

SATELLITE INDUSTRY ASSOCIATION
225 Reinekers Lane, Suite 600
Alexandria, VA 22314

November 5, 2001

BY ELECTRONIC FILING

Ms. Magalie Roman Salas, Secretary
Federal Communications Commission
445 12th Street, S.W. TW-A325
Washington, D.C. 20554

Re: IB Docket No. 00-248 Ex Parte

Dear Ms. Salas:

On May 7, 2001, the Satellite Industry Association (“SIA”) filed reply comments in which it supported, with some suggested modifications, many of the proposals the Commission made in the Notice of Proposed Rulemaking (“NPRM”) in the above-referenced proceeding. In its reply comments, SIA primarily focused on the licensing and procedural aspects of the NPRM, and indicated that it was convening a group of satellite industry experts to examine the technical issues that the NPRM raised. The experts have met regularly since that time and have reached a consensus on these technical issues.

The group of experts was drawn principally, but not exclusively, from SIA’s membership. As the Commission is aware, SIA is broadly representative of the U.S. satellite industry.¹ In addition to SIA’s members, the group of experts included representatives from StarBand Communications Inc., a broadband satellite service provider.

The two enclosed documents represent the end product of the experts’ work. The first document, “Proposed Revisions of the Satellite Industry Association,” identifies changes that the group recommends regarding the proposed technical rules that appeared in Appendix B of the NPRM. The second document, “Further Comments of the Satellite Industry Association,” sets forth other recommendations, not reflected in the proposed rule revisions, concerning station keeping tolerances, interleaved satellites, the Adjacent Satellite Interference Analysis (“ASIA”) program and consumer terminals.

¹ SIA is a national trade association representing the leading U.S. satellite manufacturers, service providers, and launch service companies. SIA serves as an advocate for the U.S. commercial satellite industry on regulatory and policy issues common to its members. With member service companies providing a broad range of manufactured products and services, SIA represents the unified voice of the U.S. commercial satellite industry. SIA’s members include: ASTROLINK International LLC; The Boeing Company; GE American Communications, Inc.; Globalstar, L.P.; Hughes Electronics Corp.; Lockheed Martin Corp.; Loral Space & Communications Ltd.; Motient Corp.; PanAmSat Corporation; Teledesic Corporation; and TRW Inc.

SIA would be pleased to meet with Commission staff to discuss its proposals. Thank you for your consideration in this matter.

Respectfully submitted,

SATELLITE INDUSTRY ASSOCIATION

By: /s/ Richard Dalbello

Richard DalBello
Executive Director
Satellite Industry Association
225 Reinekers Lane, Suite 600
Alexandria, VA 22314
(703) 549-8697

ASTROLINK INTERNATIONAL LLC

By: /s/ Jack Wengryniuk

Jack Wengryniuk
Executive Director – Regulatory Affairs
ASTROLINK International LLC
6701 Democracy Blvd.
Bethesda, MD 20817
(301) 581-4083

GE AMERICAN COMMUNICATIONS, INC.

By: /s/ Nancy J. Eskenazi

Nancy J. Eskenazi
Associate General Counsel
GE American Communications, Inc.
4 Research Way
Princeton, NJ 08540
(609) 987-4187

HUGHES ELECTRONICS CORPORATION
d/b/a HUGHES NETWORK SYSTEMS

By: /s/ Joslyn Read

Joslyn Read
Assistant Vice President
Hughes Electronics Corporation
d/b/a Hughes Network Systems
11717 Exploration Lane
Germantown, MD 20876
(301) 428-5500

LORAL SPACE & COMMUNICATIONS LTD

By: /s/ John Stern

John Stern
Deputy General Counsel, Regulatory Affairs
Loral Space & Communications, Ltd.
1755 Jefferson Davis Highway, Suite 1007
Arlington, VA 22202
(703) 414-1060

PANAMSAT CORPORATION

By: /s/ Kalpak Gude

Kalpak Gude
Vice President
Government Regulatory Affairs and Associate General Counsel
PanAmSat Corporation
1133 Connecticut Avenue, NW, Suite 675
Washington, D.C. 20036
(202) 861-4353

STARBOARD COMMUNICATIONS INC.

By: /s/ John Chang

John Chang
Senior Counsel
StarBand Communications Inc.
1760 Old Meadow Road
McLean, VA 22102
(703) 245-6432

**Proposed Revisions of the Satellite Industry Association
Part 25 Streamlining Proceeding
IB Docket No. 00-248**

For the convenience of the reader, the text of the current Commission rule appears below in plain text. Additional text proposed by the Commission in the NPRM appears in bold type, and text proposed by the Commission to be deleted in the NPRM appears with a single strikethrough.

Proposed SIA additions appear in italics and proposed SIA deletions appear with a double strikethrough.

§25.132 Verification of earth station antenna performance standards.

