

APPENDIX B

Rule Changes

For the reasons discussed above, the Federal Communications Commission amends title 47 of the Code of Federal Regulations, part 25, as follows:

PART 25 -- SATELLITE COMMUNICATIONS

1. 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, 332, unless otherwise noted.

2. In Section 25.115, add paragraphs (h) and (i) to read as follows:

§ 25.115 Application for earth station authorizations.

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(h) Any earth station applicant filing an application pursuant to § 25.218 of this chapter must file three tables showing the off-axis EIRP level of the proposed earth station antenna of the plane of the geostationary orbit, the elevation plane, and towards the horizon. In each table, the EIRP level must be provided 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.

(1) For purposes of the off-axis EIRP table in the plane of the geostationary orbit, the off-axis angle is the angle in degrees from the line connecting the focal point of the antenna to the target satellite, within 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.

(2) For purposes of the off-axis EIRP 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 target satellite, within the plane perpendicular to 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.

(3) For purposes of the off-axis EIRP table towards the horizon, the off-axis angle is the angle in degrees from the line determined by the intersection of the horizontal plane and the elevation plane described in paragraph (h)(2) of this Section, in the horizontal plane. The horizontal plane is the plane determined by the focal point of the antenna and the horizon.

(4) In addition, in an attachment to its application, the earth station applicant must certify that it will limit its pointing error to 0.5°, or demonstrate that it will comply with the applicable off-axis EIRP envelopes in Section 25.218 of this Part when the antenna is mispointed at its maximum pointing error.

(i) Any earth station applicant filing an application for a VSAT network made up of FSS earth stations and planning to use a contention protocol must include in its application a certification that it will comply with the requirements of § 25.134(g)(4).

3. In Section 25.134, add paragraph (g)(4) to read as follows:

§ 25.134 Licensing provisions of Very Small Aperture Terminal (VSAT) and C-band Small Aperture Terminal (CSAT) networks.

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(g) * * *

(4) Any earth station applicant filing an application to operate a VSAT network after [Insert effective date of rule] in the Ku-band and planning to use a contention protocol must certify that its contention protocol usage will be reasonable.

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4. In Section 25.138, add paragraph (a)(4) to read as follows:

§ 25.138 Blanket Licensing provisions of GSO FSS Earth Stations in the 18.3-18.8 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 28.35-28.6 GHz (Earth-to-space), and 29.25-30.0 GHz (Earth-to-space) bands.

(a) * * *

(4) GSO FSS earth station antenna off-axis EIRP spectral density for cross-polarized signals shall not exceed the following values, in all directions relative to the GSO arc, under clear sky conditions:

8.5-25log(θ)-10log(N)	dBW/40 kHz	for	2.0° < θ ≤ 7.0°
-12.63-10log(N)	dBW/40 kHz	for	7.0° < θ ≤ 9.23°

Where:

θ is the angle in degrees from the axis of the main lobe;

For systems where more than one earth station is expected to transmit simultaneously in the same bandwidth, e.g., CDMA systems, N is the likely maximum number of simultaneously transmitting co-frequency earth stations in the receive beam of the satellite;

N=1 for TDMA and FDMA systems.

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5. In Section 25.209, revise paragraphs (a), (b), and (c)(1), remove and reserve paragraph (d), revise paragraph (f), and remove and reserve paragraph (g), to read as follows:

§ 25.209 Antenna performance standards.

(a) The gain of any antenna to be employed in transmission from an earth station in the fixed-satellite service shall lie below the envelope defined below:

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location, for earth stations not operating in the Ka-band or conventional Ku-band:

$29 - 25\log_{10}\theta$	dBi	For	$1.5^\circ \leq \theta \leq 7^\circ$
8	dBi	For	$7^\circ < \theta \leq 9.2^\circ$
$32 - 25\log_{10}\theta$	dBi	For	$9.2^\circ < \theta \leq 48^\circ$
-10	dBi	For	$48^\circ < \theta \leq 180^\circ$

where θ is the angle in degrees from the axis of the main lobe, and dBi refers to dB relative to an isotropic radiator. For the purposes of this section, the peak gain of an individual sidelobe may not exceed the envelope defined above for θ between 1.5 and 7.0 degrees. For θ greater than 7.0 degrees, the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the gain envelope given above by more than 3 dB.

