

August 25, 2014

VIA ELECTRONIC FILING

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, D.C. 20554

**Re: Panasonic Avionics Corporation – Section 1.65 Notification;
Call Sign E100089; File Nos. SES-MFS-20130930-00845**

Dear Ms. Dortch:

Panasonic Avionics Corporation (“Panasonic”) hereby responds to a request for information by the FCC’s International Bureau (“Bureau”) regarding the above-referenced modification application, which is an uncontested proceeding. The Bureau seeks certain information regarding Panasonic’s compliance with the current rules governing earth station aboard aircraft (“ESAA”) operations, which became effective and were amended during the pendency of this application.¹

First, with respect to the requirements of Section 25.227(c), which governs operations of ESAAs in the 14.0-14.2 GHz (Earth-to-space) frequency band in the radio line-of-sight of National Aeronautics and Space Administration (“NASA”) Tracking and Data Relay Satellite System (“TDRSS”) facilities, Panasonic notes that it submitted a complete copy of its coordination agreement with NASA to the FCC in a prior application proceeding related to Call Sign E100089.² The coordination agreement addressed the protection of TDRSS earth station

¹ 47 C.F.R. §25.227.

² See Section 1.65 Letter, File Nos. SES-LIC-20100805-00992, SES- AMD-20100914-01163 and SES-AMD-20101115-01432 (Call Sign E100089) (Notice of NASA Coordination Agreement dated Feb. 1, 2011).

sites at Guam and White Sands, New Mexico, as well as Blossom Point, Maryland, as contemplated by the FCC's ESAA rules.

Although this notification was not separately placed on public notice, it was filed in an application proceeding with a subsequent amendment, initiating a new 30-day filing period for additional public comment on the application.³ No comments were received concerning Panasonic's coordination agreement with NASA. In addition, public notice of Bureau grant of operating authority to Panasonic generated no comment or action by any interested party.⁴ Accordingly, the FCC's procedures relating to ESAA operator coordination with the NASA TDRSS operations have been satisfied.

Second, with respect to the regulatory status of the proposed ESAA operations, Panasonic's pursuit of FCC authority for Ku-band aeronautical terminal operations dates back long before the current ESAA rules became effective and spans three separate application proceedings. Grant of secondary aeronautical mobile-satellite service ("AMSS") authority to operate the original MELCO terminal was issued before the FCC adopted its ESAA order,⁵ grant of AMSS authority to operate the Panasonic phased array ("PPA") terminal (formerly known as the Aura LE) was granted before the effective date of the ESAA rules,⁶ and the pending modification application to add new satellite points of communication also was filed before the FCC's ESAA rules became effective and subsequently amended to upgrade the regulatory status of ESAA operations to primary status. Although Panasonic specifically referenced adopted (but not yet effective) Section 25.227 in its pending modification application, the need or ability to formally request ESAA operating authority and make the requisite technical showing under the rules was uncertain.

Panasonic hereby confirms that it has provided all information necessary for the Bureau to grant ESAA operating authority for the terminals included in the current blanket license, Call Sign E100089, and that it seeks authority to operate under the FCC's ESAA rules. Panasonic attaches hereto a regulatory compliance matrix that cross-references information in various

³ See File No. SES-AFS-20110405-00402, Report No. SES-01335 (April 6, 2011).

⁴ See File No. SES-LIC-20100805-00992 and associated filed numbers, Report No. SES-01379 (Sept. 7, 2011); see also *Panasonic Avionics Corporation*, Order and Authorization, DA 1101480 (Int'l Bur. and OET) (Aug. 31, 2011).

⁵ See *id.*; see also *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 Service Rules and Procedures to Govern the Use of Aeronautical Mobile Satellite Service Earth Stations in Frequency Bands Allocated to the Fixed Satellite Service*, Notice of Proposed Rulemaking and Report and Order, 27 FCC Rcd 16510 (2012).

⁶ See File No. SES-MFS-20120913-00818 and associated filed numbers, granted July 24, 2013, Report No. SES-01573 (July 31, 2013).

submissions relating to Call Sign E100089 with the requirements of Section 25.227. In addition, notwithstanding statements of substantive compliance with all relevant operational requirements set forth in prior applications, out of an abundance of caution Panasonic attaches a certification confirming certain characteristics of Panasonic's licensed aeronautical terminal operations as contemplated by Section 25.227 of the Rules.

Because Panasonic is merely clarifying information provided in previous submissions to the FCC for the sake of administrative convenience, is confirming compliance with ESAA rules that became effective after its modification application was filed and referenced Section 25.227 in its modification application, the Bureau may appropriately consider the pending modification application under its current ESAA rules.

Should there be any additional questions regarding this submission, please feel free to contact the undersigned.

