



6712-01

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 2 and 25

[IB Docket No. 12-376; FCC 12-161]

Earth Stations Aboard Aircraft Communicating with Fixed-Satellite Service Geostationary-Orbit
Space Stations

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this Report and Order, the Federal Communications Commission (Commission) provides for the efficient licensing of two-way in-flight broadband services, including Internet access, to passengers and flight crews aboard commercial airliners and private aircraft. Specifically, the Report and Order establishes technical and licensing rules for Earth Stations Aboard Aircraft (ESAA), *i.e.*, earth stations on aircraft communicating with Fixed-Satellite Service (FSS) geostationary-orbit (GSO) space stations operating in the 10.95-11.2 GHz, 11.45-11.7 GHz, 11.7-12.2 GHz (space-to-Earth or downlink) and 14.0-14.5 GHz (Earth-to-space or uplink) frequency bands.

DATES: Effective [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER], except for §§ 25.132(b)(3), and 25.227(b), (c), and (d), which contain new information collection requirements that require approval by the Office of Management and Budget (OMB) under the PRA. The Federal Communications Commission will publish a document in the Federal Register announcing such approval and the relevant effective date.

FOR FURTHER INFORMATION CONTACT: Andrea Kelly, Satellite Division, International Bureau, (202) 418-0719, or Howard Griboff, Policy Division, International Bureau,

(202) 418-1460.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission's Report and Order, adopted on December 20, 2012, and released on December 28, 2012 (FCC 12-161). The full text of this document is available for inspection and copying during normal business hours in the Commission Reference Center, 445 12th Street, SW, Washington, DC 20554. The document is also available for download over the Internet at

http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-12-161A1.doc. The complete text may also be purchased from the Commission's copy contractor, Best Copy and Printing, in person at 445 12th Street, S.W., Room CY-B402, Washington, D.C. 20554, via telephone at (202) 488-5300, via facsimile at (202) 488-5563, or via e-mail at Commission@bcpiweb.com.

Summary of the Report and Order

On January 18, 2005, the Commission adopted the Notice of Proposed Rulemaking in IB Docket No. 05-20 (Order) (70 FR 20508-01), recognizing the emergence of the new market for geostationary-orbit (GSO) Fixed-Satellite Service (FSS) operations by proposing more flexible use of the 11.7-12.2 GHz and 14.0-14.5 GHz bands while protecting existing terrestrial and satellite services from harmful interference. The Order proposed to allocate the 11.7-12.2 GHz (space-to-Earth) frequency band on a primary basis for transmissions to earth stations onboard airborne aircraft from GSO FSS space stations, and the 14.0-14.5 GHz (Earth-to-space) frequency band on a secondary basis for transmissions to GSO FSS space stations from earth stations onboard airborne aircraft. The Order also proposed technical and licensing rules for these systems. In this Report and Order, the Commission allocates ESAA on a primary basis in the 11.7-12.2 GHz (space-to-Earth) band, allocating ESAA on an unprotected basis in the 10.95-11.2 GHz and 11.45-11.7 GHz (space-to-Earth) bands, and allocating ESAA on a secondary

basis in the 14.0-14.5 GHz band (Earth-to-space). In addition, this Report and Order requires ESAA licensees to coordinate their operations with stations in the Space Research Service and the Radioastronomy Service to prevent interference and adopts technical rules for the operation of ESAA systems to ensure that ESAA systems do not interfere with other FSS users or terrestrial Fixed Service (FS) users. Further, this Report and Order adopts licensing requirements and operational requirements for ESAA for both U.S.-registered aircraft and for non-U.S.-registered aircraft operating in U.S. airspace and requires all ESAA licensees to operate consistently with the Communications Assistance to Law Enforcement Act (CALEA). At this time, the Report and Order declines to extend certain requirements concerning 1.5/1.6 GHz safety services to other frequency bands, including those used by ESAA.