(2) In the plane of the geostationary satellite orbit as it appears at the particular earth station location, for earth stations operating in the Ka-band or conventional Ku-band:

$29 - 25\log_{10}\theta$	dBi	For	$1.5^\circ \leq \theta \leq 7^\circ$
8	dBi	For	$7^\circ < \theta \leq 9.2^\circ$
$32 - 25\log_{10}\theta$	dBi	For	$9.2^\circ < \theta \leq 48^\circ$
-10	dBi	For	$48^\circ < \theta \leq 85^\circ$
0	dBi	For	$85^\circ < \theta \leq 180^\circ$

(3) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths, for all earth stations not operating in the Ka-band or conventional Ku-band:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

$32 - 25\log_{10}\theta$	dBi	For	$3^\circ < \theta \leq 48^\circ$
-10	dBi	For	$48^\circ < \theta \leq 180^\circ$

where θ and dBi are defined above. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the gain 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.

(4) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths, for all earth stations operating in the Ka-band or conventional Ku-band:

Outside the main beam, the gain of the antenna shall lie below the envelope defined by:

$32 - 25\log_{10}\theta$	dBi	For	$3^\circ < \theta \leq 48^\circ$
-10	dBi	For	$48^\circ < \theta \leq 85^\circ$
0	dBi	For	$85^\circ < \theta \leq 180^\circ$

where θ and dBi are defined above. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the gain 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.

(5) Elliptical earth station antennas may be operated only when the major axis of the antenna is aligned with the plane of the geostationary satellite orbit as it appears at the particular earth station location.

(b) The off-axis cross-polarization gain of any antenna to be employed in transmission from an earth station to a space station in the domestic fixed-satellite service shall be defined as follows:

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$19 - 25\log_{10}\theta$	dBi	For	$1.8^\circ < \theta \leq 7^\circ$
-2	dBi	For	$7^\circ < \theta \leq 9.2^\circ$

where θ is the angle in degrees from the axis of the main lobe, and dBi refers to dB relative to an isotropic radiator.

(2) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$19 - 25\log_{10}\theta$	dBi	For	$3^\circ < \theta \leq 7^\circ$
-2	dBi	For	$7^\circ < \theta \leq 9.2^\circ$

where θ and dBi are defined above.

(c)(1) Earth station antennas licensed for reception of radio transmissions from a space station in the fixed-satellite service are protected from radio interference caused by other space stations 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 this section, and protected from radio interference caused by terrestrial radio transmitters identified by the frequency coordination process only to the degree to which harmful interference would not be expected to be caused to an earth station conforming to the reference pattern defined in paragraphs (a)(3) and (a)(4) of this section.

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(d) [removed and reserved.]

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(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 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.

(g) [removed and reserved.]

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6. In Section 25.212, revise paragraph (c) to read as follows:

§25.212 Narrowband analog transmissions, digital transmissions, and video transmissions in the GSO Fixed-Satellite Service.

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(c) In the 14.0-14.5 GHz band, an earth station with an antenna equivalent diameter of 1.2 meters or greater may be routinely licensed for transmission of narrowband analog services with bandwidths up to 200 kHz if the maximum input power spectral density into the antenna does not exceed -8 dBW/4 kHz and the maximum transmitted satellite carrier EIRP density does not exceed 17 dBW/4 kHz. Such earth stations may be routinely licensed for transmission of narrowband and/or wideband digital services, including digital video services, if the maximum input spectral power density into the antenna does not exceed -14 dBW/4 kHz, and the maximum transmitted satellite carrier EIRP density does not exceed +10.0 dBW/4 kHz. Antennas transmitting in the 14.0-14.5 GHz band with a major and/or minor axis smaller than 1.2 meters are subject to the provisions of §25.220, which may include power reduction requirements.

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7. Revise Part 25 by adding new § 25.218 to read as follows:

§ 25.218 Off-Axis EIRP Envelopes for FSS earth station operations.

