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

OPPOSITION OF THE SATELLITE INDUSTRY ASSOCIATION TO PETITIONS FOR RECONSIDERATION

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SUMMARY

SIA supports revision of the CBRS rules to strengthen protections against harmful interference to FSS earth stations. Several petitions for reconsideration, however, seek to move the regulatory framework in the opposite direction, increasing flexibility for CBRS licensees without regard to the impact on FSS operations. These requests must be rejected.

First, the Commission must deny proposals to relax OOBE limits. Claims that the adopted limits will be difficult to meet or would unreasonably limit CBRS operations are not supported by the record and ignore the limits' impact on protection of FSS and DoD systems. Similarly, the Commission has already rejected pleas to align the limits with those in the 3GPP standards. The Commission must retain the peak detector methodology for measuring OOBE compliance given the significance of peak emissions to the interference environment.

CBRS proponents also ignore the impact of higher power levels and unlimited antenna heights on the separation distances necessary to prevent harmful interference to FSS. As the Order recognizes, restraining CBRS operational levels has significant benefits in facilitating co-existence and increasing aggregate network capacity.

The record reinforces SIA's concerns regarding the risk of delay in terminating or modifying CBRS transmission in the event of harmful interference. Several petitions suggest that processing of termination requests to protect DoD radar systems will take much longer than the period specified in the rules, casting doubt on whether even the 60-second delay permitted to address FSS interference is realistically achievable.

Finally, the Commission must modify the framework for determining CBSD locations. Experience shows that relying on "professional" installation cannot ensure location accuracy. CBSDs instead must be equipped with a geolocation capability, and if a device cannot meet the vertical accuracy requirements, worst case assumptions must be used to calculate interference.

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The Satellite Industry Association ("SIA"), pursuant to Section 1.429 of the Commission's rules, 47 C.F.R. § 1.429, hereby submits this opposition to the relief requested in certain petitions seeking reconsideration of the Commission's Report and Order in the above-captioned proceeding.[1]

As SIA's own reconsideration petition demonstrates, in order to effectuate its commitment to prevent Citizens Broadband Radio Service ("CBRS") devices in the 3550-3700 MHz band from disrupting primary Fixed-Satellite Service ("FSS") operations in this spectrum and in adjacent bands, the Commission must tighten and strictly enforce the technical parameters for CBRS operations.[2] The requests by some petitioners for additional flexibility for CBRS to operate with greater out-of-band emissions ("OOBE"), higher power levels, and unlimited antenna heights would increase the risk of interference to FSS networks and therefore

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1 *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, GN Docket No. 12-354, 30 FCC Rcd 3959 (2015) ("Order" and "Second Further Notice").

2 Petition for Reconsideration of the Satellite Industry Association, GN Docket No. 12-354, filed July 23, 2015 (the "SIA Petition").

must be rejected. In addition, the suggestion that CBRS devices will require up to ten minutes to vacate spectrum highlights SIA's concerns regarding the Commission's ability to immediately address interference events.

SIA agrees with the National Association of Broadcasters ("NAB") that automatic geolocation capability should be required for CBRS devices rather than allowing a "professional installer" to report device locations. Additionally, if a device cannot meet the Commission's vertical location accuracy requirements, worst case assumptions regarding device location must be used to protect nearby FSS earth stations.

I. THE COMMISION SHOULD STRENGTHEN, NOT WEAKEN, MEASURES TO PROTECT FSS FROM CBRS INTERFERENCE

The SIA Petition demonstrates that the Commission's decisions regarding CBRS technical standards are of critical importance to the interference environment affecting FSS networks and other incumbent services. To avoid a significant increase in the necessary protection distances between CBRS devices and FSS operations, stricter limits are needed on CBRS operations. Requests by other petitioners to make CBRS technical requirements more relaxed are inconsistent with this objective and must be denied.

A. Robust OOBE Limits Are Essential to Minimize Protection Distances

The SIA Petition demonstrates that the OOBE limits adopted in the Order to prevent harmful unwanted emissions into adjacent spectrum are both procedurally defective and substantively flawed.[3] In particular, changes to the band edges at which the strictest OOBE limits come into effect place at risk services provided at the lower edge of the conventional C-band, including both commercial operations and telemetry critical to safe spacecraft operations.

[3] *Id.* at 2-6.

