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May 9, 2001

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

By Hand Delivery

Magalie Roman Salas, Secretary
Federal Communications Commission
Room TW-A325
445 Twelfth Street, S.W.
Washington, DC 20554

Re: IB Docket No. 00-248

Dear Ms. Salas:

Enclosed please find an original and four copies of the Corrected Reply Comments of Aloha Networks, Inc., in the above-referenced proceeding. The corrections include minor changes to pages 1, 4, and the Appendix. The corrections do not change the substantive meaning of the Comments but merely clarify unintended ambiguities (and, in the case of the Appendix, incorporate a paragraph that was inadvertently omitted).

Also enclosed with this letter is a 3.5-inch diskette formatted in an IBM compatible format using Word for Windows.

If the staff has any questions concerning the Corrected Reply Comments or the disk, the undersigned counsel should be contacted. Copies of the Corrected Reply Comments are also being emailed to Judy Boley and Edward Springer as indicated in the *Notice of Proposed Rulemaking* in the above-referenced docket.

Sincerely,

DICKSTEIN, SHAPIRO, MORIN & OSHINSKY, L.L.P.
Attorneys for Aloha Networks, Inc.

By: ______________________
Lewis J. Paper

Enclosure
LJP/klw

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

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

In the Matter of	)	
	)	
2000 Biennial Regulatory Review --	)	
Streamlining and Other Revisions of Part 25	)	IB Docket No. 00-248
of the Commission's Rules Governing the	)	
Licensing of, and Spectrum Usage by,	)	
Satellite Network Earth Stations and Space	)	
Stations	)	

REPLY COMMENTS OF ALOHA NETWORKS, INC.

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May 7, 2001

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

In the Matter of	)	
	)	
2000 Biennial Regulatory Review --	)	
Streamlining and Other Revisions of Part 25	)	IB Docket No. 00-248
of the Commission's Rules Governing the	)	
Licensing of, and Spectrum Usage by,	)	
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REPLY COMMENTS OF ALOHA NETWORKS, INC.

Aloha Networks, Inc. ("Aloha Networks") hereby files its reply comments in the above-referenced proceeding. *Notice of Proposed Rulemaking,* FCC 00-435 (December 14, 2000) (the "*Notice*").

Background

In the *Notice*, the Commission proposed to revise Sections 25.134(a) and 25.212(d) of its rules to account for the increased risk of interference to adjacent satellites from the increased use of very small aperture antenna terminal ("VSAT") networks. More specifically, the Commission proposed to include the following language in those sections: "The maximum transmitter power spectral density of a digital modulated carrier into any GSO FSS earth station antenna shall not exceed -14.0 - 10 log(N) dB (W/4 kHz)." *Notice* at ¶55. The Commission further proposed to modify those sections to specify a value for N based on whether the VSAT network was using one of four specified multiple access techniques. *Notice*, Appendix B at 53. The Commission observed that its proposals would, in effect, "require Aloha earth stations to reduce the power spectral density emitted by as much as 3 dB from the existing limits specified in Section 25.134(a)." *Notice* at ¶56 (footnote omitted).

In its comments, Aloha Networks applauded the Commission for its forward-thinking efforts to avoid future problems with respect to adjacent satellite interference. At the same time, Aloha Networks observed that the Commission's proposals would probably not alleviate the increased adjacent satellite interference that can be anticipated from VSAT network operations. Part of the difficulty lies in the Commission's proposal to pigeonhole all multiple access techniques into one of four categories. As Aloha explained, many different variations of those multiple access techniques exist today, and many more will be developed in the future. Trying to cast a permanent rule on the basis of an ever-changing landscape of multiple access techniques would be self-defeating almost from the moment of inception.

To address that problem, Aloha Networks proposed the following modification to clause (ii) of the Commission's proposed revision to Section 25.134(a)(1) :

> The maximum transmitter power spectral density of a digital modulated carrier into any GSO FSS earth station antenna shall not exceed -14.0 -10 log(N) dB (W/4 kHz) where N is the smallest number of co-frequency simultaneously transmitting earth stations in the same satellite receiving beam such that the probability of an event with greater than N simultaneous transmitters is less than .001.

Aloha Networks Comments (March 26, 2001) at 8-9.

Aloha Networks acknowledged that its selection of a .001 probability of carrier collision was greater than the 1% probability figure that the *Notice* had indicated would be "acceptable." *Notice*, Appendix E at 82. Aloha Networks explained that its selection of .001 was a compromise between the *Notice*'s proposed figure and the value of .0001 used by the European Telecommunications Standard Institute. *See* Aloha Networks Comments at 8. Aloha Networks pointed out, however, that its modification to clause (ii) could be adapted to whatever probability percentage the Commission ultimately decided to adopt as a matter of sound public policy.[1]

Opposition to Aloha Networks' Proposal

Most – but not all – of those parties addressing the proposed changes to Section 25.134(a) opposed the Commission's proposal as well as Aloha Networks' modification.[2] None of those opposition comments undermines the merits of Aloha Networks' proposal.

