

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554**

In the Matter of: )  
)  
Amendment of Parts 2 and 25 of the ) IB Docket No. 07-101  
Commission's Rules to Allocate Spectrum )  
and Adopt Service Rules and Procedures to )  
Govern the Use of Vehicle-Mounted Earth )  
Stations in Certain Frequency Bands )  
Allocated to the Fixed-Satellite Service )

To: The Commission

**REPLY COMMENTS OF THE SATELLITE INDUSTRY ASSOCIATION**

The Satellite Industry Association (“SIA”), pursuant to Section 1.415 of the Commission’s Rules, 47 C.F.R. § 1.415, hereby submits these Reply Comments in response to the comments that were submitted on the Commission’s Notice of Proposed Rule Making in the above-captioned proceeding.<sup>1</sup> In the *NPRM*, the Commission proposes to establish rules and policies that would apply to the licensing and use of vehicle-mounted earth stations (“VMESs”) in certain Ku-band frequencies allocated to the fixed-satellite service (“FSS”), including additions to the Table of Frequency Allocations in Part 2 of the Commission’s Rules.<sup>2</sup>

SIA filed comprehensive Comments addressing the VMES regulations proposed by the Commission, and the other issues on which the Commission invited comments in the *NPRM*. It urged the Commission to employ a flexible regulatory approach – one that does not favor one

---

<sup>1</sup> The comments to which SIA responds here were filed by The Boeing Company (“Boeing”), SES Americom, Inc. and Americom Government Services (“SES Americom”), Maritime Telecommunications Network, Inc. (“MTN”), Raysat Antenna Systems, LLC (“Raysat”), ViaSat, Inc. (“ViaSat”), the National Spectrum Managers Association (“NSMA”), General Dynamics Corporation (“General Dynamics”), the Association of Public Television Stations and the Public Broadcasting Service (“APTS/PBS”), ARINC, Incorporated (“ARINC”), the Fixed Wireless Communications Coalition (“FWCC”), the National Academy of Sciences’ Committee on Radio Frequencies (“CORF”), and the National Radio Astronomy Observatory (“NRAO”).

<sup>2</sup> *Amendment of Parts 2 and 25 of the Commission’s Rules to Allocate Spectrum and Adopt Service Rules and Procedures to Govern the Use of Vehicle-Mounted Earth Stations in Certain Frequency Bands Allocated to the Fixed-Satellite Service*, FCC 07-86, Notice of Proposed Rule Making (released May 15, 2007) (“*NPRM*”). The Commission’s proposal does not encompass the 10.7-10.95 GHz and 11.2-11.45 GHz portions of the extended Ku-band downlink band. See *NPRM*, FCC 07-86, at ¶ 28 n. 59.

technology over another – as it ensures that VMESs are operated within the two-degree spacing regime that today’s very small aperture terminal (“VSAT”) networks employ for the delivery of a multitude of Ku-band FSS services and applications. SIA is pleased to note that all of the commenters either actively support establishing VMESs as a primary application within the FSS allocation in Ku-band, or at least do not oppose the authorization of properly-conditioned VMESs within the FSS.

In these Reply Comments, SIA focuses on several issues that were raised by various parties in the initial comments. It offers views that are intended to help the Commission proceed expeditiously to establish VMESs as a vital new component of the FSS industry in the United States.

## **DISCUSSION**

### **A. The Commission Should Reject Proposed Approaches to Protection of Adjacent Satellites and Users that Are Not Technology Neutral.**

One of the central themes of SIA’s Comments is that the Commission should fulfill its commitment to adopt regulations that protect FSS satellites adjacent (and near adjacent) to the target satellite associated with a VMES from VMES-caused interference in a technology-neutral fashion.<sup>3</sup> Consistent with a technology-neutral approach, the Commission should give VMES applicants flexibility to allow licensing of VMESs that do not meet both the mask and pointing accuracy requirements of Proposed Rule 25.XXX, but only if the applicants demonstrate that the combination of off-axis E.I.R.P. density and pointing accuracy they seek to employ will provide the equivalent degree of protection to adjacent satellites, to users of that capacity, and to the tens of millions of customers nationwide who rely daily on Ku-band FSS services.<sup>4</sup>

---

<sup>3</sup> SIA Comments at 5-6, 15.

