

EX PARTE OR LATE FILED

WILEY, REIN & FIELDING

1776 K STREET, N.W.
WASHINGTON, D.C. 20006
(202) 429-7000

ERIC W. DESILVA
(202) 828-3182

October 21, 1996

FACSIMILE
(202) 429-7049

RECEIVED

OCT 21 1996

William S. Caton, Acting Secretary
Federal Communications Commission
1919 M Street, N.W.; Room 222
Washington, D.C. 20554

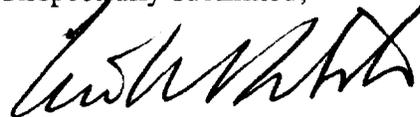
Re: Notification of *Ex Parte* Contact in ET Docket No. 96-102

Dear Mr. Caton:

The Wireless Information Networks Forum ("WINForum") hereby notifies your office of an *ex parte* contact in the above referenced docket. On October 16, 1996, Donald C. Johnson from WINForum and Robert L. Pettit and Eric W. DeSilva, WINForum's counsel, met with Bruce Franca and staff from the FCC's Office of Engineering and Technology and Thomas Tycz and staff from the FCC's International Bureau to discuss issues raised in the attached leave-behind.

If you have any questions regarding this notification, please do not hesitate to contact the undersigned at (202) 828-3182.

Respectfully submitted,



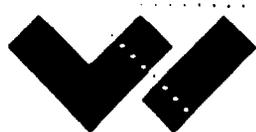
Eric W. DeSilva

Encl.

cc: Bruce Franca, FCC-OET
Thomas Tycz, FCC-IB



EX PARTE OR LATE FILED



WINFORUM

Wireless Information Networks Forum, Inc

RECEIVED

OCT 21 1996

September 12, 1996

Federal Communications Commission
Office of Secretary

Warren Richards, Chair
U.S. National Committee
International Communications and
Information Policy
U.S. Department of State
2201 C Street, N.W.
Washington, D.C. 20520

VIA FACSIMILE

Re: Globalstar Draft New Recommendation WP-4A/46: "Maximum Allowable Values of Interference From Wireless Data Networks to Systems in the Fixed Satellite Service"

Dear Mr. Richards:

The Wireless Information Networks Forum ("WINForum") hereby provides its comments on the above referenced proposal under consideration as a U.S. position. WINForum continues to object to this proposal on procedural, policy, and technical grounds. WINForum urges you therefore to return the Globalstar submission to WP4A for further consideration. WINForum is simultaneously forwarding this analysis to David Weinreich, the author of the Globalstar analysis, and offers its commitment to working with Globalstar in the context of WP4A to resolve any legitimate interference concerns in a responsible manner.

As WINForum previously noted, the late date of Globalstar's submission to US WP4A effectively precluded even the most cursory technical review of the document at the Working Party level. This proposal was not presented to US WP4A until August 28, 1996, passed virtually immediately out of US WP4A, and is now undergoing National Committee review with final comments due only two weeks and a day after submission. Yet, this proposed position has tremendous ramifications both for NII/SUPERNet developments in an ongoing domestic allocation proceeding and for HIPERLAN proceedings abroad. Despite this limited timeframe for review, WINForum has provided below its preliminary technical comments, highlighting several critical errors in the Globalstar analysis.

Before noting its technical issues with Globalstar's analysis, however, WINForum also reiterates its principal concern that the subject matter of the submission is inappropriate. Globalstar asks the U.S. National Committee to take a position that wireless networks deployed in the 5.15-5.25 GHz band should be limited to an aggregate EIRP density of -10 dBW/MHz per 3 million square miles of the earth's surface, based on an assumed threshold of noticeable interference of 0.1 percent $\Delta T/T$. The issue of what level of interference is permissible, however, is the precise issue before the FCC in ET Docket 96-102. Globalstar's submission thus appears to be an attempt to circumvent the FCC's allocation procedures through the use of the WRC preparation process.

Globalstar also predicates much of its approach on the fact that wireless networks in the band will likely be unlicensed in the U.S. While this is accurate, it may not be in other countries, thus undermining Globalstar's analytical approach. This suggests Globalstar's paper is not appropriate for consideration by international WP4 or the ITU-R.

Furthermore, the proposed limit of 0.1 percent $\Delta T/T$ for sharing between terrestrial and fixed microwave services is so low as to virtually preclude any terrestrial sharing with fixed microwave feeder uplinks. WINForum thus is concerned that the proposed position also could be contrary to the national interest, since the sharing criteria could easily be extended by analogy to other fixed satellite service bands by other administrations, precluding any sharing between terrestrial services and fixed satellite services in other bands.