(a) This section applies to all earth station applications, except for

- (1) ESV applications,
- (2) Analog video earth station applications,
- (3) Applications for feeder-link earth stations in the 17/24 GHz BSS.

(b) Earth station applications subject to this Section are eligible for routine processing if they meet the applicable off-axis EIRP envelope set forth in this Section below. For purposes of this Section, the term "extended Ku-band" is the 10.7-11.7 GHz, 12.75-13.25 GHz, and 13.75-14.0 GHz band. The term "conventional Ku-band" is defined in Section 25.201 of this chapter.

(c) *C-band Analog Earth Station Operations*

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

29.5 - $25\log_{10}\theta$	dBW/4 kHz	For	$1.5^\circ \leq \theta \leq 7^\circ$
8.5	dBW/4 kHz	For	$7^\circ < \theta \leq 9.2^\circ$
32.5 - $25\log_{10}\theta$	dBW/4 kHz	For	$9.2^\circ < \theta \leq 48^\circ$

-9.5	dBW/4 kHz	For	$48^\circ < \theta \leq 180^\circ$
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where θ is the angle in degrees from the line connecting the focal point of the antenna to the target satellite, and the geostationary orbit plane is 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. For the purposes of this section, the peak EIRP of an individual sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0° . For θ greater than 7.0° , the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dB.

(2) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$32.5 - 25\log_{10}\theta$	dBW/4 kHz	For	$3^\circ \leq \theta \leq 48^\circ$
-9.5	dBW/4 kHz	For	$48^\circ < \theta \leq 180^\circ$

where θ is the angle in degrees from the line connecting the focal point of the antenna to the target satellite, within any plane that includes that line, with the exception of 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. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the 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.

(d) *C-band Digital Earth Station Operations*

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$26.3 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$1.5^\circ \leq \theta \leq 7^\circ$
$5.3 - 10\log_{10}(N)$	dBW/4 kHz	For	$7^\circ < \theta \leq 9.2^\circ$
$29.3 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$9.2^\circ < \theta \leq 48^\circ$
$-12.7 - 10\log_{10}(N)$	dBW/4 kHz	For	$48^\circ < \theta \leq 180^\circ$

where θ and the plane of the geostationary satellite orbit are defined in paragraph (c)(1) of this Section, and N is defined below. For the purposes of this section, the peak EIRP of an individual sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0° . For θ greater than 7.0° , the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dB.

For digital SCPC using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.

For digital SCPC 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, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$29.3 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$3^\circ \leq \theta \leq 48^\circ$
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-12.7 - 10log ₁₀ (N)	dBW/4 kHz	For	48° < θ ≤ 180°
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where θ is defined in paragraph (c)(2) of this Section, and N is defined in paragraph (d)(1) of this Section. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the 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.

(e) *Conventional Ku-band Analog Earth Station Operations:*

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

21 - 25log ₁₀ θ	dBW/4 kHz	For	1.5° ≤ θ ≤ 7°
0	dBW/4 kHz	For	7° < θ ≤ 9.2°
24 - 25log ₁₀ θ	dBW/4 kHz	For	9.2° < θ ≤ 48°
-18	dBW/4 kHz	For	48° < θ ≤ 85°
- 8	dBW/4 kHz	For	85° < θ ≤ 180°

where θ and the plane of the geostationary satellite are defined in paragraph (c)(1) of this Section. For the purposes of this section, the peak EIRP of an individual sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0°. For θ greater than 7.0°, the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dB.

(2) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

24 - 25log ₁₀ θ	dBW/4 kHz	For	3° ≤ θ ≤ 48°
-18	dBW/4 kHz	For	48° < θ ≤ 85°
- 8	dBW/4 kHz	For	85° < θ ≤ 180°

where θ is defined in paragraph (c)(2) of this section. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the 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.