Final Regulatory Flexibility Analysis

The Regulatory Flexibility Act of 1980, as amended (RFA), requires that a regulatory flexibility analysis be prepared for notice-and-comment rule making proceedings, unless the agency certifies that “the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.” The RFA directs agencies to provide a description of and, where feasible, an estimate of the number of small entities that may be affected by the rules adopted herein. The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.” In addition, the term “small business” has the same meaning as the term “small business concern” under the Small Business Act. A small business concern is one that: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA). In light of the rules adopted in this Report and Order, we find that the category of Satellite Telecommunications licensees is affected

by the new rules. Two economic census categories address the satellite industry. The first category has a small business size standard of \$15 million or less in average annual receipts, under SBA rules. The second has a size standard of \$25 million or less in annual receipts. The category of Satellite Telecommunications “comprises establishments primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.” Census Bureau data for 2007 show that 512 Satellite Telecommunications firms that operated for that entire year. Of this total, 464 firms had annual receipts of under \$10 million, and 18 firms had receipts of \$10 million to \$24,999,999. Consequently, the Commission estimates that the majority of Satellite Telecommunications firms are small entities that might be affected by our action. The second category, *i.e.*, “All Other Telecommunications” comprises “establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. For this category, Census Bureau data for 2007 show that there were a total of 2,383 firms that operated for the entire year. Of this total, 2,347 firms had annual receipts of under \$25 million and 12 firms had annual receipts of \$25 million to \$49,999,999. Consequently, the Commission estimates that the majority of All Other Telecommunications firms are small entities that might be affected by our action. Commission records reveal that there are approximately 20 space station licensees and operators 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. The Commission does not

request or collect annual revenue information concerning such licensees and operators, and thus is unable to estimate the number of geostationary space station licensees and operators that would constitute a small business under the SBA definition cited above, or apply any rules providing special consideration for geostationary space station licensees and operators that are small businesses. Currently there are approximately 2,879 operational Fixed-Satellite Service transmit/receive earth stations authorized for use in the band. The Commission does not request or collect annual revenue information, and thus is unable to estimate the number of earth stations that would constitute a small business under the SBA definition. In this Report and Order, we require satellite operators to maintain tracking data on the location of airborne terminals for one year. This database will assist investigations of radio frequency interference claims. ESAA operators must name a point of contact to maintain information about location and frequencies used by ESAA terminals. Such information will assist in investigating radio frequency interference claims. The Commission does not expect significant costs associated with these proposals. Therefore, we do not anticipate that the burden of compliance will be greater for smaller entities. The RFA requires that, to the extent consistent with the objectives of applicable statutes, the analysis shall discuss significant alternatives such as: (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities. In adopting blanket licensing with 15-year terms for conforming ESAA terminals, the Report and Order simplifies the application process for ESAA and establishes licensing terms consistent with other satellite-based services, such as ESV and VMES. Thus, adoption of the

rules should reduce the costs associated with obtaining and maintaining authority to operate an ESAA network.

Final Paperwork Reduction Act of 1995 Analysis

This Report and Order contains new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13 (44.U.S.C. 3501-3520). The requirements will be submitted to the Office of Management and Budget (OMB) for review under section 3507(d) of the PRA. OMB, the general public, and other Federal agencies will be invited to comment on the new or modified information collection requirements contained in this proceeding in a separate notice that will be published in the Federal Register inviting comment on the new or revised requirements. The requirements will not go into effect until OMB has approved them and the Commission has published a notice announcing the effective date of the information collection requirements. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees. In Report and Order, we have assessed the effects of the new rules that impose various requirements on ESAA providers, and find that the collection of information requirements will not have a significant impact on small business concerns with fewer than 25 employees.

Congressional Review Act

The Commission will send a copy of this Report and Order to Congress and the Government Accountability Office pursuant to the Congressional Review Act, see 5 U.S.C. 801(a)(1)(A).