<sup>4</sup> Similar views were expressed by several other commenters. *See, e.g.*, NSMA Comments at 6; RaySat Comments at 2.

Some of the parties that support flexibility for VMES have made proposals to the Commission that may inadvertently favor some technologies over other equally efficient technologies. General Dynamics, eager to move immediately into regular licensing with its military-grade terminals, called upon the Commission to strictly apply to VMESs the technical regulations in Section 25.222 of the Commission's Rules for earth stations on board vessels ("ESVs"), and to treat all terminals that do not comply with the letter of those rules as non-routine (i.e., licensable only upon submission of a coordination agreement, as under Section 25.220(c)(2) of the Commission's Rules).<sup>5</sup> Any deviation from the ESV technical rules would require thorough testing and validation.<sup>6</sup> On the other end of the continuum is ViaSat, which appears to contend that so long as spectrum spreading is employed, there is no need to consider pointing accuracy at all – compliance with the required protection criteria will be presumed.<sup>7</sup> This may be true for the type of spread-spectrum system ViaSat describes (one that operates at high chip rates, with wide signal spreading), but there are other types of spread spectrum systems that use lower chip rates and less signal spreading. In those systems, pointing accuracy will still be relevant. SIA's flexible approach– which would allow applicants to demonstrate how the particular combination of off-axis E.I.R.P. density and pointing accuracy they propose provides protection equivalent to the mask in Proposed Rule 25.XXX(a) with a pointing accuracy of +/- 0.2 degrees – is between these two extremes.

In several instances, commenters argued for the application of specific technical regulations to VMESs that would ostensibly protect adjacent satellite operations, but that would promote or deter a specific technical approach at the expense of the principle of technology neutrality. General Dynamics, for instance, appears to demand a rigorous validation and testing approach for one

---

<sup>5</sup> General Dynamics Comments at 3-4, 30.

<sup>6</sup> *Id.* at 38.

<sup>7</sup> ViaSat Comments at 8-9.

variant of the  $10 \cdot \log(N)$  rule that it discussed in its comments.<sup>8</sup> Requiring a rigorous validation mechanism for each variation on the rule – even for one that ostensibly corrects some known shortcomings in the rule itself<sup>9</sup> – seems to be contradictory to the underlying purpose. To the extent that alternatives may be demonstrated by proponents to provide the same protections to adjacent satellite operators and users (and not demand additional protection themselves), they should be permitted.<sup>10</sup>

In a similar vein, SIA notes that there may be some current validity to the observation from MTN that very small VMES terminals will need to employ some form of spectrum spreading in order to meet VSAT standards.<sup>11</sup> It is not clear to SIA, however, that as the sole consequence of this observation, the Commission should adopt a regulation mandating the use of spectrum spreading for small VMES antennas. Again, any application filed today for a small antenna will necessarily specify spectrum spreading. It may be the case, however, that in a few short years, alternatives may emerge as the state of the technical art advances. It would only slow the advance of technology if an applicant were required to modify or seek a waiver of a rule requiring “spectrum spreading” before being able to deploy its new antenna; it makes more sense to allow the applicant to demonstrate protection under the technology-neutral provision SIA advocates.

Providing operators with an opportunity to make a technical demonstration, without having to rewrite or waive a regulation, is a real advance that can be implemented today without compromising protection of adjacent satellites or their customers. While it may take a bit more

---

<sup>8</sup> See General Dynamics Comments at 36-38.

<sup>9</sup> ViaSat, for example, correctly notes that the  $10 \cdot \log(N)$  rule limits flexibility by assuming that all of the carriers to be summed are identical in terms of their operating frequency and time of transmission. See ViaSat Comments at 17-18. SIA made essentially the same point in its Comments. SIA Comments at 16-17.

<sup>10</sup> By “demonstrate,” SIA contemplates a showing, supported by a technical annex and a declaration, in an earth station application. SIA does not believe that it will be necessary in every case, or even in the ordinary case, for such an applicant to produce a rigorous test and validation methodology of the type General Dynamics seems to believe is required to consider a variant on the  $10 \cdot \log(N)$  rule. See *id.* at 38.

