Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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 and Space Stations	)	IB Docket No. 00-248

REPLY COMMENTS OF TELESAT CANADA

Telesat Canada ("Telesat") hereby submits the following reply in response to comments filed by other parties pursuant to the Further Notice of Proposed Rulemaking ("FNPRM") in the above captioned proceeding.

Telesat, a Canadian-licensed satellite operator, has an interest in this proceeding as any resulting policy determinations could have a bearing on Telesat's present and future satellite operations across all of North America. In this regard, Telesat notes that it now has four Fixed Satellite Service ("FSS") satellites, Anik E1, E2, F1 and F2, on the FCC's Permitted Space Station List, along with Commission approval to offer two-way broadband services at Ka-band in the U.S. using the Anik F2 satellite.[1] In addition, Telesat currently owns and operates two satellites in the Broadcasting-Satellite Service band ("BSS"), Nimiq and Nimiq 2, which are used by a customer to provide Direct-to-Home and other services in Canada. With Canada and the U.S. sharing a common border and licensing satellites in close proximity across the North American arc, Telesat is also regularly involved in international spectrum coordination discussions with its U.S. counterparts or indirectly supporting discussions between the Canadian and U.S. Administrations. Telesat hopes that its reply comments in this proceeding will be helpful to the Commission in its deliberations.

[1] *Request to Eliminate Conditions on E1 and E2's Inclusion on the Permitted Space Station List,* DA 01-2051 16 FCC Rcd 15979 (International Bureau, 2001) (Order); *Anik F1 Permitted Space Station List Order,* DA 00-2835, (International Bureau, 2000); and *Anik F2 Permitted Space Station List and Ka-band Order,* DA 02-3490, (International Bureau, 2002).

1. The Starting Point of the Antenna Pattern

At page 8 of its Comments, the Satellite Industry Association ("SIA") proposes starting the reference antenna gain pattern at 1.5 degrees for Ku-band antennas,[2] rather than 1.8 degrees as proposed in the FNPRM. Telesat agrees with SIA, for the reasons provided in their submission, and believes that their proposal to change the starting point in §25.209 (g) to 1.5 degrees will achieve the objective of minimizing interference with satellites that are nominally spaced 2 degrees apart in the GSO arc.

However, Telesat is of the view that there is no reason for this "starting angle" to be different in any other frequency band, contrary to what SIA has proposed for C-band. Given that C, Ku and eventually Ka-band satellites will nominally have the same spacing throughout the orbit, and that the shape of the main beam of any parabolic reflector type antenna is the same for a given diameter to wavelength ratio, there is no reason from the standpoint of protection of other networks to have a different starting angle in each frequency band. The 1.5 degree standard will ensure the same protection to adjacent networks in each frequency band for the same GSO separation angle.

At page 9 of its Comments, SIA recommends that, at Ku-band, the 1.5 degree angle apply only to antennas less than 1.2 meters in diameter. Rather than apply to a specific size of antenna the off-axis angle at which the gain envelope begins, Telesat recommends that an applicant need only demonstrate that the antenna will meet the 29-25 Log(theta) gain envelope (in the GSO plane) for angles starting at 1.5 degrees, independent of the actual size or shape of the antenna.

As an alternative to SIA's proposed revision of §25.209 (a) and (b), in the case of parabolic reflector type antennas, Telesat suggests that a statement from the applicant that the antenna conforms with the envelope starting at 1.5 degrees should be sufficient for compliance, except in the following cases: where the antenna dimension in the GSO plane is less than 3.0 meters, 1.2 meters and 0.6 meters for the 6, 14, and 30 GHz bands respectively. In the exception cases, as SIA proposes in new §25.209 (f), the applicant should demonstrate that its transmitting

earth stations will not cause unacceptable interference to other satellite networks, using procedures proposed in a new subsection (d)(2) §25.220 of Part 25. Alternatively, if the input power density to the non-conforming antenna has been reduced to produce lower off-axis EIRP densities, a technical showing could be submitted demonstrating that no greater interference would be received by adjacent satellite networks than would be caused by earth stations with parabolic reflector antennas conforming to the minimum diameters. Similar procedures could be used to demonstrate the performance for all non-reflector-type antennas such as active phased array-type antennas.

2. Required Maximum Pointing Error Towards the Desired Satellite

At pages 9 through 13 of its Comments, SIA proposes that the actual starting point (or intersection of the antenna main beam with the 29- 25 Log(theta) envelope) be used to regulate antenna pointing error using the formula:

$$pe = 2 - x, \text{ degrees} \qquad 1.5 < x \leq 1.8$$

where x is the starting point of the antenna gain envelope.

Telesat believes that regulating pointing error in such a manner would serve no useful purpose. Measuring the angular installation pointing error in practice is not practical. Furthermore, a pointing error of approximately 0.5 dB, which is achievable in practice for any size of fixed satellite earth station antenna, lends itself to a larger angular pointing error for physically smaller antennas and smaller angular pointing errors for physically larger antennas.

