§ 25.225 Geographic Service Requirements for 17/24 GHz Broadcasting Satellite Service.

(a) Each operator of a 17/24 GHz BSS space station that is used to provide video programming directly to consumers in the 48 contiguous United States (CONUS) must provide comparable service to Alaska and Hawaii, unless such service is not technically feasible or not economically reasonable from the authorized orbital location.

(b) Each operator of a 17/24 GHz BSS space station subject to paragraph (a) of this section must design and configure its space station to be capable of providing service to Alaska and Hawaii, that is comparable to the service that such satellites will provide to CONUS subscribers, from any orbital location capable of providing service to either Alaska or Hawaii to which it may be located or relocated in the future.

(c) If an operator of a 17/24 GHz BSS space station that is used to provide video programming directly to consumers in the United States relocates or replaces a 17/24 GHz BSS space station at a location from which service to Alaska and Hawaii had been provided by another 17/24 GHz BSS space station, the operator must use a space station capable of providing at least the same level of service to Alaska and Hawaii as previously provided from that location.

[72 FR 50033, Aug. 29, 2007]

§ 25.226 Blanket licensing provisions for domestic, U.S. VMESs operating with GSO FSS space stations in the 10.95–11.2 GHz, 11.45–11.7 GHz, 11.7–12.2 GHz, and 14.0–14.5 GHz bands.

(a) The following ongoing requirements govern all VMES 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) bands receiving from and transmitting to geostationary orbit satellites in the Fixed-Satellite Service. VMES 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)(9) and paragraphs (c), (d), and (e) of this section. Paragraph (b) of this section identifies items that shall be included in the application for VMES operations to demonstrate that these ongoing requirements will be met.

(1) The following requirements shall apply to a VMES that uses transmitters with off-axis EIRP spectral-densities lower than or equal to the levels in paragraph (a)(1)(i) of this section. A VMES, or VMES system, operating under this section shall provide a detailed demonstration as described in paragraph (b)(1) of this section. The VMES transmitter also shall comply with the antenna pointing and cessation of emission requirements in paragraphs (a)(1)(ii) and (a)(1)(iii) of this section.

(i)(A) Off-axis EIRP spectral density emitted in the plane tangent to the GSO arc, as defined in § 25.103, shall not exceed the following values:

$15-25\log\theta$	dBW/4 kHz	for $1.5° \le \theta \le 7°$.
-6	dBW/4 kHz	for $7° < \theta \le 9.2°$.
$18-25\log\theta$	dBW/4 kHz	for $9.2° < \theta \le 19.1°$.
-14	dBW/4 kHz	for $19.1° < \theta \le 180°$.

Where theta (θ) is the angle in degrees from a line from the earth station antenna to the assigned orbital location of the target satellite. The EIRP density levels specified for $\theta > 7°$ may be exceeded by up to 3 dB in up to 10% of the range of theta (θ) angles from ±7–180°, and by up to 6 dB in the region of main reflector spillover energy.

(B) The off-axis EIRP spectral density of co-polarized signals shall not exceed the following values in the plane perpendicular to the GSO arc, as defined in § 25.103:

18–25logθ	dBW/4 kHz	for $3.0° \leq \theta \leq 19.1°$.
−14	dBW/4 kHz	for $19.1° < \theta \leq 180°$.

Where θ is as defined in paragraph (a)(1)(i)(A) of this section. These EIRP density levels may be exceeded by up to 6 dB in the region of main reflector spillover energy and in up to 10% of the range of θ angles not included in that region, on each side of the line from the earth station to the target satellite.

(C) The EIRP density of cross-polarized signals shall not exceed the following values in the plane tangent to the GSO arc or in the plane perpendicular to the GSO arc:

5–25logθ	dBW/4 kHz	for $1.8° \leq \theta \leq 7.0°$.

Where θ is as defined in paragraph (a)(1)(i)(A) of this section.

(ii) Except for VMES systems operating under paragraph (a)(3), each VMES transmitter must meet one of the following antenna pointing error requirements:

(A) Each VMES 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 VMES antenna, or

(B) Each VMES transmitter shall declare a maximum antenna pointing error that may be greater than 0.2° provided that the VMES 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) Except for VMES systems operating under paragraph (a)(3), each VMES transmitter must meet of one the following cessation of emission requirements:

(A) For VMESs operating under paragraph (a)(1)(ii)(A) of this section, all emissions from the VMES 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 VMES antenna exceeds 0.5°, and transmission shall not resume until such angle is less than or equal to 0.2°, or

(B) For VMES transmitters operating under paragraph (a)(1)(ii)(B) of this section, all emissions from the VMES 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 VMES 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 apply to VMES systems that operate with off-axis EIRP spectral-densities in excess of the levels in paragraph (a)(1)(i) or (a)(3)(i) of this section under licenses granted based on certifications filed pursuant to paragraph (b)(2) of this section.