(f) *Conventional Ku-band Digital Earth Station Operations:*

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

15 - 10log ₁₀ (N) - 25log ₁₀ θ	dBW/4 kHz	For	1.5° ≤ θ ≤ 7°
-6 - 10log ₁₀ (N)	dBW/4 kHz	For	7° < θ ≤ 9.2°
18 - 10log ₁₀ (N) - 25log ₁₀ θ	dBW/4 kHz	For	9.2° < θ ≤ 48°
- 24 - 10log ₁₀ (N)	dBW/4 kHz	For	48° < θ ≤ 85°
- 14 - 10log ₁₀ (N)	dBW/4 kHz	For	85° < θ ≤ 180°

where θ and the plane of the geostationary satellite orbit are defined in paragraph (c)(1) of this Section, and N is defined below. For the purposes of this section, the peak EIRP of an individual

sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0° . For θ greater than 7.0° , the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dB.

For digital SCPC using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.

For digital SCPC 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, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$18 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$3^\circ \leq \theta \leq 48^\circ$
$-24 - 10\log_{10}(N)$	dBW/4 kHz	For	$48^\circ < \theta \leq 85^\circ$
$-14 - 10\log_{10}(N)$	dBW/4 kHz	For	$85^\circ < \theta \leq 180^\circ$

where θ is defined in paragraph (c)(2) of this section, and N is defined in paragraph (f)(1) of this section. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the 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.

(g) *Extended Ku-band Analog Earth Station Operations:*

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$21 - 25\log_{10}\theta$	dBW/4 kHz	For	$1.5^\circ \leq \theta \leq 7^\circ$
0	dBW/4 kHz	For	$7^\circ < \theta \leq 9.2^\circ$
$24 - 25\log_{10}\theta$	dBW/4 kHz	For	$9.2^\circ < \theta \leq 48^\circ$
-18	dBW/4 kHz	For	$48^\circ < \theta \leq 180^\circ$

where θ and the plane of the geostationary satellite orbit are defined in paragraph (c)(1) of this Section. For the purposes of this section, the peak EIRP of an individual sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0° . For θ greater than 7.0° , the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dB.

(2) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$24 - 25\log_{10}\theta$	dBW/4 kHz	For	$3^\circ \leq \theta \leq 48^\circ$
-18	dBW/4 kHz	For	$48^\circ < \theta \leq 180^\circ$

where θ is defined in paragraph (c)(2) of this Section. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the 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.

(h) *Extended Ku-band Digital Earth Station Operations:*

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$15 - 10\log_{10}(N) - 25\log_{10}\theta$	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	$48^\circ < \theta \leq 180^\circ$

where θ and the plane of the geostationary satellite orbit are defined in paragraph (c)(1) of this Section, and N is defined below. For the purposes of this section, the peak EIRP of an individual sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0° . For θ greater than 7.0° , the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dB.

For digital SCPC using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.

For digital SCPC 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, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$18 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$3^\circ \leq \theta \leq 48^\circ$
$-24 - 10\log_{10}(N)$	dBW/4 kHz	For	$48^\circ < \theta \leq 85^\circ$

where θ is defined in paragraph (c)(2) of this section and N is defined in paragraph (h)(1) of this section. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the 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.

8. Revise § 25.220 by revising paragraphs (a) and (d), and removing and reserving paragraphs (c), (e), and (f), 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 applications and 17/24 GHz BSS feeder link applications, in which the proposed earth station operations do not fall within the applicable off-axis EIRP envelope specified in Section 25.218 of this Chapter.

(2) The requirements for petitions to deny applications filed pursuant to this section are set forth in § 25.154.

(b) * * *

(c) [removed and reserved.]

(d)(1) The applicant must submit the certifications listed in paragraphs (d)(1)(i) through (d)(1)(iv) of this Section. The applicant will be authorized to transmit only to the satellite systems included *in the coordination agreements referred to in the certification required by paragraph (d)(1)(ii) of this section*. The applicant will be granted protection from receiving interference only with respect to the satellite systems included in the coordination agreements referred to in the certification required by paragraph (d)(1)(ii) of this section, and only to the extent that protection from receiving interference is afforded by those coordination agreements.

(i) A statement from the satellite operator acknowledging that the proposed operation of the subject non-conforming earth station with its satellite(s) has the potential to receive interference from adjacent satellite networks that may be unacceptable.

