

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

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of Application of)
Iridium LLC)
Concerning the Use of the 1990-2025/)
2165-2200 MHz and Associated Frequency)
Bands for a Mobile-Satellite System .)

File Nos. 187-SAT-P/LA-97(96)
SAT-LOA-19970926-00147
SAT-AMD-20001103-00156

SEP 23 2001 CB

Satellite Policy Branch
International Bureau

REPLY TO OPPOSITION

Hughes Electronics Corporation (“Hughes”) replies to the Opposition of Iridium LLC and Iridium Satellite LLC (collectively, “Iridium”),¹ filed in response to Hughes’ Petition for Partial Reconsideration² of the Order and Authorization³ in this proceeding.

I. INTRODUCTION AND SUMMARY

There are three main themes in Iridium’s Opposition: (i) Iridium claims that sharing is possible between its MSS feeder links and the GSO FSS only “so long as [GSO FSS systems] employ well-recognized sharing techniques,” but that resolution of this issue can wait for another day, (ii) Iridium believes that Hughes is seeking to change existing Commission rules and to impermissibly shift the burden of coordination to Iridium, and (iii) Iridium suggests that Hughes’ Petition is inconsistent with Hughes’ position on sharing in other proceedings. Iridium also includes a technical exhibit that presents new data not previously submitted. None of these lines of argument is persuasive and none overcomes the legal defects inherent in the *Order*.

Iridium’s submission of a technical analysis in the reconsideration phase is a tacit admission that the record before the Bureau does not support the Bureau’s decision to license

¹ Opposition to Petition for Partial Reconsideration of Iridium LLC and Iridium Satellite LLC (Sept. 10, 2001) (the “*Opposition*”).

² Petition for Partial Reconsideration of Hughes Electronics Corporation (Aug. 16, 2001) (the “*Reconsideration Petition*”).

Iridium in the 29.25-29.5 GHz band. That is reason enough for the Bureau to reconsider its decision. However, even if the Bureau were to consider Iridium's new analysis, that proposal is not feasible because Iridium's approach (i) would preclude use of the 29.25-29.5 GHz band by the licensed Spaceway system over approximately 70% of CONUS, and (ii) is entirely dependent on Hughes substantially changing the parameters of its licensed system.

Hughes is not seeking to alter the 28 GHz band plan. Hughes simply asks that the Bureau apply its existing rules and policies, instead of impermissibly deferring to another day resolution of a critical uplink interference issue. Hughes' arguments here are fully consistent with Hughes' position in other proceedings that GSO FSS sharing is possible with MSS feeder links in certain circumstances. The problem here remains Iridium's unwillingness to meet its current obligation under Commission rules to show how Iridium will implement sharing techniques in a way that will make Iridium's sharing feasible with licensed GSO FSS systems.

II. THE BUREAU IGNORED CRITICAL EVIDENCE IN THE RECORD

There is no basis whatsoever for Iridium's claim that the Bureau considered and rejected Hughes' concerns about the interference problems posed by the Iridium system.⁴ To the contrary, the Bureau never addressed the *unrebutted* evidence in the record that showed that the Iridium MSS system presents an interference threat to the licensed Spaceway system.⁵ The courts are quite clear that an agency may not dismiss material arguments in a footnote.⁶ The Bureau's statement that Iridium has coordinated with LMDS operators---an entirely different service with different technical characteristics---is wholly irrelevant to the issue whether the Iridium system is electromagnetically compatible with licensed GSO FSS systems. Thus, it

³ *Iridium LLC*, DA 01-1636, (rel. July 17, 2001) ("*Order*").

⁴ *Opposition* at 4-5 (citing *Order* at n.41).

⁵ *See* *Petition to Deny of Hughes Communications Galaxy, Inc.* (Dec. 22, 1997) ("*Petition to Deny*") at Exhibit A.

⁶ *Bechtel v. FCC*, 957 F.2d 873, 880-81 (D.C. Cir.), *cert. denied*, 113 S.Ct. 57 (1992).

cannot be said that the Bureau “carefully addressed” the issues raised by Hughes. Rather, the Bureau ignored critical evidence, and that is a reversible error.