(i) A VMES or VMES system licensed based on certifications filed pursuant to paragraph (b)(2) of this section must operate in accordance with the off-axis EIRP density specifications provided to the target satellite operator in order to obtain the certifications.

(ii) Any VMES transmitter operating under a license granted based on certifications filed pursuant to paragraph (b)(2) of this section must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP-density in excess of the specifications supplied to the target satellite operator.

(iii) A system with variable power control of individual VMES transmitters must monitor the aggregate off-axis EIRP density from simultaneously transmitting VMES transmitters at the system's network control and monitoring center. If simultaneous operation of two or more VMES transmitters causes aggregate off-axis EIRP density to exceed the off-axis EIRP

density specifications supplied to the target satellite operator, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications and the transmitters must comply within 100 milliseconds of receiving the command.

(3) The following requirements apply to a VMES system that uses variable power control of individual VMES earth stations transmitting simultaneously in the same frequencies to the same target satellite, unless the system operates pursuant to paragraph (a)(2) of this section.

(i) Aggregate EIRP density from co-frequency earth stations in each target satellite receiving beam, not resulting from colliding data bursts transmitted pursuant to a contention protocol, will not exceed the limits defined in paragraph (a)(1)(i) of this section.

(ii) Each VMES transmitter must be self-monitoring and capable of shutting itself off and must cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density in excess of the limit in paragraph (a)(3)(i) of this section.

(iii) Aggregate power density from simultaneously transmitting VMES transmitters must be monitored at the system's network control and monitoring center. If simultaneous operation of two or more transmitters in a VMES network causes aggregate off-axis EIRP density to exceed the off-axis EIRP density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center must command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit, and those transmitters must comply within 100 milliseconds of receiving the command.

(4) An applicant filing to operate a VMES 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 VMESs.

(6) For each VMES transmitter, a record of the vehicle 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 one (1) year. Records shall be recorded at time intervals no greater than every five (5) minutes while the VMES is transmitting. The VMES operator shall make this data available upon request to a coordinator, fixed system operator, Fixed-Satellite Service system operator, NTIA, or the Commission within 24 hours of the request.

(7) In the 10.95–11.2 GHz (space-to-Earth) and 11.45–11.7 GHz (space-to-Earth) frequency bands VMESs 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) A VMES terminal 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) 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 § 25.209(a) and (b) and stationary at the location at which any interference occurred.

(9) Each VMES terminal shall automatically cease transmitting upon the loss of synchronization or within 5 seconds upon loss of reception of the satellite downlink signal, whichever is the shorter timeframe.

(b) Applications for VMES operation in the 14.0–14.5 GHz (Earth-to-space) band to GSO satellites in the FSS must include, in addition to the particulars of operation identified on FCC Form 312, and associated Schedule B, applicable technical demonstrations pursuant to paragraph (b)(1), (b)(2), or (b)(3) of this section and the documentation identified in paragraphs (b)(4) through (b)(8) of this section.

(1) A VMES applicant proposing to implement a transmitter under paragraph (a)(1) of this section must provide the information required by § 25.115(g)(1). An applicant proposing to

implement a transmitter under paragraph (a)(1)(ii)(A) of this section must also provide the certifications identified in paragraph (b)(1)(iii) of this section. An applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(B) of this section must also provide the demonstrations identified in paragraph (b)(1)(iv) of this section.

(i)–(ii) [Reserved]

(iii) A VMES applicant proposing to implement a transmitter under paragraph (a)(1)(ii)(A) of this section shall provide a certification from the equipment manufacturer stating that the antenna tracking system will 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 VMES antenna and 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 VMES antenna exceeds 0.5°.

(iv) A VMES 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 VMES 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 VMES 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 VMES antenna is less than or equal to the declared maximum antenna pointing error.

(2) An applicant proposing to operate with off-axis EIRP density in excess of the levels in paragraph (a)(1)(i) or (a)(3)(i) of this section must provide the following in exhibits to its earth station application:

(i) Off-axis EIRP density data pursuant to § 25.115(g)(1);

(ii) The certifications required by § 25.220(d);

(iii) A detailed showing that each VMES transmitter in the system will automatically cease or reduce emissions within 100 milliseconds after generating EIRP density exceeding specifications provided to the target satellite operator; and

(iv) A detailed showing that the aggregate power density from simultaneously transmitting VMES transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more VMES transmitters causes the aggregate off-axis EIRP density to exceed the off-axis EIRP density specifications supplied to the target satellite operator, the network control and monitoring center will command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below those specifications; and that those transmitters will comply within 100 milliseconds of receiving the command.

