilities Telecom Council filed July 14, 2014 at i.

<sup>110</sup> Comments of Airspan Networks filed July 14, 2014 at 1 (the untested CBRS regime should not be applied to the 3650-3700 MHz band to avoid disrupting incumbents providing backhaul solutions for mobile carriers and wireless ISPs); Comments of Cohere Technologies filed July 14, 2014 at 5 (extending CBRS rules to the 3650-3700 MHz band would be detrimental to Cohere’s efforts to use this spectrum for backhaul applications).

<sup>111</sup> Comments of Sacred Wind Communications, Inc. filed July 14, 2014 at 5. *See also* Comments of the Blooston 3.65 GHz Coalition filed July 14, 2014 at 1-2 (providers of “high-quality broadband fixed and mobile services primarily in underserved rural communities” urge the Commission “to preserve its existing regulatory approach to 3.65 GHz band operations”).

supported by government funds available for rural broadband, and that if the rules affecting the band are changed, “the hundreds of millions of dollars already invested by American taxpayers to deploy rural broadband will be completely wasted, as the equipment becomes obsolete not technically, but as a result of regulatory action.”<sup>112</sup> NPR emphasizes that it is premature to extend the CBRS framework to the 3.65 GHz band given the uncertainty regarding “the potential interference that may be caused by [CBRS] operations to C-band earth stations.”<sup>113</sup>

A number of commenters support extending the CBRS regime to the 3.65 GHz band,<sup>114</sup> but these parties do not show that the new structure is compatible with existing operations in this band and adjacent spectrum. Accordingly, the Commission should abandon its suggestion that the 3.65 GHz band should be brought within the CBRS framework.

## **VI. ANY MULTI-STAKEHOLDER GROUP CONVENED MUST FAIRLY REPRESENT ALL INTERESTS**

SIA has previously endorsed the Commission’s proposal to convene a multi-stakeholder group to perform a more detailed analysis of the substantial technical and policy issues relating to the CBRS framework and make recommendations to the Commission.<sup>115</sup> The Wireless Innovation Forum has nominated itself to oversee such a group,<sup>116</sup> but its remarks raise substantial questions regarding whether it would do so fairly.

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<sup>112</sup> Comments of Telrad Networks filed July 14, 2014 at 5.

<sup>113</sup> NPR FNPRM Comments at 12.

<sup>114</sup> *See, e.g.*, AT&T FNPRM Comments at 21; Google FNPRM Comments at 19-20; Microsoft FNPRM Comments at 9-10; Nokia FNPRM Comments at 11.

<sup>115</sup> *See* SIA December 2013 Comments at 10; SIA December 2013 Reply Comments at 9.

<sup>116</sup> Wireless Innovation Forum FNPRM Comments at 12-20.

For example, the Forum argues that “the wireless community should be given significant latitude to design the technical protocols and methods,”<sup>117</sup> ignoring the important role of FSS satellite operators and other primary service providers in ensuring that harmful interference to their operations is prevented. Furthermore, under the structure proposed by the Forum, participation would apparently be limited to dues-paying members of the Forum and government stakeholders that would act as advisors.<sup>118</sup> The Forum does not even discuss the need to ensure that satellite industry representatives, who would be directly affected by the decisions of the group, participate in the group’s deliberations.

The Commission cannot rely on a multi-stakeholder group that does not actually represent all the stakeholders. Instead, the Commission must make clear that providers of primary incumbent services will have full participation in any such group.

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<sup>117</sup> *Id.* at 9.

<sup>118</sup> *Id.* at 15-16.

**VII. CONCLUSION**

For the reasons expressed in the prior SIA comments and herein, SIA urges the Commission to protect existing and future FSS earth station operations under any new CBRS regulatory regime. This will require the Commission to: (1) establish and enforce protection zones to prevent both in-band and adjacent-band interference to FSS earth stations; (2) lift the freeze to permit new primary earth stations to be deployed; (3) decline to apply the CBRS framework to the 3650-3700 MHz band or attempt to export it to other spectrum bands; and (4) ensure the fairness and impartiality of any multi-stakeholder group convened to address technical issues.

Respectfully submitted,

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