

(1) For each ESV transmitter, a record of the ship location (*i.e.*, latitude/longitude), transmit frequency, channel bandwidth and satellite used shall be time annotated and maintained for a period of not less than 1 year. Records will be recorded at time intervals no greater than every 20 minutes while the ESV is transmitting. The ESV operator will make this data available upon request to a coordinator, fixed system operator, fixed-satellite system operator, or the Commission within 24 hours of the request.

(2) ESV operators communicating with vessels of foreign registry must maintain detailed information on each vessel's country of registry and a point of contact for the relevant administration responsible for licensing ESVs.

(3) ESV operators shall control all ESVs by a Hub earth station located in the United States, except that an ESV on U.S.-registered vessels may operate under control of a Hub earth station location outside the United States provided the ESV operator maintains a point of contact within the United States that will have the capability and authority to cause an ESV on a U.S.-registered vessel to cease transmitting if necessary.

(4) ESVs, operating while docked, that complete coordination with terrestrial stations in the 3700–4200 MHz band in accordance with § 25.251, shall receive protection from such terrestrial stations in accordance with the coordination agreements, for 180 days, renewable for 180 days.

(d) ESVs in motion shall not claim protection from harmful interference from any authorized terrestrial stations or lawfully operating satellites to which frequencies are either already assigned, or may be assigned in the future in the 3700–4200 MHz (space-to-Earth) frequency band.

(e) ESVs operating in the 5925–6425 MHz (Earth-to-space) band, within 200 km from the baseline of the United States, or within 200 km from a fixed service offshore installation, shall complete coordination prior to operation. The coordination method and the interference criteria objective shall be determined by the frequency coordinator. The details of the coordination shall be maintained and available at

the frequency coordinator, and shall be filed with the Commission to be placed on Public Notice. Operation of each individual ESV may commence immediately after the Public Notice is released that identifies the notification sent to the Commission. Continuance of operation of that ESV for the duration of the coordination term shall be dependent upon successful completion of the normal public notice process. If any objections are received to the coordination prior to the end of the 30-day comment period of the Public Notice, the licensee shall immediately cease operation of that particular station until the coordination dispute is resolved and the ESV licensee informs the Commission of the resolution.

(f) ESV operators must automatically cease transmission if the ESV operates in violation of the terms of its coordination, including, but not limited to, conditions related to speed of the vessel or if the ESV travels outside the coordinated area, if within 200 km from the baseline of the United States, or within 200 km from a fixed service offshore installation. Transmissions may be controlled by the ESV network. The frequency coordinator may decide whether ESV operators should automatically cease transmissions if the vessel falls below a prescribed speed within a prescribed geographic area.

[70 FR 4784, Jan. 31, 2005, as amended at 70 FR 33377, June 8, 2005]

**§ 25.222 Blanket Licensing provisions for Earth Stations on Vessels (ESVs) receiving 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) 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) All applications for licenses for ESVs receiving 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) frequency bands, and transmitting in the 14.0–14.5 GHz (Earth-to-space) frequency band, to Geostationary Satellites in the fixed-satellite service shall provide sufficient data to demonstrate that the ESV operations meet the following criteria,

which are ongoing requirements that govern all ESV licensees and operations in these bands:

(1) The off-axis EIRP spectral density for co-polarized signals, emitted from the ESV in the plane of the geostationary satellite orbit as it appears at the particular earth station location (*i.e.*, the plane determined by the focal point of the antenna and the line tangent to the arc of the geostationary satellite orbit at the position of the target satellite), shall not exceed the following values:

$$\begin{aligned} &15 - 25\log(\theta) - 10\log(N) \text{ dBW/4kHz for } 1.25^\circ \leq \theta \leq 7.0^\circ \\ &-6 - 10 \log(N) \text{ dBW/4kHz for } 7.0^\circ < \theta \leq 9.2^\circ \\ &18 - 25\log(\theta) - 10\log(N) \text{ dBW/4kHz for } 9.2^\circ < \theta \leq 48^\circ \\ &-24 - 10\log(N) \text{ dBW/4kHz for } 48^\circ < \theta \leq 180^\circ \end{aligned}$$

where  $\theta$  is the angle in degrees from the axis of the main lobe. For an ESV network using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique,  $N$  is equal to one. For an ESV network using code division multiple access (CDMA) technique,  $N$  is the maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam.

(2) In all other directions, the off-axis EIRP spectral density for co-polarized signals emitted from the ESV shall not exceed the following values:

$$\begin{aligned} &18 - 25\log(\theta) - 10\log(N) \text{ dBW/4kHz for } 1.25^\circ \leq \theta \leq 48^\circ \\ &-24 - 10\log(N) \text{ dBW/4kHz for } 48^\circ < \theta \leq 180^\circ \end{aligned}$$

where  $\theta$  and  $N$  are defined as set forth in paragraph (a)(1) of this section.

