

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

In the Matter of)
)
Procedures to Govern the Use of Satellite) IB Docket No. 02-10
Earth Stations on Board Vessels in the 5925-)
6425 MHz/3700-4200 MHz Bands and 14.0-)
14.5 GHz/11.7-12.2 GHz Bands)

PETITION FOR CLARIFICATION OR RECONSIDERATION

Pursuant to Section 1.429 of the Commission’s rules,¹ ViaSat, Inc. (“ViaSat”)² respectfully requests that the Commission clarify or reconsider certain aspects of the *Order on Reconsideration* released on July 31, 2009 in this proceeding (“*ESV Reconsideration Order*”).

In the *ESV Reconsideration Order*, the Commission adopted changes to its service rules for earth stations on vessels (“ESVs”) that are intended to provide ESV operators with greater operational flexibility while continuing to ensure that adjacent operations are protected from harmful interference.³ Among other things, the Commission permitted ESV operators to:

- (i) operate systems that do not maintain a 0.2 degree pointing tolerance, provided their operations remain consistent with the Commission’s off-axis EIRP spectral-density (“OAED”) mask; and
- (ii) operate ESV systems that exceed that OAED mask (while maintaining the 0.2 degree

¹ 47 C.F.R. § 1.429.

² ViaSat specializes in satellite and other wireless networking technologies, including technologies used to support mobile applications of the fixed-satellite service. Since ESV service rules were first established in 2005, ViaSat has made substantial investments in developing ESVs and, more generally, technologies in support of mobile applications of the fixed-satellite service. In recent years, ViaSat has applied for and received a license to provide aeronautical-mobile satellite services (“AMSS”), and has participated actively in Commission rulemakings involving AMSS and vehicle-mounted earth stations (“VMES”). ViaSat thus has an interest in the *ESV Reconsideration Order*, given the close ties between the Commission’s ESV rules, new rules for VMES, and forthcoming rules for AMSS.

³ *ESV Reconsideration Order* at ¶ 1.

pointing tolerance), provided the operations have been coordinated with adjacent satellite operators.

ViaSat applauds the Commission's efforts to liberalize the ESV regulatory regime. In order to provide the certainty that is needed to facilitate the continued development of ESV services and technologies, however, certain clarifications or revisions of the new ESV rules are warranted. In particular, the new rules should be revised to specify clearly that: (i) the default 0.2 degree pointing tolerance is a *peak* (rather than a maximum) level; (ii) applicants must specify both *peak* pointing tolerance and *maximum* mispointing levels; (iii) the pointing tolerances specified in the rules encompass both deliberate and non-deliberate antenna misorientation away from the target satellite; and (iv) ESV operators may specify pointing tolerances that vary from the default values *and* exceed the OAED mask—provided that the combined effect has been coordinated with adjacent satellite operators. To address these matters, ViaSat respectfully requests that the Commission make the limited revisions to its new rules proposed in Exhibit A hereto.

I. THE COMMISSION SHOULD CLARIFY THAT THE DEFAULT 0.2 DEGREE POINTING TOLERANCE LEVEL IS A *PEAK* LEVEL

The default 0.2 degree pointing tolerance level set forth in new Section 25.222(a)(1)(ii)(A) carries forward a similar technical requirement found in former Section 25.222(a)(6) of the Commission's rules.⁴ In promulgating that level of pointing tolerance (*i.e.*, "pointing error"), the Commission made clear its intent to be "consistent with the technical parameters contained in [ITU] Resolution 902," which requires operators to maintain a pointing

⁴ See 47 C.F.R. §§ 25.222(a)(6) (2005).

accuracy within 0.2 degrees *peak*.⁵ A “peak” value in this context is commonly understood to be the value three standard deviations above the mean value in a normal distribution (*i.e.*, to represent a degree of mispointing greater than or equal to approximately 99.7 percent of all values in that distribution). Thus, the Commission did not intend the 0.2 degree level to be a maximum, but rather understood that this level would be exceeded only on rare occasions.