Respectfully submitted,



Carlos M. Nalda

Counsel to Panasonic Avionics Corporation

Attachments

Cc (w/ atts.): Andrea Kelly
Paul Blais

FCC §25.227 Compliance Matrix

Rule	Text	Application Citation
§ 25.227	§ 25.227 Blanket Licensing provisions for Earth Stations Aboard Aircraft (ESAAs) receiving in the 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), and 11.7-12.2 GHz (space-to-Earth) frequency bands and transmitting in the 14.0-14.5 GHz (Earth-to-space) frequency band, operating with Geostationary Satellites in the Fixed-Satellite Service.	<i>See</i> Application, File No. SES-LIC-20100805-00992, Technical Appendix; File No. SES-MFS-20120913-00818, Technical Appendix.
§ 25.227(a)	(a) The following ongoing requirements govern all ESAA licensees and operations in the 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) and 14.0-14.5 GHz (Earth-to-space) frequency bands receiving from and transmitting to geostationary orbit satellites in the Fixed-Satellite Service. ESAA licensees shall comply with the requirements in either paragraph (a)(1), (a)(2) or (a)(3) of this section and all of the requirements set forth in paragraphs (a)(4)-(a)(16) and paragraphs (c), (d), and (e) of this section. Paragraph (b) of this section identifies items that shall be included in the application for ESAA operations to demonstrate that these ongoing requirements will be met.	<i>Id.</i>
§ 25.227(a)(1)	(1) The following requirements shall apply to an ESAA that uses transmitters with off-axis EIRP spectral-densities lower than or equal to the levels in paragraph (a)(1)(i) of this subsection. ESAA licensees operating under this subsection shall provide a detailed demonstration as described in paragraph (b)(1) of this section. The ESAA transmitter also shall comply with the antenna pointing and cessation of emission requirements in paragraphs (a)(1)(ii) and (a)(1)(iii) of this subsection.	<i>Id.</i>
§ 25.227(a)(1)(i)	(i) An ESAA licensee shall not exceed the off-axis EIRP spectral-density limits and conditions defined in paragraphs (a)(1)(A)-(D) of this subsection.	<i>Id.</i>

<p>§ 25.227(a)(1)(i)(A)</p>	<p>(A) The off-axis EIRP spectral-density for co-polarized signals emitted from the ESAA, in the plane of the geostationary satellite orbit (GSO) as it appears at the particular earth station location, shall not exceed the following values: 15 - $10 \log_{10}(N) - 25 \log_{10} \theta$ dBW/4 kHz For $1.5^\circ \leq \theta \leq 7^\circ$ -6 - $10 \log_{10}(N)$ dBW/4 kHz For $7^\circ < \theta \leq 9.2^\circ$ 18 - $10 \log_{10}(N) - 25 \log_{10} \theta$ dBW/4 kHz For $9.2^\circ < \theta \leq 48^\circ$ -24 - $10 \log_{10}(N)$ dBW/4 kHz For $48^\circ < \theta \leq 85^\circ$ -14 - $10 \log_{10}(N)$ dBW/4 kHz For $85^\circ < \theta \leq 180^\circ$ where theta (θ) is the angle in degrees from the line connecting the focal point of the antenna to the orbital location of the target satellite in the plane of the GSO. The plane of the GSO is determined by the focal point of the antenna and the line tangent to the arc of the GSO at the orbital location of the target satellite. For ESAA networks using frequency division multiple access (FDMA) or time division multiple access (TDMA) techniques, N is equal to one. For 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. For the purpose of this subsection, the peak EIRP density of an individual sidelobe shall not exceed the envelope defined above for θ between 1.5° and 7.0°. For θ greater than 7.0°, the envelope shall be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dB.</p>	<p><i>Id.</i></p>
<p>§ 25.227(a)(1)(i)(B)</p>	<p>(B) In all directions other than along the GSO, the off-axis EIRP spectral-density for co-polarized signals emitted from the ESAA shall not exceed the following values: 18 - $10 \log_{10}(N) - 25 \log_{10} \theta$ dBW/4 kHz For $3.0^\circ \leq \theta \leq 48^\circ$ -24 - $10 \log_{10}(N)$ dBW/4 kHz For $48^\circ < \theta \leq 85^\circ$ -14 - $10 \log_{10}(N)$ dBW/4kHz For $85^\circ < \theta \leq 180^\circ$ where θ and N are defined in (a)(1)(i)(A). This off-axis EIRP spectral-density applies in any plane that includes the line connecting the focal point of the antenna to the orbital location of the target satellite with the exception of the plane of the GSO as defined in paragraph (a)(1)(i)(A) of this section. For the purpose of this subsection, the envelope shall be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the EIRP density envelope given above by more than 6 dB. The region of the main reflector spillover energy is to be interpreted as a single lobe and shall not exceed the envelope by more than 6 dB.</p>	<p><i>Id.</i> (prior authority to operate conditioned on coordination with Ku-band NGSO systems).</p>