Ordering Clauses

IT IS ORDERED that, pursuant to the authority contained in sections 4(i), 4(j), 7(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), 303(r), and 303(y) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 154(j), 157(a), 302(a), 303(c), 303(e), 303(f), 303(g), 303(j), 303(r), 303(y), this Report and Order in IB Docket No. 05-20 IS ADOPTED.

IT IS FURTHER ORDERED that parts 2 and 25 of the Commission's rules ARE AMENDED and SHALL BE EFFECTIVE 30 days after the date of publication in the Federal Register, except for §§ 25.132(b)(3), and 25.227(b), (c), and (d), which contain new information collection requirements that require approval by the Office of Management and Budget (OMB) under the PRA. The Federal Communications Commission will publish a document in the Federal Register announcing such approval and the relevant effective date.

IT IS FURTHER ORDERED that the final regulatory flexibility analysis, as required by section 604 of the Regulatory Flexibility Act, IS ADOPTED.

IT IS FURTHER ORDERED that the International Bureau is delegated authority to issue Public Notices consistent with this Report and Order.

IT IS FURTHER ORDERED that IB Docket No. 05-20 IS TERMINATED.

IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center SHALL SEND a copy of this Report and Order and the

related Notice of Proposed Rulemaking, including the final regulatory flexibility analysis and initial regulatory flexibility analysis, to the Chief Counsel for Advocacy of the Small Business Administration, in accordance with section 603(a) of the Regulatory Flexibility Act, 5 U.S.C. 601, et seq.

List of Subjects in 47 CFR Parts 2 and 25

Frequency allocations, Satellites.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch,
Secretary.

Final rule

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 2 and 25 as follows:

**PART 2 – FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS;
GENERAL RULES AND REGULATIONS**

1. The authority citation for Part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Amend § 2.106, the Table of Frequency Allocations, to read as follows:

a. Pages 47-49 are revised.

b. In the list of United States (US) Footnotes, footnote US133 is added in alphanumerical order.

c. In the list of non-Federal Government (NG) Footnotes, footnotes NG52, NG54, and NG55 are added in alphanumerical order and footnotes NG104, NG182, NG184, and NG186 are removed.

The revisions and additions read as follows:

§ 2.106 Table of Frequency Allocations.

* * * * *

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
10-10.45 FIXED MOBILE RADIOLOCATION Amateur 5.479	10-10.45 RADIOLOCATION Amateur 5.479 5.480	10-10.45 FIXED MOBILE RADIOLOCATION Amateur 5.479	10-10.5 RADIOLOCATION US108 G32	10-10.45 Amateur Radiolocation US108 5.479 US128 NG50	Private Land Mobile (90) Amateur Radio (97)
10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481			5.479 US128	10.45-10.5 Amateur Amateur-satellite Radiolocation US108 US128 NG50	
10.5-10.55 FIXED MOBILE Radiolocation	10.5-10.55 FIXED MOBILE RADIOLOCATION		10.5-10.55 RADIOLOCATION US59		Private Land Mobile (90)
10.55-10.6 FIXED MOBILE except aeronautical mobile Radiolocation			10.55-10.6	10.55-10.6 FIXED	Fixed Microwave (101)
10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482 5.482A			10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) US130 US131 US265	10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED US265 SPACE RESEARCH (passive) US130 US131	
10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.483			10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US131 US246		
10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A MOBILE except aeronautical mobile		10.7-11.7 US131 US211	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 US131 US211 NG52	Satellite Communications (25) Fixed Microwave (101)
11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	11.7-12.1 FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A 5.488 Mobile except aeronautical mobile 5.485 12.1-12.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.488 5.485 5.489	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.487 5.487A	11.7-12.2	11.7-12.2 FIXED-SATELLITE (space-to-Earth) 5.485 5.488 NG55 NG143 NG183 NG187	Satellite Communications (25)