Similarly, the default 0.5 degree “shut-down” limit set forth in new Section 25.222(a)(1)(iii)(A) carries forward a similar technical requirement found in former Section 25.222(a)(7) of the Commission’s rules.⁶ Whereas the lower 0.2 degree pointing tolerance level is properly understood as a *peak* level, the higher 0.5 degree “shut-down” limit can be understood as a *maximum* limit on antenna misorientation away from the target satellite.

There is no indication in the *ESV Reconsideration Order* that the Commission intended to change this understanding of the relationship between the pointing tolerance and “shut-down” levels. Yet, the language of new Section 25.222(a)(1)(ii)(B) creates significant ambiguity about the relationship between these levels. Notably, the language in the new rule permits ESV applicants to “declare a *maximum* antenna pointing error . . . greater than 0.2°” provided applicable OAED limits are met.⁷ Unfortunately, this language implies that the default 0.2 degree pointing tolerance level specified in Section 25.222(a)(1)(ii)(A) is a *maximum*, as opposed to a *peak*, level. Such an interpretation would be inconsistent with Resolution 902 and

⁵ See *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 GHz/ 11.7-12.2 GHz Bands*, Report and Order, 20 FCC Rcd 674, at ¶ 104 n.271 (2005).

⁶ See 47 C.F.R. §§ 25.222(a)(7) (2005).

⁷ As discussed in Section IV, *infra*, ESV operators should be permitted to *both* specify pointing tolerances that vary from the default values in Section 25.222 *and* exceed the OAED mask—provided that the combined effect has been coordinated with adjacent satellite operators.

the Commission’s previously stated intention in establishing the original ESV service rules, and also would undermine the apparent basis for maintaining the pointing tolerance and “shut-down” levels at different values.

Accordingly, ViaSat respectfully requests that the Commission: (i) revise Section 25.222(a)(1)(ii)(A) to explicitly state that the 0.2 degree pointing tolerance is a *peak* level; and (ii) revise Section 25.222(a)(1)(ii)(B) to eliminate any implication that the 0.2 degree pointing tolerance is a *maximum* level.

II. THE COMMISSION SHOULD REQUIRE ESV APPLICANTS TO SPECIFY BOTH PEAK POINTING TOLERANCE AND MAXIMUM MISPOINTING LEVELS

New Section 25.222(a)(1)(ii)(B) allows an ESV applicant that wishes to be licensed with a pointing tolerance (*i.e.*, “pointing error”) level in excess of 0.2 degrees peak to specify a higher level of pointing tolerance and demonstrate that operations at this higher level would remain within applicable OAED limits.⁸ For the reasons discussed above, and in order to allow meaningful comparison with the default 0.2 degree peak pointing tolerance level, any higher pointing tolerance value specified under this provision should be described in *peak* terms, rather than as a *maximum* value as currently suggested by the new rules. At the same time, the Commission should be made aware if an applicant proposes to operate with a *maximum* mispointing limit in excess of the default 0.5 degree limit set forth in Section 25.222(a)(1)(iii)(B)—even if the *peak* pointing tolerance remains less than or equal to 0.2 degrees. At bottom, both peak pointing tolerance *and* maximum mispointing values should be specified in order to ensure that each ESV operator *normally* maintains an acceptable pointing tolerance and *never* exceeds a critical upper limit.

⁸ *ESV Reconsideration Order* at ¶ 27.

To ensure that the Commission has all of the information it needs to evaluate ESV applications and monitor ongoing ESV operations, ViaSat respectfully requests that the Commission: (i) revise Section 25.222(a)(1)(ii)(B) by substituting the word “peak” for the word “maximum;” and (ii) revise Section 25.222(a)(1)(iii)(B) to permit an ESV applicant to specify a *maximum* mispointing limit in excess of 0.5 degrees, provided the proposed operations comply with applicable OAED limits, and also to require the applicant to use that maximum mispointing limit as the relevant “shut-down” limit.