As a starting point, none of the other comments disputed the observations of Aloha Networks that more than four multiple access techniques exist today, that the number of multiple access techniques is likely to increase in the future, and that, accordingly, it would be myopic for the Commission to adopt a rule which tried to pigeonhole every multiple access network into one of four categories. *See e.g.* Comments of Astrolink International LLC ("Astrolink") (March 26, 2001) at 12. The other comments similarly agree with Aloha Networks that there is likely to be explosive growth in the use of VSAT networks for Internet access and other communications needs. Unanimity on that latter point is hardly surprising. Various industry estimates show millions of users turning to VSAT networks for broadband Internet traffic in the next few years.

The other comments implicitly, if not explicitly, accept the additional proposition advanced by Aloha Networks that the effort to reach a broader population will change the economics and hardware of VSAT networks. In order to reach a larger user population, VSAT subscriber terminals will be made more inexpensive and less obtrusive. Both of those

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1 As explained in the attached Appendix, Aloha Network's proposal is consistent with the recommendation of the International Telecommunications Union ("ITU"). *See* ITU-R S728-1.

2 One notable exception is GE American Communications, Inc. ("GE Americom"), which suggested that the Commission form an industry working group to develop appropriate revisions because "the industry working group will be in the best position to evaluate the appropriate power levels that should apply to VSAT networks relying on slotted ALOHA or other multiple access methods." GE Americom Comments (March 26, 2001) at 4.

requirements will mandate the use of smaller antennas with diameters of less than one meter. *See* Comments of Hughes Network Systems et al. ("Hughes") (March 26, 2001) at 23. Smaller dishes will result in a wider beamwidth and degraded attenuation in the sidelobes. The installation of smaller dishes in more affordable earth stations is also likely to increase the risk of antenna pointing errors. While not significantly degrading the ground terminal receive signal, these errors will exacerbate the possibility of interference to adjacent satellites.[3] *See* PanAmSat Corporation Comments (March 26, 2001) at 12-13.

The prospect of interference to adjacent satellites is further heightened by the apparent inability of many, if not most, VSAT networks to accommodate the decrease in transmitter power proposed by the Commission. According to Hughes, for instance, there is a lack of surplus link margin available in existing networks for interference protection now – a situation that is only likely to exacerbate the risk of unacceptable interference when existing VSAT operators are confronted by future growth in the number and use of VSAT networks by third parties. *See* Hughes Comments (March 26, 2001) at 22.

In this context of a rapidly changing environment, it is not enough to say, as many comments do, that each VSAT network operator "is motivated to provide its customers with reliable, high-quality service" and that VSAT network operators will take care to ensure that packets (whether for data or signaling) are transmitted "with a minimal probability for collisions." Comments of Spacenet Inc. and StarBand Communications, Inc. (March 26, 2001)

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3 With smaller dishes and the prospect of more affordableinstallations, there will inevitably be installation by undertrained personnel and the advent of "self-installation" by end users, both resulting in a greater number of misaligned antennas. The attached Appendix addresses the parameters and interference outcomes of antenna pointing errors.

at 36; Astrolink Comments at 12. Those same kind of economic motivations exist in every industry regulated by the Commission and, with minor exception, have been insufficient to deter the Commission from regulation of parties (like VSAT network operators) who secure licenses from the FCC to utilize radio frequencies. As an example, parties obtaining valuable television and radio broadcast licenses have the same mutual economic interest in minimizing interference with each other so that their respective viewers and listeners can receive a high quality signal; despite that obvious economic motivation, the Commission has promulgated detailed regulations to ensure that the economic motivation to expand the scope of their respective coverage does not lead broadcasters to undertake construction or initiate operations which, whether knowingly or unwittingly, cause interference with each other.

The same reasoning applies to the VSAT industry. To be sure, as the comments indicate, the industry is a competitive one which, to date, appears to have experienced few problems of interference. But, as all comments acknowledge, the times are changing, and it would disserve VSAT licensees as well as the using public to assume that the tranquility of the past will adequately protect against interference in the future. The need for action is especially pressing because, as VSAT equipment manufacturers and network operators anticipate, the growth in demand, construction and installation will proceed apace. If the potential and actual frequency of collision increases afterwards, it will be that much more difficult for the Commission to remedy the problem with a prospective regulation. At that juncture, the only remedy may require extensive adjustments and upgrades to established VSAT network infrastructures that would be more devastating to existing businesses than planning for the future now.