§ 25.227(a)(1)(i)(C)	(C) The off-axis EIRP spectral-density for cross-polarized signals emitted from the ESAA shall not exceed the following values: In the plane of the geostationary satellite orbit as it appears at the particular earth station location: 5 - 10 log ₁₀ (N) - 25 log ₁₀ 100 dBW/4kHz For 1.8° < θ ≤ 7° -16 - 10 log ₁₀ (N) dBW/4kHz For 7° < θ ≤ 9.2° where θ and N are defined in (a)(1)(i)(A).	<i>Id.</i>
§ 25.227(a)(1)(ii)	(ii) Each ESAA transmitter shall meet one of the following antenna pointing requirements: (A) Each ESAA transmitter shall maintain a 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 ESAA antenna; or (B) Each ESAA transmitter shall declare a maximum antenna pointing error that may be greater than 0.2° provided that the ESAA does not exceed the off-axis EIRP spectral-density limits in paragraph (a)(1)(i) of this section, taking into account the antenna pointing error.	<i>Id.</i>
§ 25.227(a)(1)(iii)	(iii) Each ESAA transmitter shall meet one of the following cessation of emission requirements: (A) For ESAs operating under paragraph (a)(1)(ii)(A) of this section, all emissions from the ESAA 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 ESAA antenna exceeds 0.5°, and transmission shall not resume until such angle is less than or equal to 0.2°, or (B) For ESAA transmitters operating under paragraph (a)(1)(ii)(B) of this section, all emissions from the ESAA 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 ESAA antenna exceeds the declared maximum antenna pointing error and shall not resume transmissions until such angle is less than or equal to the declared maximum antenna pointing error.	<i>Id.</i>

25.227(a)(2)	<p>(2) The following requirements shall apply to an ESAA, or ESAA system, that uses off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(1)(i) of this section. An ESAA, or ESAA network, operating under this subsection shall file certifications and provide a detailed demonstration as described in paragraph (b)(2) of this section.</p> <p>(i) The ESAA shall transmit only to the target satellite system(s) referred to in the certifications required by paragraph (b)(2) of this section.</p> <p>(ii) If a good faith agreement cannot be reached between the target satellite operator and the operator of a future satellite that is located within 6 degrees longitude of the target satellite, the ESAA operator shall accept the power-density levels that would accommodate that adjacent satellite.</p> <p>(iii) The ESAA shall operate in accordance with the off-axis EIRP spectral-densities that the ESAA supplied to the target satellite operator in order to obtain the certifications listed in paragraph (b)(2) of this section. The ESAA shall automatically cease emissions within 100 milliseconds if the ESAA transmitter exceeds the off-axis EIRP spectral-densities supplied to the target satellite operator and transmission shall not resume until ESAA conforms to the off-axis EIRP spectral densities supplied to the target satellite operator.</p> <p>(iv) In the event that a coordination agreement discussed in paragraph (b)(2)(ii) of this section is reached, but that coordination agreement does not address protection from interference for the earth station, that earth station will be protected from interference to the same extent that an earth station that meets the requirements of §25.209 of this title would be protected from interference.</p>	Panasonic complies (no separate certification required); <i>see also</i> Section 25.227(b)(2).
§ 25.227(a)(3)(i)	<p>(3) The following requirements shall apply to an ESAA system that uses variable power-density control of individual simultaneously transmitting co-frequency ESAA earth stations in the same satellite receiving beam. An ESAA system operating under this subsection shall provide a detailed demonstration as described in paragraph (b)(3) of this section.</p> <p>(i) The effective aggregate EIRP density from all terminals shall be at least 1 dB below the off-axis EIRP density limits defined in paragraph (a)(1)(i)(A)-(C), with the value of N=1. In this context the term “effective” means that the resultant co-polarized and cross-polarized EIRP density experienced by any GSO or non-GSO satellite shall not exceed that produced by a single transmitter operating 1 dB below the limits defined in paragraph (a)(1)(i)(A)-(C). The individual ESAA transmitter shall automatically cease emissions within 100 milliseconds if the ESAA transmitter exceeds the off-axis EIRP density limits minus 1 dB specified above. If one or more ESAA transmitters causes the aggregate off-axis EIRP-densities to exceed the off-axis EIRP density limits minus 1dB specified above, then the transmitter or transmitters shall cease or reduce emissions within 100 milliseconds of receiving a command from the system’s network control and monitoring center. An ESAA system operating under this subsection shall provide a detailed demonstration as described in paragraph (b)(3)(i) of this section.</p>	N/A