The necessary result of these weakened limits is to significantly increase the separation distances required to protect primary FSS earth stations from harmful interference to more than 15 km – a jump of 11 km.[4]

Requests by some parties to loosen the OOBE limits further, by revising the limits themselves or the manner in which compliance is calculated, must be rejected. As the Order concludes, relaxing the OOBE framework would result in "less spectral efficiency and increased risk of interference to incumbent systems."[5]

1. CTIA and Nokia Have Not Justified Less Stringent OOBE Limits

Two petitioners, CTIA[6] and Nokia,[7] argue that the Commission should allow substantially greater unwanted emissions, but neither provides an adequate rationale for such a change. CTIA expresses concern that licensees deploying 20 MHz LTE channels would be forced "to operate at roughly half-power" [8] to comply with the -25 dBm/MHz OOBE limit, and urges the Commission to apply that limit only at frequencies more than 20 MHz outside each channel. CTIA claims the Commission should eliminate altogether the -40 dBm/MHz limit applicable below 3530 MHz and above 3720 MHz.[9]

CTIA's claims are directly contradicted by the record and the Commission's findings in the Order. Having reviewed data from a number of sources, including measurements performed

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4 *Id.* at 8-9 & RKF Engineering Technical Annex.

5 Order, 30 FCC Rcd at 4020, ¶ 189.

6 Petition for Reconsideration of the CTIA – The Wireless Association®, GN Docket No. 12-354, filed July 23, 2015 (the "CTIA Petition").

7 Petition for Reconsideration by Nokia Networks (d/b/a Nokia Solutions and Networks US LLC), GN Docket No. 12-354, filed July 23, 2015 (the "Nokia Petition").

8 CTIA Petition at 5.

9 *Id*. at 5-6.

by the National Telecommunications and Information Administration, the Commission determines that the intermediate -25 dBm/MHz emission limit at frequency offsets of 10 MHz from the channel edge is "reasonably supported by industry standards and existing technologies"[10] and that "adopting this limit will allow for greater spectrum efficiency through shorter coupling distances and reduced interference potential while not having a significant impact on equipment cost."[11] The Order also notes that Motorola Mobility contended that "10 and 20 megahertz channels should not encounter any problems in meeting" the OOBE limits originally proposed by the Commission, including the -40 dBm/MHz limit.[12] The Commission concludes that meeting this limit "appears to be practically realizable with existing state-of-the-art products at little or no added cost."[13]

CTIA also ignores the purpose of the OOBE limits. Discussing the -40 dBm/MHz limit and 20 MHz transition gap, CTIA asserts without foundation that "stringent levels so close to the band edge are unnecessary to protect services in adjacent bands."[14] Notably, CTIA has taken the opposite position when its own members' operations could be the victims of unwanted emissions, arguing for adoption of much more stringent OOBE limits to protect licensed operations.[15] Furthermore, CTIA disregards the Commission's contrary finding that the OOBE framework adopted in the Order "will provide superior protection to FSS and DOD systems as compared to

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10 Order, 30 FCC Rcd at 4019, ¶ 187.

11 *Id*.

12 *Id*. at 4015-16, ¶ 179 & n.403, *citing* Comments of Motorola Mobility in GN Docket No. 12-354, filed July 14, 2014 at 9.

13 Order, 30 FCC Rcd at 4019, ¶ 189.

14 CTIA Petition at 6.

15 *See* Reply Comments of CTIA – The Wireless Association®, ET Docket No. 14-165 et al., filed Feb. 25, 2015 at 7-8.

our original proposal."[16] The SIA Petition confirms that even with the OOBE limits adopted by the Commission, substantial separation distances are needed to prevent CBRS operations from causing harmful interference to FSS earth stations.[17]

Nokia's arguments are similarly unavailing. Nokia observes that the Commission's OOBE limits do not align with the standards for the 3GPP bands 42 and 43.[18] Nokia contends that the Commission should revise its OOBE limits to comply with the 3GPP specifications so that bands 42 and 43 can be used "as is" in the United States.[19] However, the Order expressly rejects the claim made by Nokia and others that the Commission should base its OOBE on the 3GPP standard.[20] Nokia provides no reason why the Commission should revisit that decision.

2. The Commission Should Retain the Peak Measurement for OOBE

The Commission must also reject CTIA's call for a change in the way compliance with the OOBE limits is measured. CTIA observes that the Order requires that OOBE compliance be determined using a peak detector, rather than relying on average power measurements using a root mean square ("RMS") detector.[21] CTIA claims that the Commission's measurement approach will have a significant effect on permissible power levels, noting that "the peak-to-average ratio for emissions from LTE signals can easily exceed 10 db."[22]

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16 Order, 30 FCC Rcd at 4019, ¶ 187.

17 SIA Petition at 8-9.

18 Nokia Petition at 10-11.

19 *Id.* at 12.

