

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
)	
Revisions to Parts 2 and 25 of the)	IB Docket No. 12-376
Commission’s Rules to Govern the Use of)	
Earth Stations Aboard Aircraft)	
Communicating with Fixed-Satellite)	
Service Geostationary-Orbit Space Stations)	
Operating in the 10.95-11.2 GHz, 11.45-11.7)	
GHz, 11.7-12.2 GHz and 14.0-14.5 GHz)	
Frequency Bands)	
)	
Service Rules and Procedures to Govern the)	IB Docket No. 05-20
Use of Aeronautical Mobile Satellite Service)	(proceeding terminated)
Earth Stations in Frequency Bands Allocated)	
to the Fixed Satellite Service)	
)	

To: The Commission

**PETITION OF
THE BOEING COMPANY
FOR RECONSIDERATION AND CLARIFICATION**

The Boeing Company (“Boeing”) applauds the Commission for adopting its December 28, 2012 Report and Order (“Order”) creating the Earth Stations Aboard Aircraft (“ESAA”) service,¹ which provides regulatory structure and increased certainty for operators of ESAA networks, while taking significant steps towards elevating the allocation status of ESAA to be commensurate with other satellite-based broadband communications services to mobile

¹ *Revisions to Parts 2 and 25 of the Commission’s Rules to Govern the Use of Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary-Orbit Space Stations Operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz, and 14.0-14.5 GHz Frequency Bands, IB Docket No. 12-376, Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed Satellite Service, IB Docket No. 05-20, Notice of Proposed Rulemaking and Report and Order, FCC 12-161 (rel. Dec. 28, 2012) (“Order”).*

platforms such as Earth Stations on board Vessels (“ESVs”) and Vehicle-Mounted Earth Stations (“VMES”). Boeing looks forward to the Commission’s continued efforts in completing expeditiously the Notice of Proposed Rulemaking (“NPRM”) in this proceeding in order to establish ESAA as a full primary application of the Fixed-Satellite Service in the Ku-band.

With this Petition, Boeing recommends two substantive changes as well several minor alterations and clarifications to the Order. These relatively minor changes will help to ensure that the ESAA rules accurately reflect the technical characteristics of ESAA networks and the Commission’s intent for this broadband communications service.

I. THE COMMISSION’S RULES SHOULD EXPRESSLY REQUIRE ESAA TERMINALS TO BE LICENSED BY THE COMMISSION WHEN OPERATED ABOARD U.S.-FLAGGED AIRCRAFT

Boeing recommends that for consistency in licensing and operation of ESAA systems, all ESAA networks should require licenses from the Commission both when operating in U.S. airspace and when operated aboard U.S.-flagged aircraft. As the Commission acknowledges in its Order, Section 301(e) of the Communications Act requires operators of radio transmitters “upon any vessel or aircraft of the United States” to secure a license from the Commission.² Further, the Commission has concluded that when U.S.-flagged aircraft leave the United States and operate in foreign airspace, the ESAA airborne terminal will still be required to operate under the Commission’s technical rules, unless the rules of the relevant foreign administration are more constraining.³ In order to ensure that these requirements are accurately reflected in the Commission’s rules, Section 25.201 of the Commission’s rules should be modified so that the

² See *id.*, ¶ 120 (citing 47 U.S.C. § 301(e)). Certain limited exceptions to this requirement are specified in Section 303(t) of the Communications Act.

³ See *id.*, ¶ 121.

definition of ESAA includes ESAA earth stations operating on U.S.-flagged aircraft. The supplemented definition would read:

ESAA is an earth station or earth stations, operating from an aircraft, that receives from and transmits to geostationary satellite orbit Fixed-Satellite Service space stations and operates within the United States or on U.S.-flagged aircraft pursuant to the requirements set out in § 25.227 of this part.

In addition, Section 25.227(a)(14) of the rules should be changed to insert a reference to U.S.-flagged aircraft. The new text would read “[a]ll ESAA terminals operated in U.S. airspace or on U.S.-flagged aircraft must be licensed by the Commission.”