- (a) All applications for transmitting earth stations, *except for earth stations operating in the 20/30 GHz band, in the C and Ku bands* must be accompanied by a certificate pursuant to §2.902 of this chapter from the manufacturer of each antenna that the results of a series of radiation pattern tests performed on representative equipment in representative configurations by the manufacturer which demonstrates that the equipment complies with the performance standards set forth in §25.209. The licensee must be prepared to demonstrate the measurements to the Commission on request ~~in the course of an investigation of a harmful interference incident.~~
- (b)(1) In order to demonstrate compliance of a C or Ku band antenna with §25.209(a) or (g) and §25.209(b), the following measurements on a production antenna performed on calibrated antenna range, as a minimum, shall be made at the bottom, middle and top of each allocated frequency band and submitted to the Commission:
 - (i) ~~Co-polarization~~ patterns for each of two orthogonal senses of polarizations in two orthogonal cuts of the antenna.
 - (A) In the azimuth plane, plus and minus 7 degrees and plus and minus 180 degrees.
 - (B) In the elevation plane, zero to forty-five degrees.
 - (ii) Cross-polarization patterns in the E- and H- planes, plus and minus 9 degrees.
 - (iii) Main beam gain.
 - ~~(iv)~~ (iv) The FCC envelope specified in §25.209 shall be superimposed on each pattern. The minimum tests specified above are recognized as representative of the performance of the antenna in most planes although some increase in sidelobe levels should be expected in the spar planes and orthogonal spar planes.

- (2)(3) **Applicants seeking authority to use an antenna in the C or Ku band that does not meet the standards set forth in Sections 25.209(a) or (g) and Section 25.209(b) of this Chapter, pursuant to the procedure set forth in Section 25.220 of this Chapter, 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.**
- (3) *For earth station antennas in the 20/30 GHz band, the measurements specified in §§25.138(d) and (e) shall be performed.*
- (c) The tests specified in paragraph (b) of this section are normally performed at the manufacturer's facility; but for those antennas that are very large and only assembled on-site, on-site measurements may be used for product qualification data. If on-site data is to be used for qualification, the test frequencies and number of patterns should follow, where possible, the recommendations in paragraph (b) of this section, and the test data is to be submitted in the same manner as described in paragraph (a) of this section.
- (d) For each new or modified transmitting antenna over 3 meters in diameter *in the C or Ku band*, the following on-site verification measurements must be completed at one frequency on an available transponder in each frequency band of interest and submitted to the Commission.
- (1) Co-polarization~~ed~~ patterns in the elevation plane, plus and minus 7 degrees, in the transmit band.
- (2) Co-polarization~~ed~~ patterns in the azimuth and elevation planes, plus and minus 7 degrees, in the receive band.
- (3) System cross-polarization discrimination on-axis. The FCC envelope specified in §25.209 shall be superimposed on each pattern. The transmit patterns are to be measured with the aid of a co-operating earth station in coordination with the satellite system control center under the provisions of §25.272.
- (e) Certification that the tests required by paragraph (c) of this section have been satisfactorily performed shall be provided to the Commission in notification that construction of the facilities has been completed as required by §25.133.
- (f) Antennas less than 3 meters in diameter and antennas on simple (manual) drive mounts that are operated at a fixed site are exempt from the requirements of paragraphs (c) and (d) of this section provided that a detailed technical showing is made that confirms proper installation, pointing procedures, and polarization alignment and manufacturing quality control. These showings must also include a plan for periodic testing and field installation procedures and precautions.

- (g) Records of the results of the tests required by this section must be maintained at the antenna site or the earth station operator's control center and be available for inspection.

§25.134 Licensing provisions of very small aperture terminal (VSAT) networks *in the 12/14 GHz band.*

- (a) ~~All applications for digital VSAT networks with a maximum outbound downlink EIRP density of +6.0 dBW/4 kHz per carrier and earth station antennas with maximum input power density of -14 dBW/4 kHz and maximum hub EIRP of 78.3 dBW will be processed routinely. All applications for analog VSAT networks with maximum outbound downlink power densities of +13.0 dBW/4 kHz per carrier and maximum antenna input power densities of -8.0 dBW/4 kHz shall be processed routinely in accordance with Declaratory Order in the Matter of Routine Licensing of Earth Stations in the 6 GHz and 14 GHz Bands Using Antennas Less Than 9 Meters and 5 Meters in Diameter, Respectively, for Both Full Transponder and Narrowband Transmissions, 2 FCC Red 2149 (1987) (Declaratory Order).~~
- (b) ~~Each applicant for digital and/or analog VSAT network authorization proposing to use transmitted satellite carrier EIRP densities in excess of +6.0 dBW/4 kHz and +13.0 dBW/4 kHz, respectively, and/or maximum antenna input power densities of -14.0 dBW/4 kHz and maximum hub EIRPs of 78.3 dBW and -8.0 dBW/4 kHz per carrier, respectively, shall conduct an engineering analysis using the Sharp, Adjacent Satellite Interference Analysis (ASIA) program. Applicants shall submit a complete description of those baseline parameters they use in conducting their analysis and tabular summaries of the ASIA program's output detailing potential interference shortfalls. Applicants shall also 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 new applicant's high power service, and if so, how the applicant intends to resolve those margin shortfalls. Applicants shall 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. Applicants shall provide proof by affidavit that all potentially affected parties acknowledge and do not object to the use of the applicant's higher power density.~~
- (a) **All applications for VSAT service in the 12/14 GHz band that meet the following requirements will be routinely processed:**
- (1) *If the maximum ~~transmitter~~ input power spectral density of a digital modulated carrier into any GSO FSS earth station antenna does ~~shall~~ not exceed $-14.0 + X - 10\log(N)$ dB(W/4 kHz). For antennas with dimensions less than 1.8 meters in the geostationary orbital plane, X is a value from 0 dB to 2 dB, and the use of this maximum input power spectral density shall be associated with the antenna patterns in paragraph (a)(2) of this section. For antennas with dimensions of 1.8 meters in the geostationary satellite orbital plane, X is equal to zero, and the use of this maximum input power spectral density shall be associated with the antenna patterns in paragraphs (a), (b) and (g)(1)(ii) of Section 25.209. For antennas with dimensions greater than 1.8 meters in the geostationary orbital plane, X is equal to zero, and the use of this maximum input power*

spectral density shall be associated with the antenna patterns in paragraphs (a) and (b) of Section 25.209.