III. THERE IS NO DEFENSIBLE BASIS FOR DEFERRING THE UPLINK INTERFERENCE ISSUE

In the *Order*, the Bureau acknowledged the existence of the uplink interference issues that Hughes raised, but deferred resolution to another day---when an application is filed for an Iridium earth station in the 29.25-29.5 GHz band. Hughes showed in its Petition why it is illogical and contrary to Commission precedent for the Bureau to defer consideration of the uplink portion of Iridium’s Ka band feeder link request to some undetermined point in the future, while, at the same time, authorizing Iridium to proceed *in toto* with the launch, deployment and operation of its proposed satellite system.⁷

Iridium has not squarely responded to Hughes’ explanation why the deferral of the uplink interference issue is inconsistent with longstanding Commission policy. Iridium’s explanation that the “FCC always processes space station applications separately from earth station applications”⁸ is non-responsive to Hughes’ demonstration that (i) Part 25 requires applicants for space station authorizations to submit a “comprehensive proposal for the entire [satellite] system,” including detail about the proposed uplink transmissions, and (ii) a complete picture of uplink and downlink characteristics of a proposed MSS system is needed to evaluate the radiofrequency compatibility of that system with other affected satellite systems.⁹

Iridium does not even attempt to explain how the Bureau can totally ignore the requirements of a service rule, adopted last year as part of the 2 GHz MSS proceeding, that expressly mandates that Iridium supply, as part of its space station application, the earth station

⁷ *Reconsideration Petition* at 5-10.

⁸ *Opposition* at 9.

⁹ Hughes did not claim, as Iridium states, that earth station licenses are granted in a processing round. *Opposition* at 9. Hughes explained that bifurcating consideration of

characteristics that Iridium suggests can wait for another day.¹⁰ Section 25.114(c)(6)(iii) specifically requires that system applications for 2 GHz MSS space station authorizations include the earth station uplink sharing demonstration required under Commission rule Section 25.203(k), as well as the sharing demonstration required by other applicable rules, such as Section 25.258. As Hughes demonstrated in its Petition, it is arbitrary and capricious for the Bureau to ignore Iridium's failure to comply with Commission rules, including this rule that was expressly amended to cover 2 GHz MSS systems, such as Iridium.¹¹

The failure to include this information in Iridium's application should result in its application being denied or dismissed as incomplete.¹² Iridium had the chance to amend its application to remedy this defect and bring its application into compliance with the 2 GHz service rules, but it did not do so.¹³ Thus, it is irrational-- in the face of new Commission rules that expressly *require* an uplink sharing demonstration in a 2 GHz MSS space station application---for the Bureau, in issuing a space station authorization under those very rules, to ignore the deficiencies in a space station application and defer consideration of a critical uplink showing to an undetermined point in the future.

the uplink side of an MSS system would leave GSO FSS licensees without a meaningful remedy and could bias the outcome of the issue. *Reconsideration Petition* at 8-10.

¹⁰ See 47 CFR §§25.114(c)(6)(iii) (application must include “the feeder link and inter-satellite service frequencies requested for the satellite, together with any demonstration otherwise required by this chapter for use of those frequencies (see, e.g., §§25.203(j) and (k))”); *The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band*, FCC 00-302, at Appendix D (rel. Aug. 25, 2000) (amending rule Section 25.114); see also *Reconsideration Petition* at 6, n.21; *Opposition* at 9.

¹¹ *Reconsideration Petition* at 5-7 (agency may not simply ignore rules that it does not choose to follow); *Southwestern Bell Telephone Co. v. FCC*, 28 F.3d 165, 169 (D.C. Cir. 1994) (agency must follow its rules until it alters them in a rulemaking).

¹² *Harry Soukiassian, Applications for New Private Carrier Paging Facilities on the Frequency 929.8375 MHz*, 15 FCC Rcd 5251 (2000). Hughes asked that the Iridium application be denied for failing to include the required sharing demonstration. *Petition to Deny* at 2.

¹³ See Amendment of Iridium LLC (filed November 30, 2000).

Moreover, the Bureau would abdicate its responsibility to implement the 28 GHz band plan internationally if it were to adopt Iridium's suggestion that the Bureau rely on ITU earth station coordination procedures to resolve uplink interference issues in the 29.25-29.5 GHz band.¹⁴ The Commission has explained that it would jeopardize the successful operation of U.S.-licensed satellite systems using the 28 GHz band unless those systems are required to operate around the world in accordance with that plan.¹⁵ The United States is the administration responsible for coordinating U.S.-sponsored space networks at the ITU, including the Iridium MSS system and Hughes' Spaceway system. The Bureau cannot, as Iridium suggests, close its eyes to the reality that those networks have both uplink and downlink components, and hope that the intersystem coordination of its own U.S.-sponsored networks will eventually occur under ITU procedures that involve foreign administrations making claims about associated earth stations. Abdicating such responsibility in the licensing of the Iridium MSS system is bad policy. Deferring to foreign administrations to resolve intersystem coordination issues involving U.S.-licensed satellite systems would be an irrational departure from the policies articulated in the 28 GHz proceeding, would ignore the clear requirements of existing Commission rules, and therefore would constitute reversible error.