As a technical matter, WINForum does not believe that Globalstar's submission is justified. The paper requests a U.S. position limiting aggregate EIRP for wireless networks in the 5.15-5.25 GHz band to -10 dBW/MHz per 3 million square miles. This number, however, is derived from an assumption that the appropriate threshold for assessing noticeable interference is 0.1 percent $\Delta T/T$. In effect, while the paper calculates the number of wireless network devices that could be simultaneously in use with a $\Delta T/T$ of 0.1 percent, it does not attempt to demonstrate that harmful interference to its system is caused with a $\Delta T/T$ of 0.1 percent. Indeed, in submissions to the FCC, Globalstar has implied that its system will not receive harmful interference even with a change in received noise temperature that is 60 times greater.¹

Comments of L/Q Licensee Corp., ET Docket No. 96-102 (filed July 15, 1996) at Appendix A, p. 2 (noting that the ITU coordination threshold for co-primary services is 6 percent $\Delta T/T$).

Warren Richards, Chair
U.S. National Committee
September 12, 1996
Page 3 of 5

Because the submission is, in effect, a tautology, it does not address the real question before the National Committee, *i.e.*, the appropriate sharing criteria between MSS feeder links and wireless networks in the 5.15-5.25 GHz band. In this regard, WINForum notes that a prior ITU study has been approved that addresses this issue -- "Analysis of Sharing Between NGSO MSS Uplink and HIPERLANs" (ITU-R 4A/66-E at pp. 158-165). WINForum recognizes that Globalstar has recently taken issue with this study for a number of reasons. First, Globalstar has indicated that it is operating with a user EIRP of 27 dBW rather than the 51.1 dBW referenced in the ITU study. Second, Globalstar has indicated that the ITU study did not take into consideration its use of an "iso-flux" antenna. Third, Globalstar has wrongly alleged that the ITU assumption of a 1 percent duty cycle is erroneous. Finally, Globalstar has incorrectly argued that the assumed 100:1 ratio of indoor to outdoor devices is inconsistent with deployment proposals. Below, WINForum has provided a revised study of potential interference caused by wireless networks based on the ITU study methodology, but modified to address Globalstar's concerns expressed in other fora.

WINForum's revised study indicates that 352.8 million active NII/SUPERNet devices can be deployed within the coverage area of the satellite, even assuming a 27 dBW per user EIRP from the feeder link earth station. Given the bicoastal nature of the U.S. population distribution and the inability of the Globalstar system footprints to cover both coasts at the same time, the total number of active units domestically could even be twice the number estimated, or 705.6 million -- almost three times the population of the United States. To take into account the number of devices that are not active (*i.e.*, off or not in use), WINForum conservatively estimates that over 3.5 billion devices could be deployed domestically consistent with the sharing criteria in the ITU study. Notably, the noise value represented in WINForum's analysis is a $\Delta T/T$ of approximately of 2 percent, which appears to be eminently reasonable considering the 6 percent, 10 percent, and even 25 percent coordination threshold values used in other contexts. A 2 percent $\Delta T/T$ corresponds to an effective noise floor increase of less than 0.1 dB -- a quantity that is well within the calibration error of instrumentation.

The ITU study also assumed a "worst case" interference profile of a HIPERLAN device operating at the sub-satellite point and the lowest angle of elevation to the satellite. In effect, this analysis results in a path differential of 8.8 dB between the earth station, which is "further away," and the HIPERLAN device. Now, however, Globalstar has indicated that it is using an "iso-flux" antenna that results in "little difference in receive power at the spacecraft receiver of signals emanating from anywhere within the antenna coverage area." Under the circumstances, even if there is a geographic differential between the NII/SUPERNet device and the earth station favoring the NII/SUPERNet device, no path differential will result.

Warren Richards, Chair
U.S. National Committee
September 12, 1996
Page 4 of 5

Thus, the use of the iso-flux antenna provides the earth station with an additional 8.8 dB of protection over what is assumed in the ITU study. Accordingly, WINForum has eliminated the 8.8 dB penalty used in the ITU study.

WINForum believes that the 1 percent duty cycle assumption is, if anything, conservative. In its reply comments to Globalstar's objections to WINForum's petition for rulemaking, WINForum provided an appendix discussing why, on an overall throughput basis, a 1 percent duty cycle is conservative. This appendix has been redacted and attached to this submission. With respect to duty cycle ratio, WINForum also notes that its study "does not consider the fact that not all devices will be in use at any particular time." In other words, WINForum's estimate of a 1 percent duty cycle is only for those devices that are *on and in use*, and estimates that, of those computers, only 1 percent will be radiating at any given moment in time. Thus, WINForum's study indicates a 2 percent $\Delta T/T$ will only be reached if the entire U.S. population were each actually working at three different computers simultaneously.