20 Order, 30 FCC Rcd at 4016-4018, ¶¶ 180 & 184.

21 CTIA Petition at 6-7.

22 *Id.*

Once again, CTIA fails to take into account the stated purpose of the OOBE limits: to "enable closer proximity of neighboring service operations while still protecting the operations of earth stations in the C-band and [Department of Defense] systems."[23] CTIA makes no attempt to show that revising the measurement for OOBE compliance would be consistent with this objective. To the contrary, ignoring peak emission levels in favor of reliance on average measurements would undermine the prophylactic objectives of the OOBE limits. By CTIA's own admission, the change would allow power increases of 10 dB or more. Because peak emissions can have significant interference effects, the Commission must continue to require use of a peak detector to determine OOBE limit compliance.

B. CBRS Transmission Power Must Be Adequately Restrained

The SIA Petition identifies other measures in the Order that materially increase the potential for harmful interference to FSS networks, including the adoption of a higher maximum EIRP for non-rural Category B Citizens Broadband Radio Service Devices ("CBSDs") and the omission of an antenna height limit for Category B CBSDs.[24] As with the OOBE limits, these rules substantially increase the separation distances that will be required to ensure that FSS operations are not disrupted.

Petitioners who seek even higher CBSD power limits simply ignore the impact of such a change on the interference environment. CTIA, Nokia, Verizon, and WinnForum all advocate across-the-board increases in the maximum power for each category of CBSDs in order to improve the coverage capability of the devices.[25] But as the SIA Petition demonstrates, higher

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[23] Order, 30 FCC Rcd at 4015, ¶ 178.

[24] SIA Petition at 6-7.

[25] *See* CTIA Petition at 7-8; Nokia Petition at 8-9; Verizon Petition for Reconsideration, GN Docket No. 12-354, filed July 23, 2015 ("Verizon Petition") at 3-4; Petition for Reconsideration

power levels necessarily will require greater protection distances to prevent interference to FSS earth stations and other incumbent networks.[26] The petitioners fail to even acknowledge these trade-offs.

WinnForum's endorsement of unlimited antenna heights for Category B CBSDs[27] is similarly misguided. WinnForum expresses concern that a high elevation deployment by a Priority Access Licensee could limit opportunistic co-frequency operations in the vicinity by other CBSDs.[28] Yet WinnForum does not even consider the implications of unlimited CBSD antenna height for co-frequency sharing with FSS networks.

The Commission cannot take such a one-sided approach, ignoring the effect of CBSD transmissions on FSS systems and other incumbent users. Instead, as the Order recognizes, it is important to balance the purported benefits of higher power levels and other increased flexibility for CBSD operations against the costs.[29] In particular, the Commission notes that "lower power limits may lead to greater spatial reuse of the band, reduced coexistence challenges, and increased aggregate network capacity."[30] Requests for greater latitude for CBRS operations are inconsistent with these goals and must therefore be denied.

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of the Wireless Innovation Forum, GN Docket No. 12-354, filed July 2, 2015 (the "WinnForum Petition") at 5-9.

26 SIA Petition at 9.

27 WinnForum Petition at 21-22.

28 *Id.* at 21.

29 Order, 30 FCC Rcd at 4026-27, ¶ 214.

30 *Id.*

II. THE PETITIONS REINFORCE SIA'S CONCERNS ABOUT HOW QUICKLY HARMFUL INTERFERENCE CAN BE ELIMINATED

The SIA Petition highlights a number of issues relating to the enforcement framework put in place by the Order, including those associated with the 60-second delay permitted under the rules for a CBSD to cease transmission, lower its power, or move to another channel as instructed by the Spectrum Access System ("SAS") database administrator.[31] The petition observes that allowing an interference event to go unrectified for as long as 60 seconds could have significant adverse effects on FSS operations, including the potential to undermine safe satellite operations.[32]

Information provided in other petitions casts substantial doubt, however, on the feasibility of meeting even this 60-second benchmark. Specifically, Motorola Solutions, Nokia, and WinnForum all argue that the Commission should increase the required channel vacation period in Section 96.15(b)(4) from 60 seconds to 600 seconds when an incumbent federal radar use is detected.[33] In each case, the rationale for the requested rule change is the same: the parties claim that it is impractical to effectuate a termination order for a large number of CBSDs in a shorter period.[34]

The specific rule section addressed in these petitions does not apply to protection of FSS systems – it addresses only the procedures for clearing a channel when federal operations are detected. Moreover, the petitioners assume that operation of a large number of cells could need

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31 SIA Petition at 11-12, *citing* new Section 96.39(c)(2).

32 *Id.* at 12.

33 Petition for Reconsideration of Motorola Solutions Inc., GN Docket No. 12-354, filed July 23, 2015 ("Motorola Solutions Petition") at 3; Nokia Petition at 4-6; WinnForum Petition at 3-5.

34 *See, e.g.*, Nokia Petition at 5-6.

to be terminated at one time in order to prevent interference to the federal operations. However, even if the number of CBSDs affected by a shut-off requirement is likely to be fewer in the event of interference to an FSS system, there are substantial similarities in the necessary termination process.