(i) For a VSAT network using frequency division multiple access (FDMA) or time division multiple access (TDMA) technique, N is equal to one.

(ii) For a VSAT network using code division multiple access (CDMA) technique, N is the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam.

~~**(iii) For a VSAT network using contention Aloha multiple access technique, N is equal to two.**~~

~~**(iv) For a VSAT network using contention CDMA/Aloha multiple access technique, N is twice the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam without contention.**~~

(2) *If the gain of any antenna having a dimension less than 1.8 meters to be employed in transmission associated with paragraph (a)(1) of this section from an earth station in the 14 GHz GSO/FSS shall lie below the envelope defined below:*

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

$(29-X) - 25 \log \theta$	dBi	$Y^\circ \leq \theta \leq 7^\circ$
$(+8-X)$	dBi	$7^\circ < \theta \leq 9.2^\circ$
$(32-X) - 25 \log \theta$	dBi	$9.2^\circ < \theta \leq 48^\circ$
$(-10-X)$	dBi	$48^\circ < \theta \leq 85^\circ$
0	dBi	$85^\circ < \theta \leq 180^\circ$

where X is defined in paragraph (a)(1) above.

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 Y 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.

where Y is defined as follows:

For antennas with dimensions from 1.2 to less than 1.8 meters in the geostationary satellite orbital plane, $Y=1.25$.

For antennas with dimensions less than 1.2 meters in the geostationary satellite orbital plane, $Y= 1.5$.

(ii) In all other directions, the gain of the antenna shall lie below the envelope defined by:

$(32-X)-25\log\theta$	dBi	$Z^\circ \leq \theta \leq 48^\circ$
$(-10-X)$	dBi	$48^\circ < \theta \leq 85^\circ$
0	dBi	$85^\circ < \theta \leq 180^\circ$

where X is defined in paragraph (a)(1) above, and θ and dBi are defined in paragraph (a)(2)(i) 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.

where Z is defined as follows:

For antennas with the smallest dimension of the aperture greater than or equal to 1.2 meters, $Z=1$.

For antennas with the smallest dimension of the aperture less than 1.2 meters, $Z=3$.

(iii) The off-axis cross-polarization of the antenna shall not exceed the envelope defined below:

$(19-X)-25\log\theta$	dBi	$1.8^\circ < \theta \leq 7^\circ$
$(-2-X)$	dBi	$7^\circ < \theta \leq 9.2^\circ$

where X is defined in paragraph (a)(1) above, and θ and dBi are defined in paragraph (a)(2)(i) above.

(iv) All applications for transmitting earth stations in the 14 GHz band that seek to employ a maximum input power spectral density into the antenna flange specified in paragraph (a)(1) of this section where X is greater than zero and where N is defined in paragraph (a)(1) of this section, must be accompanied by a certificate pursuant to §2.902 of this chapter from the manufacturer of each antenna that the results of a series of radiation pattern tests performed on

representative equipment in representative configuration by the manufacturer demonstrate that the equipment complies with the performance standards set forth in paragraphs (a)(2)(i) to (a)(2)(iii) of this section. The verification format of earth station antenna performance standards is given in §25.132.

(v) For antennas with dimensions less than 1.2 meters in the geostationary orbital plane and compliant with Section 25.209(g) starting between 1.5 and 1.8 degrees instead of 1 degree as stipulated in paragraph (a) of Section 25.209, X equals zero for transmissions associated with paragraph (a)(1) of this Section 25.134.

- (3) **If the maximum GSO FSS satellite EIRP spectral density of the digital modulated emission of any transmission shall does not exceed 9dB (W/4kHz) ~~6 dB (W/4kHz)~~ for all methods of modulation and accessing techniques.**
- (4) *If the maximum GSO FSS satellite EIRP spectral density of the digital modulated emission does not exceed 13dB (W/4kHz) for all methods of modulation and accessing techniques provided that the operator/licensee of the satellite(s) on which such VSAT applicant wishes to use such power level has successfully coordinated that power level with adjacent satellite operators.*
- (5) **If the maximum input power spectral density into the antenna flange ~~hub earth station EIRP~~ of the hub earth station supporting the VSAT network shall does not exceed ~~78.3 dBW~~ $-14\text{dBW}/4\text{kHz} - 10\log(N)$ for all methods of multiple access techniques where N is defined in paragraph (a)(1) of this section. ~~and supporting VSAT network identified in paragraph (a)(1) of this section.~~**
- (6) *If the maximum ~~transmitter~~ input power spectral density of an analog carrier into the antenna flange of any GSO FSS earth station antenna shall does not exceed – 8.0 dB(W/4kHz) and the maximum GSO FSS satellite EIRP spectral density shall does not exceed + 13.0 dB(W/4kHz).*
- (b) **Each applicant for digital and/or analog VSAT network authorization proposing to use maximum input power spectral density at the antenna flange of the earth station or transmitted satellite carrier EIRP spectral densities ~~and/or maximum antenna input power~~ in excess of those specified in paragraph (a) of this Section must comply with the procedures set forth in § 25.220 of this Chapter.**
- (c) ~~Licensees authorized pursuant to paragraph (b) of this section shall bear the burden of coordinating with any future applicants or licensees whose proposed compliant VSAT operations, as defined by paragraph (a) of this section, is potentially or actually adversely affected by the operation of the non-compliant licensee. If no good faith agreement can be reached, however, the non-compliant licensee shall reduce its power density levels to those compliant with Section 25.212, the VSAT Order or the Declaratory Order, whichever is applicable.~~