Finally, deferring this interference issue to the earth station licensing stage would prejudice Hughes' rights and bias the resolution because it could preclude the use of sharing techniques that the Iridium MSS system is uniquely suited to employ. As set forth in Section V, it is not feasible to solve the Iridium system interference problem simply at the feeder link earth station level. The space station and earth station components are both integral elements of a satellite network. The success of the types of GSO/NGSO sharing techniques being addressed by the ITU Study groups noted in the attached Hughes Technical Analysis, such as in-line

¹⁴ *Opposition* at 8.

avoidance and space station diversity, requires consideration of all elements of the MSS system. Because the efficacy of those sharing techniques may require changes by the space station licensee, it is not logical to defer this issue for resolution with possibly unrelated earth station applicants, who may have no control or influence over the Iridium space station segment.

IV. COMMISSION REQUIREMENTS MANDATE THE UPLINK SHOWING THAT HUGHES SEEKS

Iridium responds to a number of arguments by suggesting that Hughes is somehow belatedly seeking reconsideration of the 28 GHz service rules. Specifically, Iridium takes issue with (i) Hughes' insistence that Iridium not be licensed at 29.25-29.5 GHz until Iridium demonstrates that its application complies with Commission rules, and (ii) Hughes' insistence that Iridium take into account the parameters of the Spaceway system.

There is no basis for Iridium's position that Commission rules simply require a recitation of theoretical sharing techniques and a general commitment to use some of those techniques and to otherwise comply with Commission requirements.¹⁶ Sections 25.258 and 25.114 clearly call for system-specific information from the MSS system applicant. Moreover, the Commission has recently reaffirmed the requirement that an applicant for feeder links at 29.25-29.5 GHz "demonstrate that coordination with authorized GSO/FSS operation in that band is *feasible*, as required by the final paragraph of Section 25.258.¹⁷ Thus, existing law requires a demonstration about the compatibility of the feeder links of an MSS system, as part of the system application, *that shows how coordination with GSO FSS systems is reasonably likely to be successful*. This showing must take into account the parameters of the proposed MSS system, as well as the parameters of all affected GSO FSS systems. The record in this proceeding shows

¹⁵ *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules*, 12 FCC Rcd 22310 (1997) ("28 GHz Third Report") at ¶ 67.

¹⁶ *Opposition* at 3-4 (citing Iridium's Consolidated Opposition and Response, Feb. 2, 1998).

¹⁷ *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules*, FCC 01-164 (rel. May 25, 2001) ("28 GHz Reconsideration Order") at ¶ 7 (emphasis supplied).

that Iridium has not met its burden of demonstrating that its Ka band feeder links can share with affected U.S. Ka band GSO FSS systems, including the Hughes Spaceway system.

Iridium claims that Hughes is impermissibly seeking to shift the burden of coordination to Iridium. As the applicant for a frequency band currently licensed to a number of GSO FSS systems, Iridium *already* bears the burden under existing Commission rules to show how its proposed system can feasibly share with the Hughes Spaceway system and other affected GSO FSS systems. The burden established by current rules is entirely appropriate because Iridium, as the applicant, is in the best position to show how its proposed system could co-exist with affected GSO FSS systems. Moreover, Section 25.258 recognizes that a licensed GSO FSS system may not be able to alter its system to accommodate a subsequently-applied-for MSS system, and that the MSS applicant may need to “work around” the GSO FSS licensee.¹⁸

V. IRIDIUM’S NEW SHARING ANALYSIS FAILS TO SHOW SHARING IS FEASIBLE

Iridium claims, without citation, that Hughes believes that MSS feeder links cannot share with the GSO FSS.¹⁹ This is disingenuous. The record in the 28 GHz proceeding shows that Hughes spearheaded the GSO FSS/MSS feeder link sharing solution that facilitated the adoption of the 28 GHz band plan and allows 1000 MHz of spectrum, including the 29.25-29.5 GHz band, to be used for ubiquitously deployed GSO FSS terminals.²⁰ The original Iridium system was limited to the 29.1-29.25 GHz band *because* Motorola insisted that Iridium could not

¹⁸ See *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules*, 11 FCC Rcd 19005 (1996) (“*28 GHz First Order*”) at ¶¶ 72-74 (use of 29.25-29.5 GHz by new NGSO/MSS systems subject to reaching coordination agreements with existing GSO FSS parties); 47 CFR § 25.258(b) (GSO FSS system to employ certain sharing techniques “to the maximum extent possible”).