For example, Nokia observes that the sources of delay in the context of Section 96.15(b)(4) compliance include: SAS detection processing, proxy suspension request processing, network management system ("NMS") suspension request processing, CBSD suspension request processing, NMS suspension response processing, and proxy suspension response processing.[35] In the event of an interference event affecting reception at an FSS earth station, these same factors would contribute to delay in complying with Section 96.39(c)(2).

Moreover, as the SIA Petition points out, the 60-second window under Section 96.39(c)(2) is not the only reason why necessary steps to rectify interference to an earth station would be slowed. Instead,

> the sixty-second period for responding to commands would be added to the time required by the SAS to make the necessary interference calculations that would lead to its issuing the termination or modification command. If the command is being issued in response to relocation of a CBRS device, Section 96.39(a)(3) permits an additional 60 seconds for the device to determine and communicate its position change. One must also add in the time necessary for communications among SAS Administrators if the CBRS operations in an area are controlled by different SAS providers. The cumulative effect of these delays in addressing interference could be extremely serious.[36]

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35 *Id.* at 5.

36 SIA Petition at 12.

In short, the record confirms SIA's concerns regarding the potential for substantial time to elapse between detection of interference to an earth station and completion of the necessary steps to resolve it, creating significant risks to FSS operations.

III. THE COMMISSION MUST TAKE STEPS TO ENSURE THE ACCURACY OF CBSD LOCATION INFORMATION OR USE WORST CASE ASSUMPTIONS

The SIA Petition notes the satellite industry's concern regarding ensuring that reliable CBSD location information is available to the SAS because "[a]ccurate CBSD location is essential for coordinating interactions between and among users in the band and for protecting Incumbent Users from harmful interference."[37] NAB raises similar issues in its petition and urges the Commission to mandate inclusion of geolocation capability in lieu of reliance on "professional" installation of CBSDs.[38] In addition, NAB and others express doubt regarding whether the location accuracy standards set by the Commission can be met in all instances,[39] and propose the use of worst case assumptions in calculating required separation distances if the necessary level of accuracy cannot be attained.[40]

SIA strongly supports NAB's argument that the Commission should abandon the idea of relying on "professional" installers to ensure the accuracy of CBSD location data. NAB's experience in the context of the television white spaces databases clearly demonstrates that any system relying on non-automated location reporting is inherently subject to abuse and error.[41]

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37 SIA Petition at 13, *quoting* Order, 30 FCC Rcd at4028, ¶ 220.

38 Petition for Reconsideration of the National Association of Broadcasters, GN Docket No. 12-354, filed July 23, 2015 ("NAB Petition") at 5-7.

39 *Id.* at 7-8; *see also* Motorola Solutions Petition at 4; Nokia Petition at 12-14; WinnForum Petition at 9-11.

40 *Id.* at 8; *see also* WinnForum Petition at 11.

41 SIA Petition at 13-15; NAB Petition at 5-7.

Efforts to establish a set of standardized qualifications for such installation may reduce, but certainly will not eliminate, the risk that the SAS database could make device activation decisions based on flawed data. Implementing a geolocation requirement is necessary to prevent mistakes or outright manipulations with respect to critical device location information.

SIA also agrees that if conditions prevent a device from reporting its location with the vertical position accuracy required by the Commission, worst case assumptions regarding device location must be employed in SAS calculations. SIA recognizes that complying with the requirement to specify elevation to an accuracy of +/- 3 meters may be challenging, particularly with respect to devices located indoors where GPS data may not be reliably available. However, given the importance of a device's vertical position in calculating the potential for harmful interference, simply relaxing the accuracy requirements and allowing the SAS to "estimate" or "compute" a device's elevation is not an acceptable solution.[42] Instead, if a device's elevation cannot be independently established, a larger separation distance should be required to account for the uncertainty.[43] For example, as WinnForum points out, if the SAS lacks information about what floor of a building a CBRS device is on, "then the highest floor in the building" must be used in SAS calculations.[44]

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42 *See* Nokia Petition at 14; Motorola Solutions Petition at 5.

43 *See* NAB Petition at 8; WinnForum Petition at 11.

44 WinnForum Petition at 11.

IV. CONCLUSION

For the reasons discussed herein and in the SIA Petition, the Commission should revise the CBRS rules to ensure protection of FSS networks.

Respectfully submitted,

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October 19, 2015

CERTIFICATE OF SERVICE

I hereby certify that on this 19th day of October, 2015, a copy of the foregoing "Opposition of the Satellite Industry Association to Petitions for Reconsideration" is being sent by first class, U.S. Mail, postage paid, to the following:

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