~~(d) — An application for VSAT authorization shall be filed on FCC Form 312, Main Form and Schedule B. A VSAT licensee applying to renew its license must include on FCC Form 405, the number of constructed VSAT units in its network.~~

~~(c)(d) **An application for VSAT authorization shall be filed on FCC Form 312, Main Form and Schedule B. A VSAT licensee applying to renew its license must follow the procedures provided in § 25.121(c)(3) of this part.**~~

§25.201 Definitions

- (10) **Full Transponder.** Radio emissions or transmissions that occupy, or nearly occupy, the entire satellite transponder *power and/or bandwidth*. ~~C-band and Ku-band satellite systems typically have transponder bandwidths on the order of 36 MHz or more. Single carrier full transponder transmissions can include full motion analog video, thousands of multiplexed voice channels, or high data rates on the order of 50 Mb/s.~~
- (18) ~~**Narrowband.** Radio emissions or transmissions with narrow or limited spectral bandwidths. Narrowband satellite transmissions generally provide a single channel or a very limited number of channels. Narrowband satellite transmissions generally have bandwidths of 40 kHz to 5 MHz.~~
- (41) ~~**Wideband.** See Full Transponder.~~

§25.209 Antenna performance standards.

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

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

$$\begin{array}{ll} 29 - 25 \log_{10} (\Theta) \text{ dBi} & 1^\circ \leq \Theta \leq 7^\circ \\ +8 \text{ dBi} & 7^\circ < \Theta \leq 9.2^\circ \\ 32 - 25 \log_{10} (\Theta) \text{ dBi} & 9.2^\circ < \Theta \leq 48^\circ \\ -10 \text{ dBi} & 48^\circ < \Theta \leq 180^\circ \end{array}$$

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 1.0 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 all other directions, or in the plane of the horizon including any out-of-plane potential terrestrial interference paths:

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

$$\begin{array}{ll} 32 - 25 \log_{10} (\Theta) \text{ dBi} & 1^\circ \leq \Theta \leq 48^\circ \\ -10 \text{ dBi} & 48^\circ < \Theta \leq 180^\circ \end{array}$$

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.

- (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 by:

$$\begin{array}{ll} 19 - 25 \log_{10} (\Theta) \text{ dBi} & 1.8^\circ < \Theta \leq 7^\circ \\ -2 \text{ dBi} & 7^\circ < \Theta \leq 9.2^\circ \end{array}$$

- (c) 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 reference patterns defined in paragraphs (a), ~~and~~ (b), and (g)(1)(ii) of this section, *except the reference pattern starts at 1.25 degrees instead of 1 degree as stipulated in paragraph (a) of this section for antennas in the 12 GHz band with dimensions of less than 1.8 meters in the geostationary satellite orbital plane*, 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 paragraph (a)(2) of this section.

(d) ~~The patterns specified in paragraphs (a) and (b) of this section shall apply to all new earth station antennas initially authorized after February 15, 1985 and shall apply to all earth station antennas after March 11, 1994. The patterns specified in paragraph (a) or (g) and paragraph (b) of this section shall apply to all earth station antennas after [insert date of Commission's Report and Order].~~

(e)(1) The operations of any *transmitting* earth station with an antenna not conforming to the standards of paragraphs (a) *or* (g) and *paragraph* (b) of this section shall impose no limitations upon the operation, location or design of any terrestrial station, any other earth station, or any space station beyond those limitations that would be expected to be imposed by an earth station employing an antenna conforming to the reference patterns defined in paragraphs (a) *or* (g) and *paragraph* (b) of this section.

(e)(2) *The operations of any receiving earth station with an antenna not conforming to the standards of paragraphs (a), (b) and (g)(1)(ii) of this section shall impose no limitations upon the operation, location or design of any terrestrial station, any other earth station, or any space station beyond those limitations that would be expected to be imposed by an earth station employing an antenna conforming to the reference patterns defined in paragraphs (a), (b), and (g)(1)(ii) of this section, except the reference pattern starts at 1.25 degrees instead of 1 degree as stipulated in paragraph (a) of this section for antennas in the 12 GHz band with dimensions less than 1.8 meters in the geostationary satellite orbital plane.*

~~(f) An earth station with an antenna not conforming to the standards of paragraphs (a) and (b) of this section will be routinely authorized after February 15, 1985 upon a finding by the Commission that unacceptable levels of interference will not be caused under conditions of uniform 2° orbital spacings. An earth station antenna initially authorized on or before February 15, 1985 will be authorized by the Commission to continue to operate as long as such operations are found not to cause any unacceptable levels of adjacent satellite interference. In either case, the Commission will impose appropriate terms and conditions in its authorization of such facilities and operations.~~