¹⁹ *Opposition* at n.21

²⁰ *28 GHz First Order* at ¶¶ 57-58, 78; *Ex parte* presentation of Hughes Communications Galaxy, Inc., CC Docket No. 92-297 (Feb. 6, 1996). Earlier in the 28 GHz proceeding, Hughes objected to licensing MSS systems without the adoption of any criteria that ensured that the GSO FSS could effectively share the band with prior-licensed MSS

share with GSO FSS systems,²¹ and, as here, the MSS applicant sought to place the onus on GSO FSS systems to design their networks to accommodate the MSS feeder link network.²²

In the 18 GHz proceeding, Hughes addressed whether MSS feeder links could share the 29.25-29.5 GHz band with ubiquitously deployed FSS terminals. Hughes suggested one method by which this could be accomplished, without regard to the number or size of the FSS transmitters, but noted that the feasibility was dependent on whether the design of the NGSO MSS system included elements that made it susceptible to sharing.²³ Hughes previously had successfully used this approach in coordinating with the TRW Odyssey MEO system, with two feeder link complexes in the U.S.²⁴ In that context, Hughes repeatedly explained that this approach did not apply to the Iridium system because of the way that Iridium was designed.²⁵

Iridium strips the Hughes analysis from its context and tries to apply it to the second-generation Iridium system---a LEO system with ten feeder link sites throughout the United States. As set forth in the attached Hughes Technical Analysis, there are two main reasons that this sharing approach *still* is not applicable to the Iridium system. First, Iridium's own analysis leads to the conclusion that this approach would preclude Spaceway from using 29.25-29.5 GHz over approximately 70% of CONUS.²⁶ It would create large exclusion areas where the GSO FSS could not operate in this band---areas within about a 1,000 mile diameter

systems. *See, e.g.*, Reply Comments of Hughes Communications, Inc., CC Docket 92-297 (October 10, 1995) at 3-13.

²¹ *See Petition to Deny* at 2-4.

²² *See, e.g.*, Reply Comments of Hughes Communications, Inc., CC Docket 92-297 (October 10, 1995) at 3-9. Hughes did not commit in those Reply Comments, as Iridium wrongly asserts, *Opposition* at 9, to use any method of sharing with MSS feeder links.

²³ *See* Comments of Hughes Electronics, Inc., IB Docket 98-172, RM-9005, RM-9118 (Nov. 19, 1998) at 12 & Technical Appendix A; *Ex Parte* Presentation of Hughes Network Systems, IB Docket 98-172, RM-9005, RM-9118 (May 19, 2000) at Tab III A. I.

²⁴ *See 28 GHz First Order* at ¶¶ 72-74.

²⁵ *See, e.g.*, *Ex parte* presentation of Hughes Communications Galaxy, Inc., CC Docket No. 92-297 (Feb. 6, 1996).

²⁶ *See* Hughes Technical Analysis, attached.

around each of the 10 Iridium feeder link complexes in the U.S.²⁷ Needless to say, this would significantly reduce the capacity of the Spaceway system, and would violate a guiding principle behind Section 25.258 that a GSO FSS system need not disrupt or alter its transmissions to accommodate MSS feeder link operations.²⁸ The sharing approach that worked with TRW was predicated on sharing with a 12-spacecraft MEO system with approximately eight feeder link complexes around the world, and two in the U.S.. It expressly did not apply to an Iridium-type LEO system with 96 spacecraft and 10 feeder link complexes in the U.S. alone.²⁹

Second, significant developments have occurred in ITU Study Groups 4A and 4-9S in the past few years which indicate that a more advanced method of sharing is now preferred by international experts. Namely, if Iridium were to employ in-line avoidance and space station diversity sharing techniques, it is very possible that Iridium could share with the GSO FSS without imposing the vast exclusion areas shown in the attached Hughes Technical Analysis. It is premature to conclude that this approach is feasible here, however, (i) until Iridium provides sufficient information about its technical assumptions to allow Hughes to perform a thorough evaluation,³⁰ and (ii) unless and until Iridium commits to require this technical flexibility in its space stations and from the feeder links complexes that will access its satellite network.