III. THE COMMISSION SHOULD CLARIFY THAT “POINTING ERROR” INCLUDES BOTH DELIBERATE AND NON-DELIBERATE FORMS OF ANTENNA MISORIENTATION

Sections 25.222(a)(1)(ii) and 25.222(a)(1)(iii), like former Sections 25.222(a)(6) and (7), regulate antenna mispointing in order to cabin the threat of harmful interference from ESVs into adjacent operations. In the *ESV Reconsideration Order*, the Commission recognizes that “[a]ntenna mispointing may result from the rapid movement of the vessel, a time-lag in the antenna tracking mechanism or an insensitivity of the tracking software to the precise direction of the satellite as seen from the vessel.”⁹ While this list doubtless is intended to be representative and not exhaustive, that the Commission names only *non-deliberate* sources of antenna misorientation creates uncertainty as to whether *deliberate* sources of antenna misorientation are considered to be “pointing error” under the new rules.

Notably, many ESV terminals utilize closed-loop tracking to facilitate accurate pointing toward the target satellite. Closed-loop tracking systems deliberately misorient the antenna around a tracking “loop” in order to determine whether signal strength from the target satellite can be improved. Because signal strength increases with more accurate pointing, if

⁹ *Id.* at ¶ 18.

signal strength can be improved by “mispointing” the antenna toward a given point in space, the system will reorient the antenna toward that point.

Misorientation due to closed-loop tracking or other deliberate system processes has the same potential for causing harmful interference into adjacent operations as non-deliberate forms of misorientation, such as those listed in *ESV Reconsideration Order* and referenced above. However, by omitting any explicit reference to deliberate forms of antenna misorientation, the *ESV Reconsideration Order* increases the risk that ESV applicants and operators will fail to account for and guard against the interference risk that may result from such misorientation. As such, ViaSat respectfully requests that the Commission revise Section 25.222(a)(1)(ii) to clarify that both forms of misorientation can give rise to pointing error under the new rules, and should be accounted for in ESV applications.

An applicant should be permitted to deliberately offset an antenna by more than 0.2 degrees peak in order to facilitate closed-loop tracking (or for other purposes) after: (i) specifying higher pointing tolerance levels to the Commission; and (ii) ensuring the consistency of the proposed operations with applicable OAED limits. Thus, clarifying that pointing tolerance includes both deliberate and non-deliberate antenna offsets would not restrict ESV operations, but would ensure that the Commission, the satellite industry, and the public have more complete information with which to evaluate ESV applications.

IV. THE COMMISSION SHOULD CLARIFY THAT ESV OPERATORS MAY VARY FROM DEFAULT POINTING TOLERANCES AND THE OAED MASK IF THOSE OPERATIONS HAVE BEEN COORDINATED

In the *ESV Reconsideration Order*, the Commission recognized that where ESV operations are successfully coordinated with adjacent satellites at an off-axis power-density level that exceeds the OAED mask, there is “no reason to preclude the earth station from operating at

that [off-axis] power-density level with the particular target satellite that has been coordinated.”¹⁰

The Commission recognized that allowing operations at variance from the OAED mask would:

(i) provide ESV operators with greater operational flexibility while ensuring that adjacent satellite operators are protected from harmful interference; (ii) enable U.S.-licensed ESV operators to compete with foreign competitors in areas of the world where two-degree spacing is not common; and (iii) ensure that ESVs have the operating capacity to provide quality service to their end-users.¹¹ ViaSat fully supports these policy goals.

While the new rules afford operators much-needed flexibility with which to provide innovative services to the public, they stop one step short of providing the full flexibility intended by the *ESV Reconsideration Order*. Specifically, while Section 25.222(a)(2) of the Commission’s rules now permits ESV operators to exceed the OAED mask following coordination with adjacent operators, Sections 25.222(a)(1)(ii)(B) and 25.222(a)(1)(iii)(B) require an ESV network to comply with the mask if an ESV’s antenna pointing tolerances do not comply with the default values in the rules (*i.e.*, 0.2 degrees peak, and 0.5 degrees maximum).

In other words, the new rules force operators to choose between: (i) greater flexibility in the application of the OAED mask; and (ii) greater flexibility in the application of the antenna pointing tolerance levels. ViaSat submits that it is unnecessary to force ESV operators to make such a choice. As the Commission found in the *ESV Reconsideration Order*, where proposed operations have been coordinated, such coordination ensures that adjacent operations will not be harmed, and obviates the need for the Commission to independently conduct an interference analysis. Put differently, there should be no need to continue to require

¹⁰ *Id.* at ¶ 12.