§ 25.227(a)(3)(ii)	<p>(ii) The following requirements shall apply to an ESAA that uses off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(3)(i) of this section. An ESAA system operating under this subsection shall file certifications and provide a detailed demonstration as described in paragraphs (b)(3)(ii) and (b)(3)(iii) of this section.</p> <p>(A) If a good faith agreement cannot be reached between the target satellite operator and the operator of a future satellite that is located within 6 degrees longitude of the target satellite, the ESAA shall operate at an EIRP density defined in (a)(3)(i) of this section.</p> <p>(B) The ESAA shall operate in accordance with the off-axis EIRP spectral-densities that the ESAA supplied to the target satellite operator in order to obtain the certifications listed in paragraph (b)(3)(ii) of this section. The individual ESAA terminals shall automatically cease emissions within 100 milliseconds if the ESAA transmitter exceeds the off-axis EIRP spectral-densities supplied to the target satellite operator. The 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.</p> <p>(C) The ESAA shall transmit only to the target satellite system(s) referred to in the certifications required by paragraph (b)(3) of this section.</p>	N/A
§ 25.227(a)(4)	(4) An applicant filing to operate an ESAA terminal or system and planning to use a contention protocol shall certify that its contention protocol use will be reasonable.	N/A
§ 25.227(a)(5)	(5) There shall be a point of contact in the United States, with phone number and address, available 24 hours a day, seven days a week, with authority and ability to cease all emissions from the ESAA.	<i>See</i> Application, File No. SES-LIC-20100805-00992, Technical Appendix
§ 25.227(a)(6)	(6) For each ESAA transmitter, a record of the vehicle location (i.e., latitude/longitude/altitude), transmit frequency, channel bandwidth and satellite used shall be time annotated and maintained for a period of not less than one year. Records shall be recorded at time intervals no greater than one (1) minute while the ESAA is transmitting. The ESAA operator shall make this data available, in the form of a comma delimited electronic spreadsheet, within 24 hours of a request from the Commission, NTIA, or a frequency coordinator for purposes of resolving harmful interference events. A description of the units (i.e., degrees, minutes, MHz) in which the records values are recorded will be supplied along with the records.	<i>See</i> Application, File No. SES-LIC-20100805-00992, Technical Appendix; File No. SES-MFS-20120913-00818, Technical Appendix.
§ 25.227(a)(7)	(7) In the 10.95-11.2 GHz (space-to-Earth) and 11.45-11.7 GHz (space-to-Earth) frequency bands ESAAs shall not claim protection from interference from any authorized terrestrial stations to which frequencies are either already assigned, or may be assigned in the future.	<i>Id.</i>
§ 25.227(a)(8)	(8) An ESAA terminal receiving in the 11.7-12.2 GHz (space-to-Earth) bands shall receive protection from interference caused by space stations other than the target space station only to the degree to which harmful interference would not be expected to be caused to an earth station employing an antenna conforming to the referenced patterns defined in paragraphs (a) and (b) of section 25.209 and stationary at the location at which any interference occurred.	<i>Id.</i>
§ 25.227(a)(9)	(9) Each ESAA terminal shall automatically cease transmitting within 100 milliseconds upon loss of reception of the satellite downlink signal or when it detects that unintended satellite tracking has happened or is about to happen.	<i>Id.</i>

§ 25.227(a)(10)	(10) Each ESAA terminal should be subject to the monitoring and control by an NCMC or equivalent facility. Each terminal must be able to receive at least “enable transmission” and “disable transmission” commands from the NCMC and must automatically cease transmissions immediately on receiving any “parameter change command”, which may cause harmful interference during the change, until it receives an “enable transmission” command from its NCMC. In addition, the NCMC must be able to monitor the operation of an ESAA terminal to determine if it is malfunctioning.	<i>Id.</i>
§ 25.227(a)(11)	(11) Each ESAA terminal shall be self-monitoring and, should a fault which can cause harmful interference to FSS networks be detected, the terminal must automatically cease transmissions.	<i>Id.</i>
§ 25.227(a)(12)	(12) Unless otherwise stated all ESAA system that comply with the off-axis EIRP spectral-density limits in (a)(1)(i) may request ALSAT authority.	<i>Id.</i>
§ 25.227(a)(13)	(13) ESAA providers operating in the international airspace within line-of-sight of the territory of a foreign administration where fixed service networks have primary allocation in this band, the maximum power flux density (pfd) produced at the surface of the Earth by emissions from a single aircraft carrying an ESAA terminal should not exceed the following values unless the foreign Administration has imposed other conditions for protecting its fixed service stations: $-132+0.5 \cdot \theta$ dB(W/(m ² · MHz)) For $\theta \leq 40^\circ$ -112 dB(W/(m ² · MHz)) For $40^\circ < \theta \leq 90^\circ$ Where: θ is the angle of arrival of the radio-frequency wave (degrees above the horizontal) and the aforementioned limits relate to the pfd and angles of arrival would be obtained under free-space propagation conditions.	<i>Id.</i>
§ 25.227(a)(14)	(14) All ESAA terminals operated in U.S. airspace, whether on U.S.-registered civil aircraft or non-U.S.-registered civil aircraft, must be licensed by the Commission. All ESAA terminals on U.S.-registered civil aircraft operating outside of U.S. airspace must be licensed by the Commission, except as provided by Section 303(t) of the Communications Act.	<i>Id.</i>
§ 25.227(a)(15)	(15) For ESAA systems operating over international waters, ESAA operators will certify that their target space station operators have confirmed that proposed ESAA operations are within coordinated parameters for adjacent satellites up to 6 degrees away on the geostationary arc.	<i>See</i> Application, File No. SES-MFS-20130930-00845 at Technical Appendix, Att. A (new satellites); <i>See</i> Application, File No. SES-LIC-20100805-00992, Technical Appendix; File No. SES-MFS-20120913-00818, Technical Appendix (prior satellites); <i>see also</i> Attached Certification.