WINForum further believes that the estimated HIPERLAN 100:1 indoor to outdoor use ratio is also appropriate. In this regard, the specific use envisioned for the 5.15-5.35 GHz band is for low power, on-premises networks designed for in-building and in-office use with transmission ranges up to only 40 meters. While it is true that some parties have advocated "community network" systems contemplating relatively longer range (*i.e.*, 10-16 kilometers) fixed links, both the band plan favored by NTIA and, more importantly, the band plan in the FCC's own NPRM, contemplate locating these community network systems in spectrum that does not overlap with the MSS feeder uplink spectrum. As with HIPERLAN, it is conceivable that such systems could be used in an outdoor mode, but the number of users who would be operating such devices outside with the transmission range available is minimal at best. These systems contemplate wireless support for networking capabilities, which involve highly interactive uses of computers. Given that the proposed highly interactive uses virtually require stationary platforms, a 100:1 indoor to outdoor ratio is not only reasonable, it is highly conservative.

WINForum has attempted, and continues, to try to cooperate with Globalstar to resolve any potential interference concerns as between MSS feeder links and wireless networks in the 5.15-5.25 GHz band. Rushing through a U.S. position on this issue, however, is not a reasonable or appropriate means of achieving closure on this issue. Under ordinary circumstances, Globalstar's submission should have been the opening round of technical discussions between Globalstar and WINForum, serving to stimulate debate and increase mutual understanding. This initial volley, however, should not become a default U.S. position

Warren Richards, Chair
U.S. National Committee
September 12, 1996
Page 5 of 5

because there was no opportunity to engage in reasoned discussions. WINForum looks forward to working with Globalstar, and reiterates its commitment to achieving a mutual understanding regarding reasonable sharing criteria for the 5 GHz band.

For the foregoing reasons, WINForum strongly objects to the adoption of WP-4A/46 as a U.S. position and urges the U.S. National Committee to return the document to Working Party 4A for further discussion. Should any questions arise concerning this matter, please contact Donald Johnson at (513) 445-1452, Carl R. Frank at (202) 429-7269, or Eric W. DeSilva at (202) 828-3182.

Sincerely,

WIRELESS INFORMATION
NETWORKS FORUM

By: J. Ron Cross
J. Ron Cross, Chairman
Wireless Information Networks Forum

By: Donald C. Johnson
Donald C. Johnson
Chair, NII/SUPERNet Sharing Rules
Drafting Committee
Chair, WINSpectrum

cc: David E. Weinreich, Globalstar
Don Jansky, Chair US WP4A
William Luther, FCC-IB
Julie Garcia, FCC-IB
Richard Smith, Chief, FCC-OET
Fred Thomas, FCC-OET

MSS Uplink Analysis.

Modifications to ITU 4A 66-E (the ITU paper) analysis to apply to NII SUPERNet using the new MSS parameters

The following is modifications of ANNEX 1, section 1.1 and 2.1.2 of the subject paper, required to make the paper apply to NII SUPERNet with the newly announced MSS parameters.

SUPERNet/NII Parameters

(Modification of Table 1 of the ITU paper)

	NII/SUPERNet	HIPERLAN (ITU 4A.66-E)
Transmitter Power	-6 dBW, Using the power level proposed in the comments.	-10 dBW
Bandwidth:	25 MHz.	23 MHz
Duty Cycle:	0.01. See Attachment A	0.01
Outdoor to Indoor usage ratio:	0.01	0.01
Building attenuation:	20 dB	20 dB
Number of RF channels:	14	3

MSS Uplink Parameters

(Modification of Table 2 of the ITU paper)

	Now	ITU 4A/66-E
LES EIRP per channel	27 dBW	54 dBW
Channel bandwidth	1.23 MHz	1.23 MHz
Satellite RX antenna gain	+1 dB	-1 dB
Satellite C/N	-5 dB	-2 dB
Required NII/SNet C/I	12 dB (note 1)	15 dB
Satellite Altitude	1414 km	1414 km