(f) An earth station with an *transmitting* antenna not conforming to the standards of paragraphs (a) *or* (g) and *paragraph* (b) of this section will be authorized after February 15, 1985 upon finding by the Commission that *the antenna will not cause*

unacceptable levels of interference will not be caused under conditions of uniform 2° orbital spacing. An earth station antenna initially authorized on or before February 15, 1985 will be authorized by the Commission to continue to operate as long as such operations are found not to cause unacceptable levels of adjacent satellite interference. In either case, the Commission will impose appropriate terms and conditions in its authorization of such facilities and operations. The applicant has the burden of demonstrating that its *transmitting* antenna not conforming to the standards of paragraphs (a) or (g) and paragraph (b) of this section will not cause unacceptable interference. This demonstration must comply with the procedures set forth in § 25.220 of this Chapter.

~~(g) The antenna performance standards of small antennas operating in the 12/14 GHz band with diameters as small as 1.2 meters starts at 1.25° instead of 1° as stipulated in paragraph (a) of this section.~~

(g)(1)(i) *The antenna performance standards of small antennas operating in the 14 GHz band with dimensions less than 1.8 meters in the geostationary satellite orbital plane shall start as follows:*

for antennas with dimensions from 1.2 to less than 1.8 meters in the geostationary satellite orbital plane, at 1.25 degrees instead of 1 degree as stipulated in paragraph (a)(1) of this section, and in all other directions outside the main beam, at 3.0 degrees instead of 1 degree as stipulated in paragraph (a)(2) of this section,

for antennas with dimensions less than 1.2 meters in the geostationary satellite orbital plane, at 1.5 degrees instead of 1 degree as stipulated in paragraph (a)(1) of this section, and in all other directions outside the main beam, at 3.0 degrees instead of 1 degree as stipulated in paragraph (a)(2) of this section, and

for antennas with dimensions less than 1.2 meters in the geostationary satellite orbital plane not seeking ALSAT authorization, at up to 1.8 degrees instead of 1 degree as stipulated in paragraph (a)(1) of this section, provided that the satellite operator(s) of the satellite(s) with which the applicant is seeking authority to communicate has provided written confirmation from each of the adjacent satellite operators within 3 degrees that the antenna has been successfully coordinated.

(ii) *In frequency bands between 11.7 GHz and 30 GHz not shared on a co-primary basis with terrestrial services, the antenna gain envelope as it appears at the particular earth station for small aperture antennas with dimensions of 1.8 meters or less in the geostationary satellite orbital plane at angles from 85 to 180 degrees from the axis of the main lobe shall lie below 0 dBi instead of -10 dBi as stipulated in paragraph (a)(1) of this section.*

- (2) *Small antennas operating in the 12 GHz band with dimensions less than 1.8 meters in the geostationary satellite orbital plane shall be deemed to meet the receive antenna performance standards of Section 25.209(a) and (g)(1)(ii) for purposes of determining whether such antennas qualify for routine processing, as long as such antennas meet such standards starting at 2 degrees in the geostationary satellite orbital plane. For purposes of determining receive protection, as opposed to routine processing, protection will be provided for such antennas to the extent specified in Section 25.209(c).*
- (h) The gain of any antennas to be employed in transmission from a gateway earth station antenna operating in the frequency bands 10.7-11.7 GHz, 12.75-13.15 GHz, 13.2125-13.25 GHz, 13.8-14.0 GHz, and 14.4-14.5 GHz and communicating with NGSO FSS satellites shall lie below the envelope defined below:

$$\begin{array}{ll}
 29 - 25\log(\theta) \text{ dBi} & 1^\circ \leq \theta < 36^\circ \\
 -10 \text{ dBi} & 36^\circ \leq \theta \leq 180^\circ
 \end{array}$$

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.

§25.211: *Analog Video* ¶ Transmissions in the Fixed-Satellite Service.

- (a) Downlink analog video transmissions in the band 3700-4200 MHz shall be transmitted only on a center frequency of $3700 + 20N$ MHz, where $N=1$ to 24. The corresponding uplink frequency shall be 2225 MHz higher.
- (b) All 4/6 GHz analog video transmissions shall contain an energy dispersal signal at all times with a minimum peak-to-peak bandwidth set at whatever value is necessary to meet the power flux density limits specified in §25.208(a) and successfully coordinated internationally and accepted by adjacent U.S. satellite operators based on the use of state of the art space and earth station facilities. Further, all transmissions operating in frequency bands described in §25.208(b) and (c) shall also contain an energy dispersal signal at all times with a minimum peak-to-peak bandwidth set at whatever value is necessary to meet the power flux density limits specified in §25.208(b) and (c) and successfully coordinated internationally and accepted by adjacent U.S. satellite operators based on the use of state of the art space and earth station facilities. The transmission of an unmodulated carrier at a power level sufficient to saturate a transponder is prohibited, except by the space station licensee to determine transponder performance characteristics. All 12/14 GHz video transmissions for TV/FM shall identify the particular carrier frequencies for necessary coordination with adjacent U.S. satellite systems and affected satellite systems of other administrations.
- (c) All initial analog video transmissions shall be preceded by a video test transmission at an uplink e.i.r.p. at least 10 dB below the normal operating level. The earth station operator shall not increase power until receiving notification from the satellite network control center that the frequency and polarization alignment are satisfactory pursuant to the procedures specified in §25.272. The stationary earth station operator that has successfully transmitted an initial video test signal to a satellite pursuant to this paragraph is not required to make subsequent video test transmissions if subsequent transmissions are conducted using exactly the same parameters as the initial transmission.
- ~~(d) — In the 6 GHz band, an earth station with an equivalent diameter of 9 meters or smaller may be routinely licensed for transmission of full transponder services if the maximum power into the antenna does not exceed 450 watts (26.5 dBW). In the 14 GHz band, an earth station with an equivalent diameter of 5 meters or smaller may be routinely licensed for transmission of full transponder services if the maximum power into the antenna does not exceed 500 watts (27 dBW).~~
- (d) **An earth station may be routinely licensed for transmission ~~to~~ of full-transponder analog video services provided:**
 - (1) **In the 6 GHz band, with an antenna ~~equivalent diameter~~ dimension of 4.5 to 9 meters ~~or greater~~ in the geostationary satellite orbital plane, the maximum power into the antenna does not exceed 26.5 dBW; or**