(3) For  $\theta > 7^\circ$ , the values given in paragraphs (a)(1) of this section may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the criteria given by more than 3 dB.

(4) In all directions, the off-axis EIRP spectral density for cross-polarized signals emitted from the ESV shall not exceed the following values:

$$\begin{aligned} &5 - 25\log(\theta) - 10\log(N) \text{ dBW/4kHz for } 1.8^\circ \leq \theta \leq 7^\circ \\ &-16 - 10\log(N) \text{ dBW/4kHz for } 7^\circ \leq \theta \leq 9.2^\circ \end{aligned}$$

where  $\theta$  and  $N$  are defined as set forth in paragraph (a)(1) of this section.

(5) For non-circular ESV antennas, the major axis of the antenna will be aligned with the tangent to the geostationary satellite orbital arc at the target satellite point, to the extent required to meet specified off-axis e.i.r.p. criteria.

(6) A pointing error of less than  $0.2^\circ$ , between the orbital location of the target satellite and the axis of the main lobe of the ESV antenna.

(7) All emissions from the ESV shall automatically cease within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the ESV antenna exceeds  $0.5^\circ$ , and transmission will not resume until such angle is less than  $0.2^\circ$ .

(8) There shall be a point of contact in the United States, with phone number and address included with the application, available 24 hours a day, seven days a week, with authority and ability to cease all emissions from the ESVs, either directly or through the facilities of a U.S. Hub or a Hub located in another country with which the U.S. has a bilateral agreement that enables such cessation of emissions.

(9) ESVs that exceed the radiation guidelines of §1.1310 of this chapter, Radiofrequency radiation exposure limits, must provide, with their environmental assessment, a plan for mitigation of radiation exposure to the extent required to meet those guidelines.

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

(b) Applications for ESV operation in the 14.0-14.5 GHz (Earth-to-space) to geostationary satellites in the fixed-satellite service must include, in addition to the particulars of operation identified on Form 312 and associated Schedule B, the following data for each earth station antenna type:

(1) A series of e.i.r.p. density charts or tables, calculated for a production earth station antenna, based on measurements taken on a calibrated antenna range at 14.25 GHz, with the off-axis e.i.r.p. envelope set forth in paragraphs (a)(1) through (a)(4) of this section superimposed, as follows:

(i) Showing off-axis co-polarized e.i.r.p. spectral density in the azimuth plane, for off-axis angles from minus 10° to plus 10° and from minus 180° to plus 180°.

(ii) Showing off-axis co-polarized e.i.r.p. spectral density in the elevation plane, at off-axis angles from 0° to plus 30°.

(iii) Showing off-axis cross-polarized e.i.r.p. spectral density in the azimuth plane, at off-axis angles from minus 10° to plus 10°.

(iv) Showing off-axis cross-polarized e.i.r.p. spectral density in the elevation plane, at off-axis angles from minus 10° to plus 10°; or

(2) A series of gain charts or tables, for a production earth station antenna, measured on a calibrated antenna range at 14.25 GHz, with the Earth station antenna gain envelope set forth in § 25.209(a) and (b) superimposed, for the same planes and ranges enumerated in paragraphs (b)(1)(i) through (b)(1)(iv) of this section, that, combined with input power density entered in Schedule B, demonstrates that off-axis e.i.r.p. spectral density envelope set forth in paragraphs (a)(1) through (a)(4) of this section will be met; or

(3) A certification that the ESV antenna conforms to the gain pattern criteria of § 25.209(a) and (b), that, combined with input power density entered in Schedule B, demonstrates that the off-axis e.i.r.p. spectral density envelope set forth in paragraphs (a)(1) through (a)(4) of this section will be met.

(c) ESVs receiving 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) frequency bands, and transmitting in the 14.0–14.5 GHz (Earth-to-space) frequency band shall operate with the following provisions:

(1) For each ESV transmitter a record of the ship location (*i.e.*, latitude/longitude), transmit frequency, channel bandwidth and satellite used shall be time annotated and maintained for a period of not less than 1 year. Records will be recorded at time intervals no greater than every 20 minutes while the ESV is transmitting. The ESV operator will make this data available upon request to a coordinator, fixed system operator, fixed-sat-

ellite system operator, NTIA, or the Commission within 24 hours of the request.

(2) ESV operators communicating with vessels of foreign registry must maintain detailed information on each vessel's country of registry and a point of contact for the relevant administration responsible for licensing ESVs.