Power ratio NII/SNET/GS	-6 dBW - 27 dBW = -33 dBW
Distance ratio NII/SNET/GS	0 dB
Bandwidth ratio	-13 dB
Interference ratio Ro	-33+0-13 = -46
Satellite C/I	12 dB
"Outdoor NII/SUPERNet volume tolerance"	46-12 = 34 dB
Maximum number of transmitting outdoor nodes	$\text{invlog } 3.4 = 2512$
Multiplied by the number of channels	35,168 (multiply by 14)
Compensating for duty cycle of 1 percent	3.52 Million (multiply 100)
Compensating for indoor/outdoor ratio	352.8 Million (multiply 100)
Compensating for coverage area of satellite	705.6 Million (multiply 2) (see note 2)

Note 1: The use of 15 dB C/I in the original ITU paper was based on a spacecraft C/N operating requirement of C/N (operating) = -2 dB. This would require an interference value 17 dB below spacecraft noise (-2dB -15 dB = -17 dB). The new operating C/N value of -5 dB in the spacecraft requires only a 12 dB C/I to achieve an interference level 17 dB below spacecraft noise (-5dB-12dB = -17 dB). Thus, equivalent performance is achieved with a 12 dB C/I. This noise value raises the apparent spacecraft noise temperature about 2%.

Note 2: The new antenna pattern (ISO-Flux) will now cover about ½ the population on the US.

Exhibit A. SUPERNet Duty Cycle

WINForum, in Appendix B to the petition, assumed the duty cycle of active SUPERNet nodes was 0.01. This is the same ratio assumed by ETSI for HIPERLAN. The following shows that this ratio is conservatively high.

First, consider the information throughput at a particular device at 1 percent transmitter on time:

Raw data rate	24.5 Mb/s
50 % efficiency	12.2 Mb/s per channel
1 % of 12.2 Mb/s	122 Kb/s/node

Thus, if a node transmitter is on 1 percent of the time, the node achieves approximately 120 Kb/s of throughput capacity. The question then reduces to whether the mean throughput demand will ever exceed 120 Kb/s/user when averaged over a large area, namely that area over which the devices might interfere with a satellite.

The SUPERNet throughput density objective in dense deployment is approximately 200 Mb/s/hectare which is comparable to the HIPERLAN objective of 120 Mb/s/hectare. This is the maximum mean throughput demand that will be accommodated averaged over a single location. At 1000 users per 10,000 square meters, this is 200 Kb/s/user. The multi-metropolitan composite average will be considerably less than 122 Kb/s/user if the maximum average throughput demand at the busiest locations is 200 Kb/s/user. Thus, the mean transmitter on time during busy periods will be less than 1 percent. Note that this does not consider the fact that not all devices will be in use at any particular time.

Another approach can be taken to show that 1 percent duty cycle is conservative. The following throughput demand estimates were made by WINForum as the basis for predicted spectrum requirements for packet LANs in the US.

Office automation now	1 Kb/s/user
Future typical office	10 Kb/s/user
Maximum office automation	60 Kb/s/user
Typical collaborative user-future	120 Kb/s/user
Maximum collaborative user	400 Kb/s/user

As an example, 20 percent collaborative use plus 80 percent office use is a high estimate of the predictable usage division over a large area. The result is 32 Kb/s/user mean throughput at the typical rate, and 128 Kb/s/user at the maximum rate for a location. It is not likely that the average use will exceed the 32 Kb/s typical rate over the wide area seen by a satellite. Thus, the 1 percent assumption which achieves 122 kb/s/user leaves considerable capacity margin for future multi-media use as well as packet data.

These estimates must be further reduced to account for the fact that not all nodes will have power on and be in use at any time. That is, only some small fraction will actually be in use for communication purposes. For this reason as well as the magnitude of the overall throughput demand, an average 1 percent transmitter on time over a wide area is a very pessimistic assumption.

EX PARTE OR LATE FILED

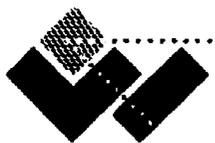
**WINFORUM 5.2 GHZ SHARING RULES DRAFTING COMMITTEE (SRDC)
STATUS**

10/09/96

RECEIVED

OCT 21 1996

Federal Communications Commission
Office of Secretary



WINFORUM
Wireless Information Networks Forum, Inc.