§ 25.227(a)(16)	(16) Prior to operations within the foreign nation’s airspace, the ESAA operator will ascertain whether the relevant administration has operations that could be affected by ESAA terminals, and will determine whether that administration has adopted specific requirements concerning ESAA operations. When the aircraft enters foreign airspace, the ESAA terminal would be required to operate under the Commission’s rules, or those of the foreign administration, whichever is more constraining. To the extent that all relevant administrations have identified geographic areas from which ESAA operations would not affect their radio operations, ESAA operators would be free to operate within those identified areas without further action. To the extent that the foreign administration has not adopted requirements regarding ESAA operations, ESAA operators would be required to coordinate their operations with any potentially affected operations.	Panasonic complies (no specific certification required).
§ 25.227(b)	(b) Applications for ESAA operation in the 14.0-14.5 GHz (Earth-to-space) band to GSO satellites in the Fixed-Satellite Service shall include, in addition to the particulars of operation identified on Form 312, and associated Schedule B, the applicable technical demonstrations in paragraphs (b)(1), (b)(2) or (b)(3) and the documentation identified in paragraphs (b)(4) through (b)(8) of this section.	MELCO: See File No. SES-AMD-20100914-01163; PPA: See File No. SES-MFS-20120913-00818, Technical Appendix
§ 25.227(b)(1)	(1) An ESAA applicant proposing to implement a transmitter under paragraph (a)(1) of this section shall demonstrate that the transmitter meets the off-axis EIRP spectral-density limits contained in paragraph (a)(1)(i) of this section. To provide this demonstration, the application shall include the tables described in paragraph (b)(1)(i) of this section or the certification described in paragraph (b)(1)(ii) of this section. The ESAA applicant also shall provide the value N described in paragraph (a)(1)(i)(A) of this section. An ESAA applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(A) of this section shall provide the certifications identified in paragraph (b)(1)(iii) of this section. An ESAA applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section shall provide the demonstrations identified in paragraph (b)(1)(iv) of this section.	MELCO: See File No. SES-AMD-20100914-01163; PPA: See File No. SES-MFS-20120913-00818, Technical Appendix

§ 25.227(b)(1)(i)	<p>(i) Any ESAA applicant filing an application pursuant to paragraph (a)(1) of this section shall file three tables and/or graphs depicting off-axis EIRP density masks defined by 25.227(a) and measured off-axis EIRP density levels of the proposed earth station antenna in the direction of the plane of the GSO; the co-polarized EIRP density in the elevation plane, that is, the plane perpendicular to the plane of the GSO; and cross-polarized EIRP density. Each table shall provide the EIRP density level at increments of 0.1° for angles between 0° and 10° off-axis, and at increments of 5° for angles between 10° and 180° off-axis.</p> <p>(A) For purposes of the off-axis EIRP density table in the plane of the GSO, the off-axis angle is the angle in degrees from the line connecting the focal point of the antenna to the orbital location of the target satellite, and the plane of the GSO is determined by the focal point of the antenna and the line tangent to the arc of the GSO at the orbital position of the target satellite.</p> <p>(B) For purposes of the off-axis co-polarized EIRP density table in the elevation plane, the off-axis angle is the angle in degrees from the line connecting the focal point of the antenna to the orbital location of the target satellite, and the elevation plane is defined as the plane perpendicular to the plane of the GSO defined in paragraph (b)(1)(i)(A) of this section.</p> <p>(C) For purposes of the cross-polarized EIRP density table, the off-axis angle is the angle in degrees from the line connecting the focal point of the antenna to the orbital location of the target satellite and the plane of the GSO as defined in paragraph (b)(1)(i)(A) of this section will be used.</p>	MELCO: See File No. SES-AMD-20100914-01163; PPA: See File No. SES-MFS-20120913-00818, Technical Appendix.
§ 25.227(b)(1)(ii)	(ii) An ESAA applicant shall include a certification, in Schedule B, that the ESAA antenna conforms to the gain pattern criteria of § 25.209(a) and (b), that, combined with the maximum input power density calculated from the EIRP density less the antenna gain, which is entered in Schedule B, demonstrates that the off-axis EIRP spectral density envelope set forth in paragraphs (a)(1)(i)(A) through (a)(1)(i)(C) of this section will be met under the assumption that the antenna is pointed at the target satellite.	N/A
§ 25.227(b)(1)(iii)	<p>(iii) An ESAA applicant proposing to implement a transmitter under paragraphs (a)(1)(ii)(A) of this section shall:</p> <p>(A) demonstrate that the total tracking error budget of their antenna is within 0.2° or less between the orbital location of the target satellite and the axis of the main lobe of the ESAA antenna. 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, <i>i.e.</i>, that there is a 0.997 probability the antenna maintains a pointing error within 0.2°; and</p> <p>(B) demonstrate that the antenna tracking system is capable of ceasing emissions within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the ESAA antenna exceeds 0.5°.</p>	PPA: <i>See</i> File No. SES-MFS-20120913-00818, Technical Appendix.