5.487 5.487A 12.5-12.75 FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space)	12.2-12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492	12.2-12.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING 5.484A 5.487	12.2-12.75	12.2-12.7 FIXED BROADCASTING-SATELLITE 5.487A 5.488 5.490	Satellite Communications (25) Fixed Microwave (101)
5.494 5.495 5.496 12.75-13.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)	5.487A 5.488 5.490 12.7-12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	12.5-12.75 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A MOBILE except aeronautical mobile BROADCASTING-SATELLITE 5.493	12.75-13.25	12.7-12.75 FIXED NG118 FIXED-SATELLITE (Earth-to-space) MOBILE 12.75-13.25 FIXED NG118 FIXED-SATELLITE (Earth-to-space) 5.441 NG52 MOBILE	TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101) Satellite Communications (25) TV Broadcast Auxiliary (74F) Cable TV Relay (78) Fixed Microwave (101)
13.25-13.4 EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A 5.499			US251	US251 NG53	Aviation (87)
13.4-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B			13.25-13.4 EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A	13.25-13.4 AERONAUTICAL RADIONAVIGATION 5.497 Earth exploration-satellite (active) Space research (active)	
13.75-14 FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 5.499 5.500 5.501 5.502 5.503			13.4-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.501B	13.4-13.75 Earth exploration-satellite (active) Radiolocation Space research Standard frequency and time signal-satellite (Earth-to-space)	Private Land Mobile (90)
			13.75-14 RADIOLOCATION G59 Standard frequency and time signal-satellite (Earth-to-space) Space research US337	13.75-14 FIXED-SATELLITE (Earth-to-space) US337 Standard frequency and time signal-satellite (Earth-to-space) Space research Radiolocation	Satellite Communications (25) Private Land Mobile (90)
			US356 US357	US356 US357	

International Table			United States Table		FCC Rule Part(s)
Region 1 Table	Region 2 Table	Region 3 Table	Federal Table	Non-Federal Table	
14-14.25 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.504C 5.506A Space research			14-14.2 Space research US133	14-14.2 FIXED-SATELLITE (Earth-to-space) NG54 NG183 NG187 Mobile-satellite (Earth-to-space) Space research US133	Satellite Communications (25)
5.504A 5.505 14.25-14.3 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.508A Space research			14.2-14.4	14.2-14.47 FIXED-SATELLITE (Earth-to-space) NG54 NG183 NG187 Mobile-satellite (Earth-to-space)	
5.504A 5.505 5.508 14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A	14.3-14.4 FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B Mobile-satellite (Earth-to-space) 5.506A Radionavigation-satellite 5.504A	14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A			
14.4-14.47 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Space research (space-to-Earth) 5.504A			14.4-14.47 Fixed Mobile		
14.47-14.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radio astronomy 5.149 5.504A			14.47-14.5 Fixed Mobile US133 US203 US342	14.47-14.5 FIXED-SATELLITE (Earth-to-space) NG54 NG183 NG187 Mobile-satellite (Earth-to-space) US133 US203 US342	
14.5-14.8 FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research			14.5-14.7145 FIXED Mobile Space research 14.7145-14.8 MOBILE Fixed Space research	14.5-14.8	
14.8-15.35 FIXED MOBILE Space research			14.8-15.1365 MOBILE SPACE RESEARCH Fixed US310	14.8-15.1365 US310	

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UNITED STATES (US) FOOTNOTES

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US133 In the bands 14-14.2 GHz and 14.47-14.5 GHz, the following provisions shall apply to the operations of Earth Stations Aboard Aircraft (ESAA):

(a) In the band 14-14.2 GHz, ESAA licensees proposing to operate within radio line-of-sight of the coordinates specified in 47 CFR 25.227(c) are subject to prior coordination with NTIA in order to minimize harmful interference to the ground terminals of NASA's Tracking and Data Relay Satellite System (TDRSS).

(b) In the band 14.47-14.5 GHz, operations within radio line-of-sight of the radio astronomy stations specified in 47 CFR 25.226(d)(2) are subject to coordination with the National Science Foundation in accordance with 47 CFR 25.227(d).