¹¹ *Id.*

rigid adherence to the pointing tolerances in Section 25.222 in order to protect adjacent operations where adjacent satellite operators themselves have found that such protection is unnecessary.

In context, it appears likely that the Commission intended to allow operators to take advantage of both forms of relief simultaneously. That result would be consistent with the intent of the *ESV Reconsideration Order*—namely, to maximize operator flexibility provided harmful interference does not result from such flexibility. Further, that result would be consistent with recent Commission action in the AMSS context, in which the Commission “decline[d] to address . . . arguments concerning adjacent satellite interference”—including significant issues with respect to the applicant’s ability to comply with a 0.2 degree “pointing error” limit—because the applicant had “resolved these interference issues through coordination with potentially affected satellite operators.”¹² All participants in emerging markets for mobile applications of the fixed-satellite service should be entitled to an equivalent level of flexibility.

Accordingly, ViaSat urges the Commission to revise Sections 25.222(a)(1)(ii)(B) and 25.222(a)(1)(iii)(B) to acknowledge explicitly that if an applicant has coordinated higher OAED levels with adjacent satellite operators, that applicant may specify higher pointing tolerance levels so long as operations comply with those higher OAED levels.

V. CONCLUSION

For the foregoing reasons, ViaSat respectfully requests that the Commission revise Sections 25.222(a)(1)(ii) and 25.222(a)(1)(iii) as proposed in Exhibit A hereto. These revisions will help to ensure a clear and stable regulatory framework for ESVs and other mobile

¹² See *Row 44, Inc., Application to Operate up to 1,000 Technically Identical Aeronautical Mobile Satellite Service Transmit/Receive Earth Stations Aboard Commercial and Private Aircraft*, Order and Authorization, DA 09-1752, at ¶ 22 (Aug 4, 2009).

EXHIBIT A
PROPOSED REVISIONS TO NEW RULES

Section 25.222(a)(1)(ii):

Each ESV transmitter must meet one of the following ~~antenna pointing~~ requirements **with respect to antenna pointing error (which shall encompass both deliberate and non-deliberate forms of antenna misorientation):**

(A) Each ESV transmitter shall maintain a **peak** pointing error of less than or equal to 0.2° between the orbital location of the target satellite and the axis of the main lobe of the ESV antenna, or

(B) Each ESV transmitter shall declare a ~~maximum~~ **peak** antenna pointing error that may be greater than 0.2° provided that the ESV does not exceed the off-axis EIRP spectral-density limits in paragraph (a)(1)(i) of this section, **(or any other off-axis EIRP spectral-density limits allowed under paragraph (a)(2) of this section)**, taking into account the antenna pointing error.

Section 25.222(a)(1)(iii):

Each ESV transmitter must meet one of the following cessation of emission requirements:

~~(A) For ESVs operating under paragraph (a)(1)(ii)(A) of this section, a~~ All emissions from the ESV **transmitter** shall automatically cease within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the ESV antenna exceeds 0.5° , and transmission ~~will~~ **may** not resume until such angle is less than or equal to **the applicable peak antenna pointing error under paragraph (a)(1)(ii) of this section**, or

(B) Each ESV transmitter shall declare a **maximum antenna pointing error that may be greater than 0.5° provided that the ESV does not exceed the off-axis EIRP spectral-density limits in paragraph (a)(1)(i) of this section, (or any other off-axis EIRP spectral-density limits allowed under paragraph (a)(2) of this section)**, taking into account the antenna pointing error.

~~For ESV transmitters operating under paragraph (a)(1)(ii)(B) of this section, a~~ All emissions from the ESV **transmitter** shall automatically cease within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the ESV antenna exceeds ~~the~~ **this** declared maximum antenna pointing error, and **transmission may** ~~shall~~ not resume ~~transmissions~~ until such angle is less than or equal to the ~~declared maximum~~ **applicable peak** antenna pointing error **under paragraph (a)(1)(ii) of this section**.