§ 25.227(b)(1)(iv)	<p>(iv) An ESAA applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section shall:</p> <p>(A) declare, in its application, a maximum antenna pointing error and demonstrate that the maximum antenna pointing error can be achieved without exceeding the off-axis EIRP spectral-density limits in paragraph (a)(1)(i) of this section; and</p> <p>(B) demonstrate that the ESAA transmitter can detect if the transmitter exceeds the declared maximum antenna pointing error and can cease transmission within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the ESAA antenna exceeds the declared maximum antenna pointing error, and will not resume transmissions until the angle between the orbital location of the target satellite and the axis of the main lobe of the ESAA antenna is less than or equal to the declared maximum antenna pointing error.</p>	MELCO: <i>See</i> File No. SES-MOD-20111128-01386.
§ 25.227(b)(2)	<p>(2) An ESAA applicant proposing to implement a transmitter under paragraph (a)(2) of this section and using off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(1)(i) of this section shall provide the following certifications and demonstration as exhibits to its earth station application:</p> <p>(i) 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.</p> <p>(ii) A statement from the target satellite operator certifying that the power density levels that the ESAA applicant provided to the target satellite operator are consistent with the existing coordination agreements between its satellite(s) and the adjacent satellite systems within 6° of orbital separation from its satellite(s).</p> <p>(iii) A statement from the target satellite operator certifying that it will include the power-density levels of the ESAA applicant in all future coordination agreements.</p> <p>(iv) A demonstration from the ESAA operator that the ESAA system will comply with all coordination agreements reached by the satellite operator and is capable of detecting and automatically ceasing emissions within 100 milliseconds when the transmitter exceeds the off-axis EIRP spectral-densities supplied to the target satellite operator.</p>	<i>See</i> Application, File No. SES-MFS-20130930-00845 at Technical Appendix, Att. A (new satellites); <i>See</i> Application, File No. SES-LIC-20100805-00992, Technical Appendix; File No. SES-MFS-20120913-00818, Technical Appendix (prior satellites).
§ 25.227(b)(3)(i)	<p>(3) An ESAA applicant proposing to implement an ESAA system under paragraph (a)(3) of this section and using variable power-density control of individual simultaneously transmitting co-frequency ESAA earth stations in the same satellite receiving beam shall provide the following certifications and demonstration as exhibits to its earth station application:</p> <p>(i) The applicant shall make a detailed showing of the measures it intends to employ to maintain the effective aggregate EIRP density from all simultaneously transmitting cofrequency terminals operating with the same satellite transponder at least 1 dB below the off-axis EIRP density limits defined in paragraph (a)(1)(i)(A) through (C) of this section. In this context, the term “effective” means that the resultant co-polarized and crosspolarized EIRP density experienced by any GSO or non-GSO satellite shall not exceed that produced by a single ESAA transmitter operating at 1 dB below the limits defined in paragraphs (a)(1)(i)(A) through (C) of this section. The ESAA applicant shall provide a detailed showing that an individual ESAA terminal is self-monitoring and capable of shutting itself off automatically within 100 milliseconds if the ESAA transmitter exceeds the off-axis EIRP-density limit specified in paragraph (a)(3)(i) of this section. The ESAA applicant also shall provide a detailed showing that one or more transmitters are capable of automatically ceasing or</p>	N/A