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NON-FEDERAL GOVERNMENT (NG) FOOTNOTES

* * * * *

NG52 Except as otherwise provided for herein, use of the bands 10.7-11.7 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by geostationary satellites in the fixed-satellite service (FSS) shall be limited to international systems, i.e., other than domestic systems. In the sub-bands 10.95-11.2 GHz and 11.45-11.7 GHz, Earth Stations on Vessels (ESV), Vehicle-Mounted Earth Stations (VMES), and Earth Stations Aboard Aircraft (ESAA) as regulated under 47 CFR part 25 may be authorized for the reception of FSS emissions from geostationary satellites, subject to the condition that these earth stations shall not claim protection from transmissions of non-Federal stations in the fixed service.

* * * * *

NG54 In the band 14-14.5 GHz, Earth Stations Aboard Aircraft (ESAA) as regulated under 47 CFR part 25 may be authorized to communicate with geostationary satellites in the fixed-satellite service (Earth-to-space), subject to the condition that ESAA shall not claim protection from, nor cause interference to, earth stations at given positions (where the given position may be a specified fixed point or any fixed point within specified areas).

NG55 In the band 11.7-12.2 GHz, Earth Stations Aboard Aircraft (ESAA) as regulated under 47 CFR part 25 are an application of the fixed-satellite service and may be authorized to communicate with geostationary satellites in the fixed-satellite service (space-to-Earth) on a primary basis.

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PART 25 – SATELLITE COMMUNICATIONS

3. The authority citation for Part 25 continues to read as follows:

AUTHORITY: 47 U.S.C. 701-744. Interprets or applies Sections 4, 301, 302, 303, 307, 309, and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309, and 332 unless otherwise noted.

4. Section 25.115 is amended by revising paragraph (a)(2)(iii) to read as follows:

§ 25.115 Application for earth station authorizations.

* * * * *

(a) * * *

(2) * * *

(iii) The earth station is not an ESV, VMES or ESAA.

* * * * *

5. Section 25.130 is amended by revising paragraph (a) introductory text to read as follows:

§ 25.130 Filing requirements for transmitting earth stations.

(a) Applications for a new or modified transmitting earth station facility shall be submitted on FCC Form 312, and associated Schedule B, accompanied by any required exhibits, except for those earth station applications filed on FCC Form 312EZ pursuant to § 25.115(a). All such earth station license applications must be filed electronically through the International Bureau Filing System (IBFS) in accordance with the applicable provisions of part 1, subpart Y of this chapter. Additional filing requirements for Earth Stations on Vessels are described in §§ 25.221 and 25.222. Additional filing requirements for Vehicle-Mounted Earth Stations are described in § 25.226. Additional filing requirements for Earth Stations Aboard Aircraft are described in § 25.227. In addition, applicants that are not required to submit applications on Form 312EZ, other than ESV, VMES or ESAA applicants, must submit the following information to be used as an “informative” in the public notice issued under § 25.151 as an attachment to their application:

* * * * *

6. Section 25.132 is amended by revising paragraph (b)(3) to read as follows:

§ 25.132 Verification of earth station antenna performance standards.

* * * * *

(b) * * *

(3) Applicants seeking authority to use an antenna that does not meet the standards set forth in § 25.209(a) and (b), pursuant to the procedure set forth in § 25.220, § 25.221, § 25.222, § 25.223, §

25.226 or § 25.227, are required to submit a copy of the manufacturer's range test plots of the antenna gain patterns specified in paragraph (b)(1) of this section.

* * * * *

7. Section 25.201 is amended by adding a definition of Earth Stations Aboard Aircraft (ESAA) in alphabetical order to read as follows:

§ 25.201 Definitions.

* * * * *

Earth Stations Aboard Aircraft (ESAA). 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 pursuant to the requirements set out § 25.227.