3. Pilot Tones

At paragraph 46 of the FNPRM, mention is made of PanAmSat's proposal of requiring consumer terminals to inhibit transmit capability until it can be verified that the earth station antenna has been pointed correctly, and that this could be implemented for smaller-than-routine C-band and Ku-band earth stations by adopting a "pilot tone" requirement. Telesat concurs with

[2] Comments of the Satellite Industry Association, IB Docket No. 00-248, March 10, 2003.

the SIA comments on this issue and is opposed to any such requirement for a pilot tone. Such a requirement would increase the cost and the complexity of VSAT networks and could threaten the success of business plans aimed at providing low cost user terminals. Provision of pilot tones from a spacecraft is costly, not only because it requires additional hardware and software complexity in the ground network, but also because it consumes spacecraft power and spectrum resources. These requirements would increase the service cost on a per terminal basis. Moreover, in the event that the pilot tones are generated on-board the spacecraft, there would need to be a long lead time until the requirement comes into force to allow for fleet replacement.

The actual benefit that could be derived from the use of pilot tones, namely the improvement in antenna pointing and minimization of interference into adjacent satellite networks, may be minimal. This is because the normal received signal level variations in the pilot due to space station antenna pointing error and propagation effects across the intended service area may in fact exceed the level of desired installation pointing accuracy. Telesat believes that it would be better to allow operators to use a technology-neutral approach, a general principle advocated in the Task Force Report, toward achieving the objective of minimizing antenna pointing error and reducing interference into the adjacent satellite network. If the Commission were to mandate the use of pilot tones, it would run contrary to this technology-neutral approach.

4. Professional Installation

As noted at paragraph 49 of the FNPRM, PanAmSat has proposed requiring professional installation on all consumer terminals. At page 8 of its Comments, Aloha Networks ("Aloha") points out that professional installation can be expensive and that this is an important consideration from a public interest perspective, as consumers will ultimately have to bear this cost.[3] Aloha therefore concludes that the Commission should impose a professional installation requirement only in those situations where the cost is likely to result in reduction in adjacent satellite interference. SIA at page 15 of its Comments also supports the view that the Commission should not adopt a professional installation requirement for Ku-band antennas less than 1.2 meters in diameter or C-band antennas less that 4.5 or 3.7 meters in diameter.

Telesat also supports the view that the Commission need not adopt a professional installation requirement, nor should the Commission regulate installation by way of certification programs. Telesat has its own tested installation procedures, and recognizes the importance of performing an installation correctly in the first place thus minimizing unnecessary costs involved in making subsequent service calls. The necessity to minimize costs associated with installation and dealing with potential complaints of harmful interference provides sufficient incentive to all operators to minimize costs and inconvenience to the consumer. The industry can be self-regulating in provisioning this part of their networks whether the installations are done by the operators, qualified third parties, or the VSAT end user.

5. Input Power Spectral Density of a Digitally Modulated Signal at 14 GHz

At page 4 of Appendix A of its Comments, SIA proposes a level of -14.0 - 10log(N) dBW/4 kHz for routine processing in the 12/14 GHz band. In the case of code division multiple access ("CDMA"), N is the number of co-frequency transmitting earth stations in the same satellite receiving beam. Given the random nature of access for CDMA where systems contend for bandwidth, the probability of "collisions" is statistical in nature and thus some short-term relaxation in the proposed level would permit these events of low probability to occur, consistent with the level expected by SIA in their proposal. In Telesat's view, Spacenet/StarBand, at pages 14 through 20 of their Comments[4], take a more reasonable approach toward accommodating CDMA systems which use bandwidth contention techniques. Their approach more closely represents the statistical nature of the input power density by permitting exceedances for low probabilities.

6. Antenna Back Lobe Gain Patterns & Harmful Interference Procedures

Telesat agrees with the SIA proposal at page 17 of their Comments that there can and should be some relaxation in the antenna back lobe at Ku-band. Telesat also believes that the same relaxation may be applicable in some other frequency bands, and that it may be premature

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[3] Comments of Aloha Networks, Inc, IB Docket No. 00-248, March 10, 2003.
[4] Comments of Spacenet Inc. and StarBand Communications Inc., IB Docket No. 00-248, March 10, 2003.

at this time to conclude on exactly what the level of relaxation should be and exactly where it should start. Any such level of relaxation should be supported by experimental data. In this regard, Telesat supports the work that has been initiated in ITU-R Working Party 4A in document 4A/TEMP/280, which is a working document that has the objective of characterizing antennas over a wide range of frequency bands.

In principle Telesat also agrees with SIA's suggested addition to procedures in the case of harmful interference under §25.274 by the inclusion of new sub-paragraphs (h) and (i). However, the "sensitivity" of the adjacent operator receiving the interference also needs to be considered before concluding that the sub-meter antenna identified as being the cause of harmful interference is operating in a manner inconsistent with Part 25 of the FCC Rules. In this regard, Telesat notes that Section VII of Article I of the *International Radio Regulations* defines *interference*, *permissible interference*, *accepted interference* and *harmful interference*. In cases where there is an agreement in place between operators and the level of interference is within what is defined as accepted interference, the adjacent operator affected by such levels of interference may need to take measures of its own to ensure that such interference, which is not harmful, can be tolerated by ensuring that its own links are appropriately designed.

Respectfully submitted,

TELESAT CANADA

By: _____

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