	reducing emissions within 100 milliseconds of receiving a command from the system's network control and monitoring center that the aggregate off-axis EIRP spectral-densities of the transmitter or transmitters exceed the off-axis EIRP-density limits specified in paragraph (a)(3)(i) of this section. The International Bureau will place this showing on public notice along with the application.	
§ 25.227(b)(3)(ii)	<p>(ii) An applicant proposing to implement an ESAA system under paragraph (a)(3)(ii) of this section that uses off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(3)(i) of this section shall provide the following certifications, demonstration and list of satellites as exhibits to its earth station application:</p> <p>(A) A detailed showing of the measures the applicant intends to employ to maintain the effective aggregate EIRP density from all simultaneously transmitting co-frequency terminals operating with the same satellite transponder at the EIRP density limits supplied to the target satellite operator. The International Bureau will place this showing on Public Notice along with the application.</p> <p>(B) 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.</p> <p>(C) A statement from the target satellite operator certifying that the aggregate power-density levels that the ESAA applicant provided to the target satellite operator are consistent with the existing coordination agreements between its satellite(s) and the adjacent satellite systems within 6° of orbital separation from its satellite(s).</p> <p>(D) A statement from the target satellite operator certifying that it will include the aggregate power-density levels of the ESAA applicant in all future coordination agreements.</p> <p>(E) A demonstration from the ESAA operator that the ESAA system is capable of detecting and automatically ceasing emissions within 100 milliseconds when an individual transmitter exceeds the off-axis EIRP spectral-densities supplied to the target satellite operator and that the overall system is 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.</p> <p>(F) An identification of the specific satellite or satellites with which the ESAA system will operate.</p>	N/A
§ 25.227(b)(4)	(4) There shall be an exhibit included with the application describing the geographic area(s) in which the ESAA will operate.	<p><i>See</i> Application, File No. SES-MFS-20130930-00845 at Technical Appendix, Att. A. (new satellites);</p> <p><i>See</i> Application, File No. SES-LIC-20100805-00992, Technical Appendix; File No. SES-MFS-20120913-00818, Technical Appendix (prior satellites).</p>

§ 25.227(b)(5)	(5) Any ESAA applicant filing for an ESAA terminal or system and planning to use a contention protocol shall include in its application a certification that will comply with the requirements of paragraph (a)(4) of this section.	N/A
§ 25.227(b)(6)	(6) The point of contact referred to in paragraph (a)(5) of this section shall be included in the application.	<i>See</i> Application, File No. SES-LIC-20100805-00992, Technical Appendix.
§ 25.227(b)(7)	(7) Any ESAA applicant filing for an ESAA terminal or system shall include in its application a certification that will comply with the requirements of paragraph (a)(6), (a)(9), (a)(10), (a)(11) of this section.	<i>See</i> Attached Certification
§ 25.227(b)(8)	(8) All ESAA applicants shall submit a radio frequency hazard analysis determining via calculation, simulation, or field measurement whether ESAA terminals, or classes of terminals, will produce power densities that will exceed the Commission's radio frequency exposure criteria. ESAA applicants with ESAA terminals that will exceed the guidelines in Section 1.1310 for radio frequency radiation exposure shall provide, with their environmental assessment, a plan for mitigation of radiation exposure to the extent required to meet those guidelines. All ESAA licensees shall ensure installation of ESAA terminals on aircraft by qualified installers who have an understanding of the antenna's radiation environment and the measures best suited to maximize protection of the general public and persons operating the vehicle and equipment. An ESAA terminal exhibiting radiation exposure levels exceeding 1.0 mW/cm ² in accessible areas, such as at the exterior surface of the radome, shall have a label attached to the surface of the terminal warning about the radiation hazard and shall include thereon a diagram showing the regions around the terminal where the radiation levels could exceed 1.0 mW/cm ² .	<i>See</i> Application, File No. SES-LIC-20100805-00992, Technical Appendix at Att. A.; File No. SES-MFS-20120913-00818, Technical Appendix.