- (2) In the 14 GHz band, with an antenna ~~equivalent diameter~~ dimension of 1.2 to 5 meters ~~or greater~~ in the geostationary satellite orbital plane, the maximum power into the antenna does not exceed 27 dBW.
- (e) Antennas with an ~~equivalent diameter~~ dimension smaller than those specified in paragraph (d) of this section ~~are subject to the provisions of Section 25.220 of this Chapter, which may include power reduction requirements.~~ These antennas will not be routinely licensed for transmission of full transponder *analog video* services.
- (f) Each applicant for authorization for *analog video* in the fixed-satellite service proposing to use transmitted satellite carrier EIRP densities, and/or maximum power into the antenna in excess of those specified in Section 25.211(d), must comply with the procedures set forth in § 25.220 of this Chapter.
- (g) ~~The Commission has authority to apply the power level limits in this section to earth station applications for authority to operate in any other FSS frequency band to the extent it deems necessary to prevent unacceptable interference into adjacent satellite systems, to the extent that power limits have not been established elsewhere in this Part.~~

§25.212 Narrowband *Analog* ~~and~~ *Transmissions and Digital Transmissions* in the GSO Fixed-Satellite Service.

- (a) Except as otherwise provided by these rules and regulations, criteria for unacceptable levels of interference caused by other satellite networks shall be established on the basis of nominal operating conditions and with the objective of minimizing orbital separations between satellites.
- (b) Emissions with an occupied bandwidth of less than 2 MHz are not protected from interference from wider bandwidth transmissions if the r.f. carrier frequency of the narrowband signal is within ± 1 MHz of one of the frequencies specified in §25.211(a).
- (c) In the 12/14 GHz band,

(i) an earth station meeting the requirements of paragraph (a) or (g) and paragraph (b) of Section 25.209 ~~with an equivalent diameter of 1.2 meters or greater~~ may be routinely licensed under this Section 25.212 for transmission of narrowband analog services with bandwidths up to 200 kHz if the maximum input power spectral density into the antenna flange does not exceed -8 dBW/4 kHz and the maximum transmitted satellite carrier EIRP spectral density does not exceed 13 dBW/4 kHz, and

(ii) an earth station meeting the requirements of Section 25.209(a) or (g) and Section 25.209(b) may be routinely licensed under this Section 25.212 for transmission of digital services if the maximum input power spectral density into the antenna of the earth station does not exceed $-14\text{dBW}/4\text{kHz} - 10\log(N)$ where N is defined in Section 25.134(a)(1) of this Chapter, or in the case of full transponder digital video services, the maximum power into the antenna flange does not exceed 27 dBW for an antenna with a dimension of 1.2 meters to 5 meters in the geostationary orbital plane, and, either

(1) the maximum transmitted satellite carrier EIRP spectral density does not exceed 9dBW/4kHz, or

(2) the maximum transmitted satellite carrier EIRP spectral density does not exceed 13dBW/4kHz and provided that the operator/licensee of the satellite(s) on which the applicant wishes to use such power level has successfully coordinated that power level with adjacent satellite operators.

~~Antennas with an equivalent diameter smaller than 1.2 meters~~ Earth stations in the 14 GHz band not meeting the applicable requirements of clause (i) or (ii) are subject to the provisions of §25.220 of this chapter, ~~which may include power reduction requirements.~~

~~(d) (1) In the 6 GHz band, an earth station with an equivalent diameter of 4.5 meters or greater may be routinely licensed for transmission of SCPC services if the maximum power densities into the antenna do not exceed -0.5 dBW/4 kHz for analog SCPC carriers with~~

~~bandwidths up to 200 kHz, and do not exceed -2.7 dBW/4 kHz for narrow and/or wideband digital SCPC carriers. Antennas with an equivalent diameter smaller than 1.2 meters in the 14 GHz band are subject to the provisions of §25.220 of this chapter, which may include power reduction requirements.~~

(d) ~~(2)~~ In the 6 GHz band, an earth station with an ~~equivalent diameter~~ antenna *dimension* of 4.5 meters or greater *in the geostationary satellite orbital plane* may be routinely licensed for transmission of SCPC services if the maximum *input* power spectral densities into the antenna *flange* do not exceed + 0.5 dB(W/4kHz) for analog SCPC carriers with bandwidths up to 200 kHz and do not exceed -2.7 - 10log(N) dB (W/4kHz) for ~~narrow and/or wideband~~ digital SCPC carriers.