(ii) A statement from the satellite operator that it has coordinated the operation of the subject non-conforming earth station accessing its satellite(s), including its required downlink power density based on the information contained in the application, with all adjacent satellite networks within 6° of orbital separation from its satellite(s), and the operations will operate in conformance with existing coordination agreement for its satellite(s) with other satellite systems, except as set forth in paragraph (d)(4) of this paragraph.

(iii) A statement from the satellite operator that it will include the subject non-conforming earth station operations in all future satellite network coordinations, and

(iv) A statement from the earth station applicant certifying that it will comply with all coordination agreements reached by the satellite operator(s).

(2) A license granted pursuant to paragraph (d)(1) of this section will include, as a condition on that license, that if a good faith agreement cannot be reached between the satellite operator and the operator of a future 2° compliant satellite, the earth station operator shall accept the power density levels that would accommodate the 2° compliant satellite.

(3) In the event that a coordination agreement discussed in paragraph (d)(1)(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.

(4) Notwithstanding paragraph (d)(1)(ii) of this section, a party applying for an earth station license pursuant to this section will not be required to certify that its target satellite operator has reached a coordination agreement with another satellite operator whose satellite is within 6° of orbital separation from its satellite in cases where the off-axis EIRP density level of the proposed earth station operations will be less than or equal to the levels specified by the applicable off-axis EIRP envelope set forth in § 25.218 of this Chapter in the direction of the part of the geostationary orbit arc within 1° of the nominal orbit location of the adjacent satellite.

(e) [removed and reserved.]

(f) [removed and reserved.]

(g) * * *

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APPENDIX C

Proposed Off-Axis EIRP Envelopes for FSS Earth Station Applications

In this Appendix, we list several off-axis EIRP envelopes for various types of FSS earth station transmissions, as originally proposed in Appendix C of the *Third Notice of Proposed Rulemaking*.

I. Power Limits for C-band Analog Earth Stations

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$29.5 - 25\log_{10}\theta$	dBW/4 kHz	For	$1.5^\circ \leq \theta \leq 7^\circ$
8.5	dBW/4 kHz	For	$7^\circ < \theta \leq 9.2^\circ$
$32.5 - 25\log_{10}\theta$	dBW/4 kHz	For	$9.2^\circ < \theta \leq 48^\circ$
-9.5	dBW/4 kHz	For	$48^\circ < \theta \leq 180^\circ$

where θ is the angle in degrees from the axis of the main lobe. For the purposes of this section, the peak EIRP of an individual sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0° . For θ greater than 7.0° , the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dBW/4 kHz.

(2) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$32.5 - 25\log_{10}\theta$	dBW/4 kHz	For	$3^\circ \leq \theta \leq 48^\circ$
-9.5	dBW/4 kHz	For	$48^\circ < \theta \leq 180^\circ$

where θ is defined above. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the envelope given above by more than 6 dBW/4 kHz. 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 dBW/4 kHz.

II. Power Limits for C-band Digital Earth Stations

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$26.3 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$1.5^\circ \leq \theta \leq 7^\circ$
$5.3 - 10\log_{10}(N)$	dBW/4 kHz	For	$7^\circ < \theta \leq 9.2^\circ$
$29.3 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$9.2^\circ < \theta \leq 48^\circ$
$-12.7 - 10\log_{10}(N)$	dBW/4 kHz	For	$48^\circ < \theta \leq 180^\circ$

where θ is the angle in degrees from the axis of the main lobe, and N is defined below. For the purposes of this section, the peak EIRP of an individual sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0° . For θ greater than 7.0° , the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dBW/4 kHz.

For digital SCPC using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.

For digital SCPC 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, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$29.3 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$3^\circ \leq \theta \leq 48^\circ$
$-12.7 - 10\log_{10}(N)$	dBW/4 kHz	For	$48^\circ < \theta \leq 180^\circ$

where θ and N are defined above. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the envelope given above by more than 6 dBW/4 kHz. 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 dBW/4 kHz.