<sup>11</sup> See MTN Comments at 7.

effort on the part of the Commission, applicants, and operators of satellite systems and networks, the approach should pay dividends in terms of improving the efficient use both of the orbital/spectrum resource and the regulatory process.

**B. The Commission Should Not Prohibit or Unduly Restrict VMES Operations in the 14.47-14.50 GHz Band.**

SIA urges the Commission to reject the call of CORF to prohibit all VMES transmissions in the 14.47-14.5 GHz band nationwide to protect a handful of radio astronomy sites during those limited periods when observations are being conducted.<sup>12</sup> CORF appears to be operating under the mistaken impression that Note US203 to Section 2.106 of the Commission's Rules supports or even compels this drastic measure. It most certainly does not. Indeed, CORF appears implicitly to presume that harmful interference to radio astronomy will result from the mere co-frequency operation of VMESs, as it presented no interference analysis or even technical information.

In its Comments, SIA supported the application to VMESs of the condition on ESVs in the same band that is found in Section 25.222(e) of the Commission's Rules, 47 C.F.R. § 25.222(e). That rule protects three specific radio astronomy sites in the Virgin Islands, Puerto Rico, and Hawaii through a condition requiring coordination with the National Telecommunications and Information Administration ("NTIA") for ESV operations within 45-125 km of the respective sites. SIA argued for rejection of the Commission's proposal to extend the coordination obligations regarding radio astronomy sites to a 160 km zone around the six additional radio astronomy sites that are listed in Note US203 to Section 2.106 of the Commission's Rules.<sup>13</sup>

As SIA noted in its Comments, and contrary to the impression created by CORF, Note US203 is inapplicable to satellite uplink operations. The regulation calls for the Commission to

---

<sup>12</sup> See CORF Comments at 5-6. NRAO also proposed unspecified exclusion zones for VMESs in the 14.47-14.5 GHz band. See NRAO Comments at 1.

<sup>13</sup> SIA Comments at 11-12. Other commenters also supported the extension to VMESs only of the coordination provision in the ESV rule. See, e.g., NSMA Comments at 4.

make every practicable effort to avoid assigning frequencies to stations “in the fixed or mobile services” in the 14.47-14.5 GHz band. It does not address satellite services – with their very different link geometries – at all. Notably, the Commission did not impose a coordination condition regarding the six sites listed in Note US203 on ESV operations in the same band, and observed instead, quite properly, that radioastronomy “has permissive use of the 14.47-14.5 GHz band.”<sup>14</sup> There is no similar condition to licensing for standard VSAT terminals, which can operate full-time at any location without regard to whether there is a radio astronomy site nearby.

SIA also urges the Commission to reject CORF’s call in the alternative for very specific conditions on VMES operations that are conducted in the 14.47-14.5 GHz band.<sup>15</sup> Proposals for regulations mandating such measures as embedding in the VMES terminals hardware or software that is “reasonably impervious to unauthorized modification by end users” are both vague and unnecessary. In no case should coordination – which SIA maintains needs to be conducted at the Section 25.222(e) sites with NTIA, not directly with radio astronomers or the National Science Foundation – be made a prerequisite to licensing rather than a condition of operation.

Next, SIA opposes CORF’s call for an unprecedented coordination zone around radio astronomy sites for VMES operations in the 14.44-14.47 GHz band to protect radio astronomy from out-of-band emissions (“OOBE”).<sup>16</sup> Once again, CORF provides no justification beyond band proximity for its request, and reflects not at all on the extent of the burden its request would entail. The burden, of course, from both a policy and a practical standpoint would be unprecedented and

---

<sup>14</sup> *Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5/11.7-12.2 GHz Bands*, 20 FCC Rcd 674, 715 (¶ 95 n.245) (2005) (“*ESV Report and Order*”). CORF tries to use its Comments to effect a change in Note US203, as some radio astronomy sites listed in the note do not observe in the 14.47-14.5 GHz band, and other sites not in the note now conduct observations in that band. CORF Comments at 9. While this is not the proper proceeding to consider modifications to Note US203, of course, the fluidity CORF desires argues against imposing a prohibition of use of the band by VMESs or otherwise basing regulations on Note US203.