II. THE SECTION 25.227(b)(3)(i) DEMONSTRATION REQUIREMENTS FOR ESAA EARTH STATION APPLICATIONS SHOULD BE CHANGED TO BETTER REFLECT THE TECHNICAL CHARACTERISTICS OF ESAA TERMINALS AND SYSTEMS

Section 25.227(b)(3)(i), pertaining to the certification and demonstrations required for an ESAA earth station application, requires applicants to “demonstrate that an individual transmitter and the entire ESAA system is capable of automatically ceasing emissions within 100 milliseconds if the aggregate off-axis EIRP-densities exceed the off-axis EIRP density limits minus 1 dB, as set forth in paragraph (a)(3)(i) of this section.”⁴ This requirement raises two issues that Boeing recommends be addressed so as to better reflect the technical and operating characteristics of ESAA systems.

A. Section 25.227(b)(3)(i) Should Not Require Applicants to Demonstrate that Individual Terminals Are Capable of Monitoring Aggregate Off-Axis EIRP-Density Levels

Section 25.227(b)(3)(i) of the Commission’s rules should be modified because the demonstration requirement that it specifies differs from both the underlying technical

⁴ *Id.* at 82.

requirement in 25.227(a)(3)(ii)(B) of the rules and from the Commission’s discussion of the issue in the Order. Section 25.227(a)(3)(ii)(B) of the Commission’s rules requires that ESAA networks be designed so that “[t]he *overall system* shall be capable of shutting off an individual transmitter or the entire system if the aggregate off-axis EIRP spectral densities exceed those supplied to the target satellite operator.”⁵ In contrast, Section 25.227(b)(3)(i) of the Commission’s rules requires that “an individual transmitter” be capable of this same function.⁶

Requiring individual transmitters to track the aggregate off-axis EIRP spectral density is contrary to the Commission’s previous practice and is infeasible and unnecessary. The aggregate off-axis EIRP spectral density of an ESAA network can be tracked only at the network level, a fact that is reflected in Section 25.227(a)(3)(ii)(B) of the rules and in the Commission’s discussion of this issue in the Order. Regarding the power density from an individual transmitter, the Order explains that an individual transmitter must be able to self-monitor to ensure that the power density from its transmissions do not exceed the applicable limits.⁷ In the case of aggregate off-axis EIRP density, however, the system’s Network Control and Monitoring Center (“NCMC”) is responsible for monitoring and issuing the command to cease or reduce emissions if it detects that aggregate density exceeds the power-density limit.⁸ This is the approach that should be consistently reflected in the Commission’s rules. Boeing therefore recommends that 25.227(b)(3)(i) refer only to “the entire ESAA system” and omit the reference to “an individual

⁵ *Id.* at 78 (emphasis added).

⁶ *Id.* at 82.

⁷ *Id.*, ¶ 78.

⁸ *Id.*

transmitter” as being capable of monitoring the aggregate off-axis EIRP spectral density of an ESAA network.

B. Section 25.227(b)(3)(i) Should Not Specify a Time Requirement for Ceasing Transmissions

Section 25.227(b)(3)(i) requires applicants to demonstrate that the system is capable of “automatically ceasing emissions within 100 milliseconds if the aggregate off-axis EIRP-densities exceed the off-axis EIRP-density limits....”⁹ The wording of the requirement is not clear regarding the event from which the 100 millisecond requirement is measured. A plain reading of the rule would suggest that the 100 milliseconds are measured from the time of the exceedance. This reading would impose an infeasible limit in light of the time required for the system to detect the exceedance, issue the command to cease transmission, and for that command to reach the transmitter or transmitters. Additionally, such a reading would impose a stricter time limit than that discussed in the Order, which states that the NCMC must *issue* the command within 100 milliseconds¹⁰ rather than that the individual terminals must cease transmissions within that timeframe.

Boeing therefore recommends that the reference to “100 milliseconds” be removed from 25.227(b)(3)(i). Combining this change with the previous change discussed above (recommending omitting reference to “individual transmitters”), the revised rule would read “[t]he applicant also must demonstrate that the ESAA system is capable of shutting off an individual transmitter or the entire system if the aggregate off-axis EIRP-densities exceed the off-axis EIRP density limits minus 1 dB, as set forth in paragraph (a)(3)(i) of this section.”

⁹ *Id.* at 82.

¹⁰ *Id.*, ¶ 78.

III. THE COMMISSION SHOULD MAKE THE FOLLOWING MINOR CHANGES AND CLARIFICATIONS

In addition to the substantive changes discussed above, Boeing also notes the following minor changes and clarifications to the ESAA rules.