III. Power Limits for Ku-band Analog Earth Stations

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$21 - 25\log_{10}\theta$	dBW/4 kHz	For	$1.5^\circ \leq \theta \leq 7^\circ$
0	dBW/4 kHz	For	$7^\circ < \theta \leq 9.2^\circ$
$24 - 25\log_{10}\theta$	dBW/4 kHz	For	$9.2^\circ < \theta \leq 48^\circ$
-18	dBW/4 kHz	For	$48^\circ < \theta \leq 85^\circ$
- 8	dBW/4 kHz	For	$85^\circ < \theta \leq 180^\circ$

where θ is the angle in degrees from the axis of the main lobe. For the purposes of this section, the peak EIRP of an individual sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0° . For θ greater than 7.0° , the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dBW/4 kHz.

(2) In all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$24 - 25\log_{10}\theta$	dBW/4 kHz	For	$3^\circ \leq \theta \leq 48^\circ$
-18	dBW/4 kHz	For	$48^\circ < \theta \leq 85^\circ$
- 8	dBW/4 kHz	For	$85^\circ < \theta \leq 180^\circ$

where θ is defined above. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the envelope given above by more than 6 dBW/4 kHz. 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 dBW/4 kHz.

IV. Power Limits for Ku-band Digital Earth Stations

(1) In the plane of the geostationary satellite orbit as it appears at the particular earth station location:

$15 - 10\log_{10}(N) - 25\log_{10}\theta$	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 θ is the angle in degrees from the axis of the main lobe, and N is defined below. For the purposes of this section, the peak EIRP of an individual sidelobe may not exceed the envelope defined above for θ between 1.5° and 7.0° . For θ greater than 7.0° , the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3 dBW/4 kHz.

For digital SCPC using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.

For digital SCPC 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, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

$18 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$3^\circ \leq \theta \leq 48^\circ$
$-24 - 10\log_{10}(N)$	dBW/4 kHz	For	$48^\circ < \theta \leq 85^\circ$
$-14 - 10\log_{10}(N)$	dBW/4 kHz	For	$85^\circ < \theta \leq 180^\circ$

where θ and N are defined above. For the purposes of this section, the envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the envelope given above by more than 6 dBW/4 kHz. 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 dBW/4 kHz.

APPENDIX D

Technical Arguments

SIA identifies certain minor errors in Appendix C of the *Third Further Notice*. First, throughout Appendix C, in each place that the phrase "No individual sidelobe would exceed 3 dB/4 kHz" appears, SIA recommends replacing "3 dBW/4 kHz" with simply "3 dB".¹ We agree, and we correct this typographical error in the rule revisions we adopt in this Order. Similarly, we replace "6 dBW/4 kHz" with "6 dB" as SIA suggests.²

SIA also claim that the Commission misstated two of the equations in Appendix C of the *Third Further Notice*, in which the Commission proposed an off-axis EIRP envelope for C-band digital transmissions.³ SIA's claims are illustrated below.

Table II(1) in Appendix C of *Third Further Notice*

$27.3 - 10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$1.5^\circ \leq \theta \leq 7^\circ$
$5.3 - 10\log_{10}(N)$	dBW/4 kHz	For	$7^\circ < \theta \leq 9.2^\circ$

Table II(1) as Proposed by SIA

26.3 - $10\log_{10}(N) - 25\log_{10}\theta$	dBW/4 kHz	For	$1.5^\circ \leq \theta \leq 7^\circ$
5.2 - $10\log_{10}(N)$	dBW/4 kHz	For	$7^\circ < \theta \leq 9.2^\circ$

SIA is correct that the Commission misstated the first line of Table II(1). This figure is derived by combining the antenna gain pattern in Section 25.209 with the C-band power level permitted by Section 25.212. In this case, for angles between 1.5° and 7° , that is $29 - 2.7$, which is 26.3 as SIA points out.

However, we disagree that the second line of Table II(1) is misstated. When the antenna gain pattern in Section 25.209 is combined with the C-band power level permitted by Section 25.212, for angles between 7° and 9.2° , the figure is $8 - 2.7$, which is 5.3, not 5.2 as SIA claims.

¹ SIA Comments at 11.

² SIA Comments at 11.

³ SIA Comments at 11 and 16 n.25.