(3) ESV operators shall control all ESVs by a Hub earth station located in the United States, except that an ESV on U.S.-registered vessels may operate under control of a Hub earth station location outside the United States provided the ESV operator maintains a point of contact within the United States that will have the capability and authority to cause an ESV on a U.S.-registered vessel to cease transmitting if necessary.

(d) Operations of ESVs in the 14.0–14.2 GHz (Earth-to-space) frequency band within 125 km of the NASA TDRSS facilities on Guam (located at 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 through the National Telecommunications and Information Administration (NTIA) Interdepartment Radio Advisory Committee (IRAC). 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 that the site is nearing operational status. Upon public notice from the Commission, all Ku-band ESV operators must cease operations in the 14.0–14.2 GHz band within 125 km of the new TDRSS site until after NTIA/IRAC coordination for the new TDRSS facility is complete. ESV operations will then again be permitted to operate in the 14.0–14.2 GHz band within 125 km of the new TDRSS site, subject to any operational constraints developed in the coordination process.

(e) Operations of ESVs in the 14.47–14.5 GHz (Earth-to-space) frequency band within a) 45 km of the radio observatory on St. Croix, Virgin Islands (latitude 17° 46' N, longitude 64° 35' W); b) 125 km of the radio observatory on Mauna Kea, Hawaii (at latitude 19° 48'

N, longitude 155° 28' W); and c) 90 km of the Arecibo Observatory on Puerto Rico (latitude 18° 20' 46" W, longitude 66° 45' 11" N) are subject to coordination through the National Telecommunications and Information Administration (NTIA) Interdepartment Radio Advisory Committee (IRAC).

(f) In the 10.95–11.2 GHz (space-to-Earth) and 11.45–11.7 GHz (space-to-Earth) frequency bands ESVs 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.

[70 FR 4786, Jan. 31, 2005, as amended at 70 FR 33377, June 8, 2005]

**§ 25.223 Off-axis EIRP spectral density limits for feeder link earth stations in the 17/24 GHz BSS.**

(a) This section applies to all applications for earth station licenses in the 17/24 GHz BSS frequency bands, except for applications in which the proposed antenna does not conform to the standards of §§25.209(a) and (b), and/or the proposed power density levels are in excess of those specified in §25.212(f) of this part.

(b) All applications for earth station licenses in the 24.75–25.25 GHz portion of 17/24 GHz BSS shall be routinely processed if they meet the following requirements:

(1) 17/24 GHz BSS earth station antenna off-axis EIRP spectral density for co-polarized signals shall not exceed the following values, within ±3° of the GSO arc, under clear sky conditions:

32.5–25log(θ) .....	dBW/MHz .....	for 2° ≤ θ ≤ 7°
11.4 .....	dBW/MHz .....	for 7° ≤ θ ≤ 9.2°
35.5–25log(θ) .....	dBW/MHz .....	for 9.2° ≤ θ ≤ 48°
3.5 .....	dBW/MHz .....	for 48° ≤ θ ≤ 180°

Where θ is the angle in degrees from the axis of the main lobe.

(2) 17/24 GHz BSS earth station antenna off-axis EIRP spectral density for co-polarized signals shall not exceed the following values, for all directions other than within ±3° of the GSO arc, under clear sky conditions:

35.5–25log(θ) .....	dBW/MHz .....	for 2° ≤ θ ≤ 7°
14.4 .....	dBW/MHz .....	for 7° ≤ θ ≤ 9.2°
38.5–25log(θ) .....	dBW/MHz .....	for 9.2° ≤ θ ≤ 48°
6.5 .....	dBW/MHz .....	for 48° ≤ θ ≤ 180°

Where θ is the angle in degrees from the axis of the main lobe.

(3) The values given in paragraphs (b) (1) and (2) of this section may be exceeded by 3 dB, for values of θ > 10°, provided that the total angular range over which this occurs does not exceed 20° when measured along both sides of the GSO arc.

(4) 17/24 GHz BSS earth station antenna off-axis EIRP spectral density for cross-polarized signals shall not exceed the following values, in all directions greater than +3 relative to the GSO arc, under clear sky conditions:

22.5–25log(θ) .....	dBW/MHz .....	for 2° ≤ θ ≤ 7°
1.4 .....	dBW/MHz .....	for 7° ≤ θ ≤ 9.2°

Where θ is the angle in degrees from the axis of the main lobe.

(c) Notwithstanding §25.220 of this part, each applicant for earth station license(s) that proposes levels in excess of those defined in paragraph (b) of this section shall:

(1) Submit link budget analyses of the operations proposed along with a

detailed written explanation of how each uplink and each transmitted satellite carrier density figure is derived;

(2) Submit a narrative summary which must indicate whether there are margin shortfalls in any of the current baseline services as a result of the addition of the applicant's higher power