* * * * *

8. Section 25.202 is amended by adding paragraph (a)(11) to read as follows:

§ 25.202 Frequencies, frequency tolerance and emission limitations.

* * * * *

(a)(11)(i) The following frequencies are available for use by Earth Stations Aboard Aircraft (ESAA):

10.95-11.2 GHz (space-to-Earth)

11.45-11.7 GHz (space-to-Earth)

11.7-12.2 GHz (space-to-Earth)

14.0-14.5 GHz (Earth-to-space)

(ii) ESAAAs shall be authorized as set forth in § 25.227.

* * * * *

9. Section 25.203 is amended by revising the introductory text in paragraph (c), and paragraphs (d) and (k) to read as follows:

§ 25.203 Choice of sites and frequencies.

* * * * *

(c) Prior to the filing of its application, an applicant for operation of an earth station, other than an ESV, VMES or ESAA, shall coordinate the proposed frequency usage with existing terrestrial users and with applicants for terrestrial station authorizations with previously filed applications in accordance with the following procedure:

* * * * *

(d) An applicant for operation of an earth station, other than an ESV, VMES or an ESAA, shall also ascertain whether the great circle coordination distance contours and rain scatter coordination distance contours, computed for those values of parameters indicated in § 25.251 (Appendix 7 of the ITU RR) for international coordination, cross the boundaries of another Administration. In this case, the applicant shall furnish the Commission copies of these contours on maps drawn to appropriate scale for use by the Commission in effecting coordination of the proposed earth station with the Administration(s) affected.

* * * * *

(k) An applicant for operation of an earth station, other than an ESV, VMES or an ESAA, that will operate with a geostationary satellite or non-geostationary satellite in a shared frequency band in which the non-geostationary system is (or is proposed to be) licensed for feeder links, shall demonstrate in its applications that its proposed earth station will not cause unacceptable interference to any other satellite network that is authorized to operate in the same frequency band, or certify that the operations of its earth station shall conform to established coordination

agreements between the operator(s) of the space station(s) with which the earth station is to communicate and the operator(s) of any other space station licensed to use the band.

* * * * *

10. Section 25.204 is amended by adding paragraph (k) to read as follows:

§ 25.204 Power limits.

* * * * *

(k) Within radio line-of-sight of the Tracking and Data Relay System Satellite (TDRSS) sites identified in § 25.227(c), ESAA transmissions in the 14.0-14.2 GHz (Earth-to-space) band shall not exceed an EIRP spectral density towards or below the horizon of 12.5 dBW/MHz, and shall not exceed an EIRP towards or below the horizon of 16.3 dBW.

11. Section 25.205 is amended by adding paragraph (d) to read as follows:

§ 25.205 Minimum angle of antenna elevation.

* * * * *

(d) While on the ground, ESAAs shall not be authorized for transmission at angles less than 5° measured from the plane of the horizon to the direction of maximum radiation. While in flight there is no minimum angle of antenna elevation.

12. Section 25.209 paragraph (f) is revised to read as follows:

§ 25.209 Antenna performance standards.

* * * * *

(f) An earth station with an antenna not conforming to the standards of paragraphs (a) and (b) of this section will be authorized only if the applicant meets its burden of demonstrating that its antenna will not cause unacceptable interference. For ESVs in the C-band, this demonstration must comply with the procedures set forth in § 25.221. For ESVs in the Ku-band, this demonstration must comply with the

procedures set forth in § 25.222. For VMES, this demonstration shall comply with the procedures set forth in § 25.226. For ESAAs, this demonstration shall comply with the procedures set forth in § 25.227. For feeder-link earth stations in the 17/24 GHz BSS, this demonstration must comply with the procedures set forth in § 25.223. For other FSS earth stations, this demonstration must comply with the procedures set forth in §§ 25.218 or 25.220. In any case, the Commission will impose appropriate terms and conditions in its authorization of such facilities and operations.