<sup>15</sup> CORF Comments at 6-8.

<sup>16</sup> *Id.* at 8-9. Curiously, CORF indicates that it needs OOBE protection from VMESs operating in the 14.44-14.47 GHz band only if VMESs are not prohibited from operating in the 14.47-14.5 GHz band. *Id.* at 8.

substantial. As SIA noted in its comments, it expects that VMES terminals will have to meet the unwanted emission requirements of Section 25.202(f) of the Commission's Rules, 47 C.F.R. § 25.202(f). CORF provides no reason to apply to VMESs any more constraining unwanted emission limit than applies to non-mobile earth stations in the FSS.

Finally, CORF argues that VMESs should be restricted to government use only, for the simple reason that such a restriction would likely limit the number of potential interferers.<sup>17</sup> While CORF's logic is straightforward enough, it cannot be allowed to form the basis for a regulatory restriction on VMES use. As SIA stated in its Comments, there is no reason for the Commission to consider artificially limiting VMES use to the military and civil applications that are expected to comprise the bulk of initial VMES deployments – particularly when the VMES terminal acts operationally similar to a standard VSAT terminal.<sup>18</sup> There are many opportunities for non-government users such as satellite news gathering vehicles, disaster recovery organizations, and other commercial or even private users to benefit from VMESs.

**C. Coordination with NASA TDRSS Earth Stations in the 14.0-14.2 GHz Band**

In its Comments, SIA supported the extension to VMESs of the coordination obligation from Section 25.222(d) – i.e., the adoption of a regulation that conditions operations of VMESs in the 14.0-14.2 GHz band within 125 kilometers of Guam and/or White Sands on the completion of coordination through NTIA, and subjects a future possible East Coast U.S. space research station site to the same condition on a prospective basis. Most commenters, notably including the NSMA, supported the viability of a coordination condition as a means of protecting operations of the National Aeronautics and Space Administration's ("NASA") Tracking and Data Relay Satellite System ("TDRSS") earth station sites in New Mexico and on Guam.<sup>19</sup>

---

<sup>17</sup> *Id.* at 9-10.

<sup>18</sup> SIA Comments at 24.

<sup>19</sup> *See, e.g.*, NSMA Comments at 4; RaySat Comments at 5.

There have been some developments with respect to the possible East Coast TDRSS site. On August 17, the deadline for comments in this proceeding, NTIA sent a letter to the Commission's Office of Engineering and Technology announcing NASA's intent to construct a new TDRSS station in the vicinity of Washington, DC, at Blossom Point, Maryland.<sup>20</sup> Unfortunately, Blossom Point, Maryland is not a remote site. It lies within 125 kilometers of the Washington, Baltimore, and Richmond metropolitan areas, and covers most of the surrounding areas from the Blue Ridge Mountains to the Delmarva Peninsula. If NASA and NTIA seek to proceed with the establishment of a TDRSS station at this location, the fact that NTIA confirms in its letter that the receiver RF filtering on the potential new TDRSS station will be improved over the White Sands and Guam facilities will become very important. The smaller the guard band and in-band interference protection the new station needs, the easier it will be to coordinate with the many VMES operators that will want to have access of some kind to the Baltimore-Washington-Richmond corridor for their terminals.

Despite the fact that NASA appears to have selected a location for its new TDRSS station that could pose a very difficult interference environment, where it will face potential interference from many sources other than VMESs, SIA members look forward to the opportunity to engage in constructive coordination discussions with NASA and NTIA to assure the site's protection.

**D. Power Densities in Directions Other than the GSO Plane**

In its Comments, SIA expressed concerns about the suggestion that VMESs should be permitted to operate at greater power densities than the Commission's rules currently permit in directions other than the geostationary satellite orbit ("GSO") plane.<sup>21</sup> SIA noted that VMES

---

<sup>20</sup> See August 17, 2007 Letter, from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, NTIA, to Julius Knapp, Chief, FCC Office of Engineering and Technology, regarding location of future TDRSS earth station. NTIA provided a copy of this letter to SIA, and requested that the letter be widely distributed within the satellite community.