A. Section 25.227(b)(1)(iii)(A) Should Include Language Clarifying the Intended Meaning of Maintaining Pointing Error Within Three Sigma From the Mean Value

Section 25.227(b)(1)(iii)(A) addresses transmitters governed under section 25.227(a)(1)(ii)(A) and requires that “as part of the engineering analysis, the ESAA applicant must show that the antenna pointing error is within three sigma (σ) from the mean value.”¹¹ Boeing recommends including in the rules the same parenthetical example that the Commission provided in the Order. Specifically, the Commission should insert the parenthetical example into the last sentence of rule 25.227(b)(1)(iii)(A) so that the sentence reads “[a]s part of the engineering analysis, the ESAA applicant must show that the antenna pointing error is within three sigma (σ) from the mean value (*i.e.*, that the antenna maintains a pointing error within 0.2 degrees for 99.7 percent of the time)...” This will ensure that the rules make clear the Commission’s intent as discussed in the Order.

B. The Inadvertent Reference to ESV Earth Stations in Section 25.227(a)(1)(i)(A) Should Be Changed to Refer to ESAA Earth Stations

Section 25.227(a)(1)(i)(A) inadvertently contains a spurious reference to ESV terminals. The sentence “[f]or ESAA networks using multiple co-frequency transmitters that have the same EIRP density, N is the maximum expected number of co-frequency simultaneously transmitting *ESV* earth stations in the same satellite receiving beam” should be changed to replace “ESV”

¹¹ *Id.*, at 81.

with “ESAA.”¹² Boeing acknowledges that this change likely could be accomplished through the issuance of an errata order.

C. The Commission Should Clarify the Intended Effect of the Harmful Interference Certification Required by Section 25.227(b)(3)(ii)(B)

Boeing requests clarification on the intended purpose of the requirement in Section 25.227(b)(3)(ii)(B) that applicants must include “[a] statement from the target satellite operator certifying that the proposed operation of the ESAA has the potential to create harmful interference to satellite networks adjacent to the target satellite(s) that may be unacceptable.”¹³ Although analogous language appears in both the ESV rules and the VMES rules, the rationale for the inclusion of this requirement was not discussed in the Order.¹⁴ Boeing seeks clarification regarding the intent of this requirement since, as written, it would appear to require satellite operators to indicate to the Commission that interference from ESAA networks is likely and no purpose would arguably be served through such certifications.

D. The Commission Should Clarify the Coordination Requirements in Section 25.227(b)(3)(ii)(D) for Target Satellite Operators Hosting ESAA Networks

Finally, Boeing suggests clarification to Section 25.227(b)(3)(ii)(D) of the Commission’s rules, which requires target satellite operators to provide the Commission with a certification “that it will include the aggregate power-density levels of the ESAA applicant in all future coordination agreements.”¹⁵ Boeing assumes that the Commission’s intent is to require the inclusion of the aggregate power-density levels of the ESAA network only in all coordination

¹² *Id.* at 76.

¹³ *Id.* at 82.

¹⁴ 47 C.F.R. § 25.221(b)(1)(iv)(B)(2)(i) (ESV rules); 47 C.F.R. § 25.226(b)(2)(i) (VMES rules).

¹⁵ *Id.* at 82.

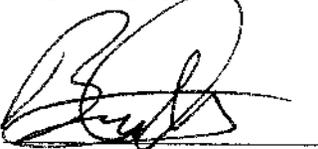
agreements during the period that the ESAA network is using the capacity of the target satellite. In the event that the ESAA network ceases to use the capacity of the target satellite, the requirement of Section 25.227(b)(3)(ii)(D) should abate. This can be clarified by supplementing the rule to state that the certification should indicate that the target satellite operator “will include the aggregate power-density levels of the ESAA applicant in all future coordination agreements during the period that the ESAA network is using the target satellite.”

IV. CONCLUSION

Boeing appreciates the Commission’s attention to these issues, its creation of the ESAA service, and its adoption of rules for ESAA networks. The changes recommended herein will increase the clarity and consistency of the Commission’s ESAA rules, and help to ensure that the rules fully reflect the technical realities of ESAA systems as well as the Commission’s policy objectives. For these reasons Boeing urges the Commission to adopt the changes recommended above.

Respectfully submitted,

THE BOEING COMPANY

By: 

Audrey L. Allison
Director, Frequency Management Services
The Boeing Company
1200 Wilson Boulevard
Arlington, VA 22209
(703) 465-3215

Bruce A. Olcott
Preston N. Thomas
Squire Sanders (US) LLP
1200 19th Street, N.W.
Washington, D.C. 20036
(202) 626-6615

Its Attorneys

January 28, 2013