Aloha Networks nonetheless agrees with many of the comments that any regulation adopted in the instant proceeding should be generally prospective in nature and that existing VSAT network operations should be grandfathered. *See e.g.* Hughes Comments at 23. It would certainly be unfair to existing VSAT network operators to require expensive modifications to existing systems that were licensed and made operational in reliance on prior Commission rules. However, grandfather protection should be extended only to operations of networks under existing licenses and with existing equipment. The grandfathering should not extend to new licenses (which can certainly comply with any prospective regulation adopted by the Commission), new equipment (such as two-way satellite facilities) that do not reflect prior investments but could unduly increase the risk of unacceptable interference, or the addition of a significant number of new users in an existing network once regulation is enacted.

Conclusion

WHEREFORE, in view of the foregoing and the entire record herein, it is respectfully requested that the Commission adopt the changes proposed by Aloha Networks for Sections 25.134(a) and 25.212(d) of the rules.

Respectfully submitted,

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APPENDIX

Impact of VSAT Transmitters on Adjacent Satellite Uplinks

The impact of Uplink Adjacent Satellite Interference ("ASI") is more pronounced in uplink limited satellite links. Given the earth station transmitter power spectral density ("PSD"), off-axis-antenna gain, and satellite G/T, the magnitude of this interference can be calculated and expressed as a fraction of satellite thermal noise floor.

Any increase in this noise floor reduces the quality of the victim's communication link. The ITU Recommendation entitled, "Maximum Permissible Level of off-axis EIRP Density from Very Small Aperture Terminals (VSATs)" (ITU-R S.728-1), suggests that interference from other satellite networks be limited to 40% of the demodulator thermal noise power (with the thermal noise power accounting for 50% of the total noise power).

A single 0.85m antenna (transmitting at the maximum allowable PSD) that is aligned with approximately 1 dB receive pointing loss, injects ASI equivalent to 31% of the victim's uplink thermal noise floor. While a 1 dB pointing error will give satisfactory signal reception on the sunny days used to point the antennas, it can result in a significant number of troubling interference cases for adjacent satellites. The relevant data is as follows:

Uplink Frequency	14.00GHz
Antenna Diameter	0.85m
Transmitter Power PSD	-14.00dBW/4kHz
Antenna Pointing Error	0.5~1dB) degrees (receive pointing loss
Earth Station Antenna Gain Towards Adjacent Satellite	23.24dBi
Earth Station EIRP Towards Adjacent Satellite	9.24dBW/4kHz
Path Loss	206.85dB
Satellite Received PSD	-197.61dBW/4kHz
Boltzmann's Constant	-192.58dBW/4kHzK
Satellite G/T	0.00dB/K
ASI/Thermal Noise Density	-5.03dB (4kHz band)
ASI/Thermal Noise Denisty	31%

For a 0.75m dish, the pointing error associated with a 1 dB receiver signal degradation is even greater, and the adjacent satellite will not fall in the 29-25log(theta) envelope at that alignment. As a result, the ASI injects noise equal to 2/3 of the uplink thermal noise floor. The following data is instructive:

Uplink Frequency	14.00GHz
Antenna Diameter	0.75m
Transmitter Power PSD	-14.00dBW/4kHz
Antenna Pointing Error	0.58 Degrees (receive pointing loss ~ 1dB)
Station Antenna Gain Towards Adjacent	26.50dBi

Satellite	
Earth Station EIRP Towards Adjacent Satellite	12.50dBW/4kHz
Path Loss	206.85dB
Satellite Received PSD	-194.35dBW/4kHz
Boltzmann's Constant	-192.58dBW/4kHzK
Satellite G/T	0.00dB/K
ASI/Thermal Noise Density	-1.77dB (4kHz band)
ASI/Thermal Noise Density	67%

For satellites with G/T > 0, the increase in thermal noise experienced by the victim satellite will of course be even greater.

Any increase in transmitter power spectral density above the –14/dB(W/4kHz), as is envisioned with the use of random access/Aloha channels, will further reduce the quality of adjacent satellite uplinks. For the case of the slotted Aloha channel with a 38% loading factor as envisioned in the *Notice*, the ASI shown in the above tables will double at least 5% of the time.

With the anticipated proliferation of submeter dishes and untrained installations, the need to safeguard against ASI becomes that much more critical.

CERTIFICATE OF SERVICE

I, Katherine Wersinger, a legal secretary at Dickstein Shapiro Morin & Oshinsky, do hereby certify that on this 9th day of May, 2001, I caused copies of the foregoing "Corrected Reply Comments of Aloha Networks, Inc." to be sent by first-class mail, postage prepaid, to the following:

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