<sup>21</sup> See SIA Comments at 20 (citing *NPRM*, FCC 07-86, at ¶¶ 67-68).

applications were likely to have antennas that are rotationally symmetric, since the antenna must maintain its off-axis gain characteristics no matter the attitude of the vehicle – something that would eliminate the need for any special relaxation in directions away from the GSO plane. SIA also noted that the Commission has proposed starting the mask at 3 degrees off-axis, rather than at 1.25 degrees.<sup>22</sup> Boeing suggested that the Commission adopt this proposal, pending in the Part 25 Streamlining rulemaking proceeding, to start the antenna gain pattern envelope at 3 degrees off-axis from the antenna main lobe, rather than the current 1.25 degrees.<sup>23</sup>

ViaSat and RaySat both call upon the Commission to provide an increased allowance for off-axis E.I.R.P. density away from the GSO arc.<sup>24</sup> Neither ViaSat nor RaySat provide any specifics to their proposals, but both indicate that a Commission failure to make such an allowance will leave VMESs “unduly constrained in favor of NGSO systems that may never be deployed.”<sup>25</sup> SIA reiterates that it supported the Commission’s proposal to relax the antenna gain pattern in the related *Part 25 Streamlining* proceeding. Any relaxation that is adopted there should be applied to VMESs as well. SIA finds, however, that the showings and claims made in support of unspecified relaxations of the limits on one prospective FSS application that could preemptively impact another co-primary FSS application are not compelling. There is insufficient justification for amending the regulations in the manner suggested by ViaSat and RaySat.<sup>26</sup>

---

<sup>22</sup> SIA Comments at 20 n.40.

<sup>23</sup> Boeing Comments at 23 (citing *2000 Biennial Regulatory Review – Streamlining and Other Revisions of Part 25 of the Commission’s Rules Governing the Licensing of, and Spectrum Usage by, Satellite Network Earth Stations and Space Stations*, 20 FCC Rcd 5593, 5656 (Appendix C, Part IV) (2005) (“*Sixth Report and Order and Third Further Notice*”)).

<sup>24</sup> ViaSat Comments at 29; RaySat Comments at 15.

<sup>25</sup> ViaSat Comments at 29; RaySat Comments at 15.

<sup>26</sup> However, it may be possible for VMES applicants to make specific showings regarding increased allowances that could lead to authorization of antennas of the type loosely described by ViaSat and RaySat on a non-interfering basis with regard to future users of the NGSO allocations in the Ku-band FSS frequencies.

**E. Other Matters**

SIA appreciates the comments that were filed by APTS/PBS. These comments vividly present the perspective of the Ku-band satellite customer, and the criticality of ensuring that any action the Commission takes to promote establishment of VMESs in the conventional Ku-band FSS frequencies does not jeopardize or diminish the utility of Ku-band FSS satellite services to millions of direct and indirect beneficiaries of those services nationwide. SIA maintains that the overall approach to VMES establishment and regulation it recommends in its Comments and these Reply Comments will allow the objective stated by APTS/PBS to be achieved in full. The application process provides sufficient opportunity for proposals that may negatively impact existing FSS providers and their customers to be exposed and rejected; the particular safeguards APTS/PBS urge regarding prototype testing, automatic transmitter identification system use, and data provision<sup>27</sup> – though understandably well intentioned – should not be necessary.

**CONCLUSION**

For the reasons discussed in its Comments and these Reply Comments, SIA supports the Commission's proposals to establish a regulatory regime for VMESs.

Respectfully submitted,

SATELLITE INDUSTRY ASSOCIATION

By: Carolyn Tatum Roddy

September 4, 2007

Carolyn Tatum Roddy  
Director of Regulatory Affairs  
1730 M Street, NW  
Suite 600  
Washington, DC 20036

---

<sup>27</sup> See APTS/PBS Comments at 3-4. SIA, of course, has no difficulty with the suggestion that a hub master station (or network control center for stations operated remotely) be held responsible for the operation of VMES terminals. SIA provided a detailed explanation of why it is neither necessary nor appropriate for the Commission to require the use of an automatic transmitter identification system for VMESs in its Comments. See SIA Comments at 24 & n.46.