* * * * *

13. Section 25.218 is amended by revising the section heading and paragraph (a)(1) to read as follows:

§ 25.218 Off-axis EIRP density envelope for FSS earth station operators.

(a) * * *

(1) ESV, VMES and ESAA applications

* * * * *

14. Section 25.220 is amended by revising paragraph (a)(1) to read as follows:

§ 25.220 Non-conforming transmit/receive earth station operations.

(a)(1) This section applies to earth station applications other than ESV, VMES, ESAA and 17/24 GHz BSS feeder link applications in which the proposed earth station operations do not fall within the applicable off-axis EIRP density envelope specified in § 25.218.

* * * * *

15. Add § 25.227 to Subpart C of Part 25 to read as follows:

§ 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.

(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) through (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.

(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 section. ESAA licensees operating under this section 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 (iii) of this section.

(i) An ESAA licensee shall not exceed the off-axis EIRP spectral-density limits and conditions defined in paragraphs (a)(1)(i)(A) through (D) of this subsection.

(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 ESAA 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.

(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 paragraph (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.

(C) The off-axis EIRP spectral-density for cross-polarized signals emitted from the ESAA shall not exceed the following values:

$5 - 10 \log_{10} (N) - 25 \log_{10} \theta$	dBW/4kHz	For	$1.8^\circ < \theta \leq 7^\circ$
$-16 - 10 \log_{10} (N)$	dBW/4kHz	For	$7^\circ < \theta \leq 9.2^\circ$

where θ and N are defined in paragraph (a)(1)(i)(A). This off-axis EIRP spectral-density applies in the plane of the geostationary satellite orbit as it appears at the particular earth station location.

(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.

(iii) Each ESAA transmitter shall meet one of the following cessation of emission requirements:

(A) For ESAAAs 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.

(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.

(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.

(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.

(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.

(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.

(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.

(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) through (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) through (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.

(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.

(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.

(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.

(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.

(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.

(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.

(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.

(7) In the 10.95-11.2 GHz (space-to-Earth) and 11.45-11.7 GHz (space-to-Earth) frequency bands ESAA's 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.

(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.

(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.

(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.

(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.

(12) Unless otherwise stated all ESAA system that comply with the off-axis EIRP spectral-density limits in paragraph (a)(1)(i) of this section may request ALSAT authority.

(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 · θ	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.

(14) All ESAA terminals operated in U.S. airspace must be licensed by the Commission.

(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.

(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.

(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.

(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.

(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.

(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.

(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.

(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.

(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.

(iii) An ESAA applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(A) of this section shall:

(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 ($\bar{\sigma}$) from the mean value; and

(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° .

(iv) An ESAA applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section shall:

(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

(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.

(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:

(i) A statement from the target satellite operator certifying that the proposed operation of the ESAA has the potential to receive harmful interference from adjacent satellite networks that may be unacceptable.

(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).

(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.

(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.

(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:

(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 co-frequency terminals operating with the same satellite transponder at least 1 dB below the off-axis EIRP density limits defined in paragraphs (a)(1)(i)(A) through (C) of this section. 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 ESAA transmitter operating at 1 dB below the limits defined in paragraphs (a)(1)(i)(A) through (C) of this section. The applicant also must 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. The International Bureau will place this showing on public notice along with the application.

(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:

(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.

(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.

(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).

(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.

(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.

(F) An identification of the specific satellite or satellites with which the ESAA system will operate.

(4) There shall be an exhibit included with the application describing the geographic area(s) in which the ESAA will operate.

(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.

(6) The point of contact referred to in paragraph (a)(5) of this section shall be included in the application.

(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 paragraphs (a)(6), (a)(9), (a)(10), and (a)(11) of this section.

(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 § 1.1310 of this chapter 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/cm² 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/cm².

(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.

(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.

(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.

(2) A list of applicable RAS sites and their locations can be found in § 25.226(d)(2)

Table 1.

(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.

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