<p>§ 25.227(c)</p>	<p>(c) (1) Operations of ESAAs in the 14.0-14.2 GHz (Earth-to-space) frequency band in the radio line-of- sight of the NASA TDRSS facilities on Guam (latitude 13° 36' 55" N, longitude 144° 51' 22" E) or White Sands, New Mexico (latitude 32° 20' 59" N, longitude 106° 36' 31" W and latitude 32° 32' 40" N, longitude 106° 36' 48" W) are subject to coordination with the National Aeronautics and Space Administration (NASA) through the National Telecommunications and Information Administration (NTIA) Interdepartment Radio Advisory Committee (IRAC). Licensees shall notify the International Bureau once they have completed coordination. Upon receipt of such notification from a licensee, the International Bureau will issue a public notice stating that the licensee may commence operations within the coordination zone in 30 days if no party has opposed the operations.</p> <p>(2) When NTIA seeks to provide similar protection to future TDRSS sites that have been coordinated through the IRAC Frequency Assignment Subcommittee process, NTIA will notify the Commission's International Bureau that the site is nearing operational status. Upon public notice from the International Bureau, all Ku-band ESAA licensees shall cease operations in the 14.0-14.2 GHz band within radio line-of-sight of the new TDRSS site until the licensees complete coordination with NTIA/IRAC for the new TDRSS facility. Licensees shall notify the International Bureau once they have completed coordination for the new TDRSS site. Upon receipt of such notification from a licensee, the International Bureau will issue a public notice stating that the licensee may commence operations within the coordination zone in 30 days if no party has opposed the operations. The ESAA licensee then will be permitted to commence operations in the 14.0-14.2 GHz band within radio line-of-sight of the new TDRSS site, subject to any operational constraints developed in the coordination process.</p>	<p><i>See</i> Section 1.65 Letter, File Nos. SES-LIC-20100805-00992, SES-AMD-20100914-01163 and SES-AMD-20101115-01432 (Call Sign E100089) (Notice of NASA Coordination Agreement dated Feb. 1, 2011)</p>
<p>§ 25.227(d)</p>	<p>(d) (1) Operations of ESAA in the 14.47-14.5 GHz (Earth-to-space) frequency band in the radio line-of- sight of radio astronomy service (RAS) observatories observing in the 14.47-14.5 GHz band are subject to coordination with the National Science Foundation (NSF). The appropriate NSF contact point to initiate coordination is Electromagnetic Spectrum Manager, NSF, 4201 Wilson Blvd., Suite 1045, Arlington VA 22203, fax 703-292-9034, email esm@nsf.gov. Licensees shall notify the International Bureau once they have completed coordination. Upon receipt of the coordination agreement from a licensee, the International Bureau will issue a public notice stating that the licensee may commence operations within the coordination zone in 30 days if no party has opposed the operations.</p> <p>(2) A list of applicable RAS sites and their locations can be found in 25.226(d)(2) Table 1.</p> <p>(3) When NTIA seeks to provide similar protection to future RAS sites that have been coordinated through the IRAC Frequency Assignment Subcommittee process, NTIA will notify the Commission's International Bureau that the site is nearing operational status. Upon public notice from the International Bureau, all Ku-band ESAA licensees shall cease operations in the 14.47-14.5 GHz band within the relevant geographic zone of the new RAS site until the licensees complete coordination for the new RAS facility. Licensees shall notify the International Bureau once they have completed coordination for the new RAS site and shall submit the coordination agreement to the Commission. Upon receipt of such notification from a licensee, the International Bureau will issue a public notice stating that the licensee may commence operations within the coordination zone in 30 days if no party has opposed the operations. The ESAA licensee then will be permitted to commence operations in the 14.47-14.5 GHz band within the relevant coordination distance around the new RAS site, subject to any operational constraints developed in the coordination process.</p>	<p><i>See</i> Application, File No. SES-LIC-20100805-00992, Technical Appendix at Att. C.</p>

CERTIFICATIONS

Panasonic Avionics Corporation (“Panasonic”), pursuant to Section 25.227 of the FCC’s Rules, hereby certifies the following:

1. In accordance with Section 25.227(a)(15), as the operator of an ESAA system operating over international waters, Panasonic has confirmed with its target space station operators that its existing and proposed operations are within coordinated parameters for adjacent satellites up to six degrees away (+/- 6°) on the geostationary arc.
2. In accordance with Section 25.227(b)(7), Panasonic certifies that its existing and proposed operations comply with the following requirements of Section 25.227:
 - Per Section 25.227(a)(6), for each ESAA transmitter, Panasonic will time annotate and maintain a record for a period of not less than one year of the vehicle location (i.e., latitude/longitude/altitude), transmit frequency, channel bandwidth and satellite used. Records will be recorded at time intervals no greater than one (1) minute while the ESAA is transmitting. Panasonic will make this data available in the requisite format within 24 hours of a request from the Commission, NTIA, or a frequency coordinator for purposes of resolving harmful interference events.
 - Per Section 25.227(a)(9), each ESAA terminal will automatically cease transmitting within 100 milliseconds upon loss of reception of the satellite downlink signal or when it detects that unintended satellite tracking has happened or is about to happen.
 - Per Section 25.227(a)(10), each ESAA terminal will be subject to the monitoring and control by an NCMC. Each terminal will be able to receive “enable transmission” and “disable transmission” commands from the NCMC and must automatically cease transmissions immediately on receiving any “parameter change command”, which may cause harmful interference during the change, until it receives an “enable transmission” command from its NCMC. In addition, the NCMC will be able to monitor the operation of an ESAA terminal to determine if it is malfunctioning.
 - Per Section 25.227(a)(11), each ESAA terminal shall be self-monitoring and, should a fault which can cause harmful interference to FSS networks be detected, the terminal will automatically cease transmissions.

By:



Mark DeFazio
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Panasonic Avionics Corporation

August 25, 2014