(3) An applicant proposing to implement a VMES system subject to paragraph (a)(3) of this section must provide the following information in exhibits to its earth station application:

(i) Off-axis EIRP density data pursuant to § 25.115(g)(1);

(ii) A detailed showing of the measures that will be employed to maintain aggregate EIRP density at or below the limit in paragraph (a)(3)(i) of this section;

(iii) A detailed showing that each VMES terminal will automatically cease or reduce emissions within 100 milliseconds after generating off-axis EIRP density exceeding the limit in paragraph (a)(3)(i) of this section; and

(iv) A detailed showing that the aggregate power density from simultaneously transmitting ESV transmitters will be monitored at the system's network control and monitoring center; that if simultaneous operation of two or more transmitters in the VMES network causes aggregate off-axis EIRP density to exceed the off-axis EIRP density limit in paragraph (a)(3)(i) of this section, the network control and monitoring center will

command those transmitters to cease emissions or reduce the aggregate EIRP density to a level at or below that limit; and that those transmitters will comply within 100 milliseconds of receiving the command.

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

(5) Any VMES applicant filing for a VMES 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 VMES applicant filing for a VMES terminal or system shall include in its application a certification that will comply with the requirements of paragraph (a)(6) of this section.

(8) All VMES applicants shall submit a radio frequency hazard analysis determining via calculation, simulation, or field measurement whether VMES terminals, or classes of terminals, will produce power densities that will exceed the Commission's radio frequency exposure criteria. VMES applicants with VMES 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 VMES licensees shall ensure installation of VMES terminals on vehicles 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. A VMES 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. All VMES applicants shall demonstrate that their VMES terminals are capable of automatically ceasing transmissions upon the loss of synchronization or within 5 seconds upon loss of reception of the satellite downlink signal, whichever is the shorter timeframe.

(9) Except for VMES systems operating pursuant to paragraphs (a)(2) and (a)(3)(ii) of this section, VMES systems authorized pursuant to this section shall be eligible for a license that lists Permitted List as an authorized point of communication.

(c)(1) Operations of VMESs in the 14.0–14.2 GHz (Earth-to-space) frequency band within 125 km 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 VMES licensees shall cease operations in the 14.0–14.2 GHz band within 125 km 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 VMES

licensee then will be permitted to commence operations 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.

(d)(1) Operations of VMESs in the 14.47–14.5 GHz (Earth-to-space) frequency band in the vicinity 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, e-mail *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) Table 1 provides a list of each applicable RAS site, its location, and the applicable coordination zone.

TABLE 1—APPLICABLE RADIO ASTRONOMY SERVICE (RAS) FACILITIES AND ASSOCIATED COORDINATION DISTANCES

Observatory	Latitude (north)	Longitude (west)	Radius (km) of coordination zone
Arecibo, Observatory, Arecibo, PR	18°20′37″	66°45′11″	Island of Puerto Rico.
Green Bank, WV	38°25′59″	79°50′23″	160.
Very Large Array, near Socorro, NM	34°04′44″	107°37′06″	160.
Pisgah Astronomical Research Institute, Rosman, NC	35°11′59″	82°52′19″	160.
U of Michigan Radio Astronomy Observatory, Stinchfield Woods, MI.	42°23′56″	83°56′11″	160.
Very Long Baseline Array (VLBA) stations:			
Owens Valley, CA	37°13′54″	118°16′37″	160*.
Mauna Kea, HI	19°48′05″	155°27′20″	50.
Brewster, WA	48°07′52″	119°41′00″	
Kitt Peak, AZ	31°57′23″	111°36′45″	
Pie Town, NM	34°18′04″	108°07′09″	
Los Alamos, NM	35°46′30″	106°14′44″	
Fort Davis, TX	30°38′06″	103°56′41″	
North Liberty, IA	41°46′17″	91°34′27″	
Hancock, NH	42°56′01″	71°59′12″	
St. Croix, VI	17°45′24″	64°35′01″	

*Owens Valley, CA operates both a VLBA station and single-dish telescopes.

(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 VMES licensees shall cease operations in the 14.47–14.5 GHz band within the relevant geographic zone (160 kms for single-dish radio observatories and Very Large Array antenna systems and 50 kms for Very Long Baseline Array antenna systems) 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 opposed the operations. The VMES 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.

(e) VMES licensees shall use Global Positioning Satellite-related or other similar position location technology to ensure compliance with paragraphs (c) and (d) of this section.

[74 FR 57099, Nov. 4, 2009, as amended at 78 FR 8429, Feb. 6, 2013; 78 FR 9604, Feb. 11, 2013; 79 FR 8324, Feb. 12, 2014; 81 FR 55345, Aug. 18, 2016]