SHARING RULES DRAFTING COMMITTEE (SRDC)

SCOPE AND OBJECTIVES

Draft the Sharing Rules for NII/SUPERNet

Minimum Regulatory Framework to Permit Spectrum Coexistence

Ensure Coexistence with other Radio Services in the same or Adjacent Spectrum

Enforceable by Compliance Testing of Equipment

Perform Studies and Analysis Concerning Coexistence with Other Radio Services

SHARING RULES DRAFTING COMMITTEE (SRDC)

APPROACH

Requirements, Goals and Issues Definition

Resolve Issues - Strive for Consensus

Draft the Rules

STATUS

Requirements, Goals and Definitions Underway

One Proposal for A Rules Structure Tabled

SHARING RULES DRAFTING COMMITTEE (SRDC)

SOME ESTABLISHED REQUIREMENTS AND GOALS

Two Sets of Rules

Class1: Low Power, Short Range, Either Band

Class2: Higher Power, Upper Band Only, Longer Links

Network Access and Interoperability

Intra-Building Multimedia Communication and

**Interconnection to Broadband Networks for Inter-Location Multimedia
Communication**

Support Access to the National Information Infrastructure

**Support for Wireless ATM Quality of Service Goals to Extent Consistent with Fair Spectrum
Sharing**

Goal: Achieve International Agreement on Sharing Rules for 5.2 GHz Band

Seeking Cooperation with ETSI

SHARING RULES DRAFTING COMMITTEE (SRDC)

SOME ISSUES

At this stage any matter is listed as an issue if any opposition to a position has been voiced. Some issues have proposed solutions supported by the majority.

Interim Rules

Majority Position: If Issued, Limit to Upper Band

Power and EIRP

Current Lower Band Estimate:

250 mw and 0 dBW EIRP for 40 Meter In-Building

Technologically Neutral Levels With Spread Spectrum in Upper Band

Main Out-of-Band Concern is MLS Below Lower Band

Channelization

Whether Single Emission Bandwidth (or Channel Separation)

Assignment of Frequencies, if Limited Number of Channels

WINForum Position: Single Emission Bandwidth of about 25 MHz

SHARING RULES DRAFTING COMMITTEE (SRDC)

SOME ISSUES (CONTINUED)

At this stage any matter is listed as an issue if any opposition to a position has been voiced. Some issues have proposed solutions supported by the majority.

Antenna Gain in Lower Band

Distributed Versus Centralized Control

Means of Usage Assessment

LBT

Receiver Listen

System Level Assessment

RLS Sharing

Principal Concern is Control of Susceptibility

Interference to Ground-based RLS Not as Major a Concern

Means of Enforcing Spectrum Efficiency

Consensus: Modulation Efficiency Not Sufficient

SHARING RULES DRAFTING COMMITTEE (SRDC)

MSS COEXISTENCE

GlobalStar and AirTouch Concerns

Principal Issues

Indoor/Outdoor Deployment Ratio

Transmitter “on” Time Ratio

Antenna Gain and Its Effects

Space Receiver Interference Threshold

SHARING RULES DRAFTING COMMITTEE (SRDC)

GLOBALSTAR

Questions ITU-R 4A/66E Conclusions on HIPERLAN

Changed System - Iso-Flux pattern

Differences Between HIPERLAN and NII SUPERNet

Proposes 0.1% Limit on Noise Floor Increase (.004 dB increase in noise floor)

WINForum :

Using ITU-R 4A/66E with Updated Parameters, Over 300 Million Devices

Create Less Than a 2% Noise Floor Increase (0.09 dB increase in noise floor)

(WINForum letter to US WG 4A Chairman)

At Issue

Transmitter Duty Cycle

Building Excess Attenuation

Indoor/Outdoor Device Deployment Ratio



SHARING RULES DRAFTING COMMITTEE (SRDC)

AIR TOUCH COMMENT SUMMARY

Principal Use of 5.15-5.25 GHz Band will be Outdoor, Directional Point-to-Point Links.

Claims 60% of Devices Outdoor

50% Transmitter Duty Cycle

Implies Trunking of Both Wired and Wireless Local Network Generated Traffic

At least 50 Mobile Wireless Devices per Wireless Trunk if Wireless Only

Claims 27% Reduction in MSS Throughput

SHARING RULES DRAFTING COMMITTEE (SRDC)

COMMENTS ON AIRTOUCH POSITION AND ANALYSIS

Outdoor Application in MSS Shared Band will be Short Range Mobile

The ITU-R 4A/66E Modification Submitted by WINForum is Correct for Indoor/Outdoor Ratio and Transmitter Duty Cycle.

Unfavorable Analysis Assumptions Under Study

10 Degree Grazing Angle: 2500 Mile Coverage Radius (20 Million Square Miles)

Globalstar claims only about 3 million square miles (977 mile radius and 37 degree angle)

No Excess Attenuation

Unrealistic Antenna Pattern:

Average gain >1

35 - 45% of Power in Sidelobes.

5% Power in Sidelobes is High Range

Usual Point-to-Point Link Antenna Gain Much Higher (Multipath Considerations)

Typically 40 dB