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

(ii) For digital ~~SCPC~~ *transmissions* using code division multiple access (CDMA) technique, N is the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam.

~~(iii) For digital SCPC using contention Aloha multiple access technique, N is equal to two.~~

~~(iv) For digital SCPC using contention CDMA/Aloha multiple access technique, N is twice the likely maximum number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam without contention.~~

In the 6 GHz band, antennas with a dimension smaller than 4.5 meters in the geostationary satellite orbital plane are subject to the provisions of §25.220 of this chapter.

(e) Each applicant for authorization for narrowband *analog transmissions and/or digital transmissions* in the fixed-satellite service proposing to use transmitted satellite carrier EIRP densities, and/or maximum antenna input power densities in excess of those specified in paragraph (c) of this Section for Ku-band service, or paragraph (d) of this Section for C-band service, respectively, must comply with the procedures set forth in § 25.220 of this Chapter.

(f) ~~The Commission has authority to apply the power level limits in this section to earth station applications for authority to operate in any other FSS frequency band to the extent it deems necessary to prevent unacceptable interference into adjacent satellite systems, to the extent that power limits have not been established elsewhere in this Part.~~

§ 25.220 Non-conforming transmit/receive earth station operations in the C and Ku bands.

(a)(1) This Section 25.220 applies to earth station applications for antennas proposed to operate in the C band and/or Ku band in which:

(i) the transmit portion of the proposed antenna does not conform to the standards of §25.209(a) or (g) and §25.209(b) of this Chapter, and/or

(ii) the proposed transmit power density levels are in excess of those specified in §25.134, §25.211, or §25.212 of this Chapter, or for antennas proposed to transmit in the 6 GHz band, those derived by the procedure set forth in paragraph (c)(1) of this Section, whichever is applicable.

Protection from interference will be provided for the receive portion of such antennas to the extent specified in Section 25.209(c), and routine processing for the receive portion of such antennas will be determined in accordance with Section 25.209(g)(2).

~~**(2) Paragraphs (b) through (e) of this section apply to the earth station applications described in paragraph (a)(1) of this section, in which the applicant seeks transmit/receive authority.**~~

~~**(3) Paragraph (f) of this section applies to the earth station applications described in paragraph (a)(1) of this section in which the applicant seeks transmit only or receive only authority.**~~

~~**(2)(4) The requirements for petitions to deny applications filed pursuant to this section are set forth in Section 25.154 of this Chapter.**~~

(b) If ~~an~~ the transmit portion of the antenna proposed for use by the applicant does not comply with the antenna performance standards contained in §25.209(a) or (g) and §25.209(b), the applicant must provide, as an exhibit to its FCC Form 312 application, the antenna gain patterns specified in §25.132(b) of this Chapter.

(c) If ~~an~~ the transmit portion of the antenna proposed for use by the applicant in the 6 GHz band does not comply with the antenna performance standards contained in §25.209(a) and (b), the applicant must meet the requirements of either this paragraph (c)(1) or paragraph (d)(1) ~~(e)(2)~~ of this Section, as applicable, ~~to obtain protection from receiving interference from adjacent satellite operators. The applicant must meet the requirements of either paragraph (e)(1) or (e)(3) of this Section~~ to obtain authority to transmit.

The applicant must provide:

- (i) in its Form 312, Schedule B, the power and power density levels that result by reducing the values stated in §25.134, §25.211, or §25.212, whichever is applicable, by the number of decibels that the non-compliant antenna fails to meet the antenna performance standards of §25.209(a) and (b), ~~and~~
- (ii) *statement(s) that the operator(s) of the satellite(s) with which the applicant is seeking authority to communicate has obtained from the adjacent satellite operators within 3 degrees, indicating that the operation of the proposed antenna has been coordinated.*

~~(2) The applicant will not receive protection from adjacent satellite interference from any satellite unless the applicant has provided the affidavits listed in paragraph (d)(1) of this Section from the operator of that satellite(s).~~

~~(3) The applicant will not be permitted to transmit to any satellite unless the applicant has provided the affidavits listed in paragraph (e)(1) of this Section from the operator of that satellite(s).~~

~~(d)(1) If an antenna proposed for use by the applicant does not comply with the performance standards contained in §25.209(a) and (b), the applicant must submit the affidavits listed in paragraphs (d)(1)(i) through (d)(1)(iv) of this Section to qualify for protection from receiving interference from other satellite systems. 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 affidavit 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 not violate any existing coordination agreement for its satellite(s) with other satellite systems.~~