APPENDIX E

Final Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act of 1980, as amended (RFA), an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Third Further Notice of Proposed Rulemaking (Third Further Notice)* in IB Docket No. 00-248.¹ The Commission sought written public comment on the proposals in the *Third Further Notice*, including comment on the IRFA. This Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.²

A. Need for, and Objectives of, the Report and Order

The Telecommunications Act of 1996 requires the Commission in every even-numbered year beginning in 1998 to review all regulations that apply to the operations or activities of any provider of telecommunications service and to determine whether any such regulation is no longer necessary in the public interest due to meaningful economic competition. Our objective is to repeal or modify any rules in Part 25 that are no longer necessary in the public interest, as required by Section 11 of the Communications Act of 1934, as amended.

We codify streamlined procedures that allow for routine treatment of applications for earth stations that will comply with an of-axis EIRP envelope.

B. Summary of Significant Issues Raised by Public Comments In Response to the IRFA

No comments were submitted directly in response to the IRFAs in the *Third Further Notice*.

C. Description and Estimate of the Number of Small Entities To Which Rules Will Apply

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.³ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁴ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.⁵ A small business concern is one which: (1) is independently owned and operated;

¹ 2000 Biennial Regulatory Review -- Streamlining and Other Revisions of Part 25 of the Commission's Rules Governing the Licensing of, and Spectrum Usage by, Satellite Network Earth Stations and Space Stations, *Sixth Report and Order and Third Further Notice of Proposed Rulemaking*, IB Docket No. 00-248, 20 FCC Red 5593 (2005) (*Third Further Notice*).

² See 5 U.S.C. § 604.

³ 5 U.S.C. § 604(a)(3).

⁴ 5 U.S.C. § 601(6).

⁵ 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for (continued . . .)

(2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).⁶

1. Cable Services. The SBA has developed a small business size standard for Cable and Other Program Distribution, which consists of all such firms having \$12.5 million or less in annual receipts.⁷ According to Census Bureau data for 1997, in this category there was a total of 1,311 firms that operated for the entire year.⁸ Of this total, 1,180 firms had annual receipts of under \$10 million, and an additional fifty-two firms had receipts of \$10 million to \$24,999,999.⁹ Thus, under this size standard, the majority of firms can be considered small.

The Commission has developed its own small business size standard for a small cable operator for the purposes of rate regulation. Under the Commission's rules, a "small cable company" is one serving fewer than 400,000 subscribers nationwide.¹⁰ Based on our most recent information, we estimate that there were 1,439 cable operators that qualified as small cable companies at the end of 1995.¹¹ Since then, some of those companies may have grown to serve over 400,000 subscribers, and others may have been involved in transactions that caused them to be combined with other cable operators. Consequently, we estimate that there are fewer than 1,439 small cable companies that may be affected by the proposed rules.

The Communications Act of 1934, as amended, also contains a size standard for a "small cable operator," which is "a cable operator that, directly or through an affiliate, serves in the aggregate fewer than one percent of all subscribers in the United States and is not affiliated with any entity or entities whose gross annual revenues in the aggregate exceed \$250,000,000."¹² The Commission has determined that there are 67,700,000 subscribers in the United States.¹³ Therefore, an operator serving fewer than 677,000 subscribers shall be deemed a small operator,

(Continued from previous page)

public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3).

⁶ 15 U.S.C. § 632.

⁷ 13 C.F.R. § 121.201, NAICS code 517510.

⁸ U.S. Census Bureau, 1997 Economic Census, Subject Series: Information, "Establishment and Firm Size (Including Legal Form of Organization)," Table 4, NAICS code 513220 (issued October 2000).

⁹ *Id.*

¹⁰ 47 C.F.R. § 76.901(e). The Commission developed this definition based on its determinations that a small cable company is one with annual revenues of \$100 million or less. See *Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992: Rate Regulation*, MM Doc. Nos. 92-266 and 93-215, Sixth Report and Order and Eleventh Order on Reconsideration, 10 FCC Rcd 7393, 7408-7409 ¶¶ 28-30 (1995).