- ~~(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 no good faith agreement can 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.~~
- ~~(e) (d)(1) If the transmit portion of the antenna proposed for use by the~~ **An earth station applicant** ~~does not comply with the antenna performance standards contained in paragraph (a) or (g) and paragraph (b) of Section 25.209, and paragraph (c) of this section does not apply, and/or the antenna has~~ **proposing to use** ~~transmitted satellite carrier EIRP densities, and/or maximum input power spectral density into the antenna flange in excess of the levels in §25.134, §25.211, §25.212, or the power density levels derived through the procedure set forth in paragraph (e)(1) of this Section, whichever is applicable, shall provide the following statements~~ **affidavits shall be provided as an exhibit to the** ~~its~~ **earth station application:**
- ~~(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 create interference to adjacent satellite networks that may be unacceptable.~~
 - ~~(ii) a statement(s) that the operator(s) of the satellite(s) with which the applicant is seeking authority to communicate has obtained from the adjacent satellite operators within 6 degrees, indicating that it has coordinated the operation of the subject non-conforming Earth Station has been coordinated. accessing its satellite(s), and its corresponding downlink power density requirements (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 not violate any existing coordination agreement for its satellite(s) with other satellite systems.~~
 - ~~(iii) a statement from the satellite operator that it will include the subject non-conforming Earth Station operations with respect to the antenna performance standards referenced in paragraph (d)(1) of this section, power and power densities 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 ~~(e)~~ (d)(1) of this section will include, as a condition on that license, that if no good faith agreement can be reached between the satellite operator and the operator of a future 2° compliant satellite, the earth station operator shall reduce its power to those levels that would accommodate the 2° compliant satellite.
- ~~(f)(1) If an earth station applicant requests transmit only authority, and its proposed antenna does not conform to the standards of §25.209(a) and (b) of this Chapter, it must meet the requirements of paragraphs (b) and (e) of this section.~~
- ~~(2) If an earth station applicant requests transmit only authority, and its proposed power density levels are in excess of those specified in §25.134, §25.211, or §25.212 of this Chapter, or those derived by the procedure set forth in paragraph (e)(1) of this section, it must meet the requirements of paragraph (e) of this section.~~
- ~~(3) If an earth station applicant requests receive only authority, and its proposed antenna does not conform to the standards of §25.209(a) and (b) of this Chapter, it must meet the requirements of paragraphs (b) and (d) of this section.~~

**Further Comments of the Satellite Industry Association
Part 25 Streamlining Proceeding
IB Docket No. 00-248**

1. Station Keeping

No change to the current station keeping tolerance of $\pm 0.05^\circ$ specified in Section 25.210(j)(1) is recommended. Tightened station keeping will adversely impact the satellite's operation(s) and would reduce the satellite's in-orbit life significantly. For this reason, SIA recommends no change to the current station keeping tolerance.

2. Interleaved Satellites

For sub-meter VSAT network services operating in a co-frequency, co-polarized environment with 1° interleaved satellites, the SIA Working Group recognizes that the amount of inter-system interference will depend on the geographical spatial isolation between the footprints of the interleaved satellites. Since the earth station antenna beam isolation toward the interleaved neighbor satellite is small when sub-meter VSATs are used, the satellites will need to provide sufficient inter-beam isolation (e.g. 20-25 dB) in both the transmit and receive directions to avoid serious mutual interference. SIA recommends that the amount of required spatial isolation between the footprints of interleaved satellites should be determined in the coordination process between the satellite operators.

3. ASIA Program

While the intent of having a standardized calculation method is useful, the Adjacent Satellite Interference Analysis ("ASIA") requirement is a burdensome process that is both time consuming and difficult to perform. The data required to perform the analysis must be obtained from various sources, the results of an ASIA study can be subject to varying interpretations, and the findings of the study also must be coordinated with adjacent satellite operators. As a result, in SIA's experience, the ASIA requirement often delays the introduction of technological advances and new services to the public.² Therefore, SIA recommends that use of the ASIA Program no longer be required.

4. Consumer Terminals

With the advent of consumer terminals, some satellite operators have expressed concern regarding the pointing and other installation and operational matters related to small aperture antenna earth stations. Currently, the technical issues regarding antenna

² *In the Matter of 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*, FCC 00-435 at ¶¶8, 13 (released Dec. 14, 2000).

pointing are being addressed between satellite operators and network earth station operators on a commercial basis – both at the contractual and operational level. The SIA working group recommends that pointing and installation issues continue to be handled by the industry on a case-by-case basis while industry continues to discuss development of guidelines for the pointing and proper installation of consumer terminals. Any more detailed specifications in the rules at this early stage of consumer terminal and broadband service development is premature and could impact innovation, competition, service cost, and broadband deployment. Thus, at this stage, SIA believes that the regulation of pointing techniques is not required.

While more experience is being gained with consumer terminals, certain licensing approaches could alleviate the concern of satellite operators. SIA notes that, to ensure consumer health and safety, the Commission has applied certain conditions, such as installation by technically-trained professionals, on blanket licenses for transmitting satellite antennas having a dimension of less than 1.2 meters in the geostationary satellite orbital plane and operating in the Ku-band. To facilitate industry discussion, SIA recommends that any applicant requesting issuance of a license for such earth stations without a condition requiring installation by technically-trained professionals will be required to provide notice of its request, prior to filing it with the Commission, to the operators of all space station(s) within three degrees of the specific U.S. licensed space station(s) and specific space station(s) on the Permitted Space Station List with which the earth station(s) will communicate. In addition, also to facilitate industry discussion, SIA recommends that any licensee of such earth stations that seeks removal of a condition requiring installation by technically-trained professionals will be required to provide notice of its request, prior to filing it with the Commission, to the operators of all space stations within three degrees of the specific U.S. licensed and Permitted List space station(s) with which the earth station(s) are communicating. Similar provisions may be considered in the future for consumer terminals operating in other frequency bands.