¹¹ Paul Kagan Assocs., Inc., Cable TV Investor, Feb. 29, 1996 (based on figures for Dec. 30, 1995).

¹² 47 U.S.C. § 543(m)(2).

¹³ See *FCC Announces New Subscriber Count for the Definition of Small Cable Operator*, Public Notice, 16 FCC Rcd 2225 (2001).

if its annual revenues, when combined with the total annual revenues of all of its affiliates, do not exceed \$250 million in the aggregate.¹⁴ Based on available data, we estimate that the number of cable operators serving 677,000 subscribers or less totals approximately 1,450.¹⁵ We do not request or collect information on whether cable operators are affiliated with entities whose gross annual revenues exceed \$250,000,000,¹⁶ and therefore are unable to estimate accurately the number of cable system operators that would qualify as small cable operators under the definition in the Communications Act.

2. Satellite Telecommunications. The rules proposed in this *Further Notice* would affect providers of satellite telecommunications services, if adopted. Satellite telecommunications service providers include satellite operators and earth station operators. The Commission has not developed a definition of small entities applicable to satellite operators. Therefore, the applicable definition of small entity is generally the definition under the SBA rules applicable to Satellite Telecommunications.¹⁷ This definition provides that a small entity is expressed as one with \$12.5 million or less in annual receipts.¹⁸ 1997 Census Bureau data indicate that, for 1997, 273 satellite communication firms had annual receipts of under \$10 million. In addition, 24 firms had receipts for that year of \$10 million to \$24,999,990.¹⁹

3. Auxiliary, Special Broadcast and other program distribution services. This service involves a variety of transmitters, generally used to relay broadcast programming to the public (through translator and booster stations) or within the program distribution chain (from a remote news gathering unit back to the station). The Commission has not developed a definition of small entities applicable to broadcast auxiliary licensees. Therefore, the applicable definition of small entity is the definition under the Small Business Administration (SBA) rules applicable to radio broadcasting stations,²⁰ and television broadcasting stations.²¹ These definitions provide that a small entity is one with either \$6.0 million or less in annual receipts for a radio broadcasting station or \$12.0 million in annual receipts for a TV station.²² There are currently 3,237 FM

¹⁴ 47 C.F.R. § 76.1403(b).

¹⁵ See *FCC Announces New Subscriber Count for the Definition of Small Cable Operator*, Public Notice, 16 FCC Rcd 2225 (2001).

¹⁶ We do receive such information on a case-by-case basis only if a cable operator appeals a local franchise authority's finding that the operator does not qualify as a small cable operator pursuant to section 76.901(f) of the Commission's rules. See 47 C.F.R. § 76.990(b).

¹⁷ "This industry comprises establishments primarily engaged in providing point-to-point 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." Small Business Administration, NAICS code 517310.

¹⁸ 13 C.F.R. § 120.121, NAICS code 517310.

¹⁹ U.S. Census Bureau, 1997 Economic Census, Subject Service: Information, "Establishment and Firm Size," Table 4, NAICS 513340 (Issued Oct. 2000).

²⁰ 13 C.F.R. § 121.201, NAICS code 515112.

²¹ 13 C.F.R. § 121.201, NAICS code 515120.

²² 13 C.F.R. § 121.201.

(continued . . .)

E. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives: (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 or 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.²⁸

In this *Eighth Report and Order*, the Commission considers and rejects a proposal to require analog video earth station operators to comply with an off-axis EIRP envelope. Commenters persuasively argued that such a requirement would have been burdensome for all analog video earth station operators, including small business analog video earth station operators.

F. Report to Congress

The Commission will send a copy of the *Eighth Report and Order*, including this FRFA, in a report to be sent to Congress pursuant to the Congressional Review Act, *see* 5 U.S.C. § 801(a)(1)(A). In addition, the Commission will send a copy of the *Eighth Report and Order*, including FRFA, to the Chief Counsel for Advocacy of the Small Business Administration. A copy of the *Eighth Report and Order* and FRFA (or summaries thereof) will also be published in the Federal Register. *See* 5 U.S.C. § 604(b).

²⁸ 5 U.S.C. §§ 603(c)(1) – (c)(4).