Another fundamental problem with the Iridium analysis is the underlying but unfounded assumption that there will be a limited number of large FSS antennas operating at 29.25-29.5 GHz.³¹ The Spaceway system always was designed to support ubiquitous VSAT

²⁷ See *id.*

²⁸ See 28 GHz First Order at ¶¶ 72-74.

²⁹ See *Ex parte* presentation of FCC Staff, CC Docket No. 92-297 (Jan. 22, 1996); *Ex parte* presentation of Hughes Communications Galaxy, Inc., CC Docket No. 92-297 (Feb. 6, 1996).

³⁰ See Hughes Technical Analysis, attached.

³¹ See Application of Iridium LLC to Launch and Operate the MACROCELL Satellite System (Sept. 26, 1997) at A-38-40.

terminal deployment in this band.³² It therefore is both wrong and misleading for Iridium to claim that the 28 GHz band plan and Section 25.258 sharing criteria were grounded on individual, not blanket, licensing of GSO FSS terminals in the 29.25-29.5 GHz band.³³ It is wrong because Hughes successfully coordinated with TRW the operation of ubiquitous FSS VSAT terminals in the 29.25-29.5 GHz band, subject to certain frequency/polarization constraints in the areas surrounding the two TRW feeder link complexes, and the record of the 28 GHz proceeding reflects the intent of both TRW and Hughes to accommodate large numbers of small FSS transmitters.³⁴ It is misleading because the sharing concept that Iridium itself endorses is entirely independent of the number or size of the GSO FSS transmitters. Under Iridium's own proposal, as long as the GSO FSS transmitters are sufficiently separated in distance from the MSS feeder link, it does not matter how many there are or where else they are located.

VI. CONCLUSION

Iridium has neither rebutted nor undermined Hughes' arguments. Thus, the Bureau should rescind the portion of the *Order* that grants Iridium authority to use the 29.25-29.5 GHz band, and should either dismiss the Iridium application as deficient, or defer consideration of the request for feeder link authority until Iridium has met its burden under the Commission's rules to demonstrate how it is feasible for the feeder link component of its space station network to share with Ka band GSO FSS licensees.

³² See, e.g., *Ex parte* presentation of Hughes Communications Galaxy, Inc., CC Docket No. 92-297 (Feb. 6, 1996).

³³ Opposition at n. 27 & 31 and Appendix A.

³⁴ See, e.g., *Ex parte* presentations cited at n. 29, *supra*.

Respectfully submitted,

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TECHNICAL ANALYSIS OF HUGHES NETWORK SYSTEMS

This Technical Analysis responds to the analysis of Dr. Edward F. Miller, dated September 10, 2001, entitled "Sharing Between NGSO MSS Feeder Link Earth Stations and GSO FSS Services in the 29.25-29.5 GHz Bands Through Coordination Agreements." That analysis discusses a possible way that sharing of the 29.25 to 29.5 GHz band could occur so long as the GSO-FSS system employs opposite sense polarization and avoids use of the band when transmitting in the same geographic area as the NGSO MSS earth station. That analysis also indicates that Hughes itself considered this type of approach before.

Page 6 of Dr. Miller's analysis includes a Figure 2 that Hughes submitted to the Commission in May 2000. That Hughes analysis was based on a different set of assumptions than Dr. Miller uses. The Hughes analysis was based on frequency sharing between a MEO – NGSO system and a GSO system, not a LEO system, which is what the Iridium system is, was based on sharing with only two MSS gateway stations in the U.S. (not sharing with ten as proposed by Iridium), and provided link budgets showing that a C/I value of 50.7 db was achievable with cross polarization isolation only, so that GSO-FSS beams adjacent to the beam containing the MSS gateway could be operated by the GSO-FSS system in the 29.25 to 29.5 GHz band.

As an initial matter, it is not possible to fully respond to Dr. Miller's analysis because he does not provide sufficient information regarding the assumptions, values, procedures, (specifically - link budgets, antenna patterns, rain effect assumptions), which were used in determine the C/I values given on page three of his analysis. Such details are critical to a thorough evaluation of the results and conclusions contained there. We therefore have not been able to confirm the validity of those items.

The results stated in paragraph two on page three of Dr. Miller's analysis indicate for the gateway in Tallahassee, Florida that adjacent beams to the beam containing the MSS gateway cannot be used if they are operating in a co-channel, cross polarized mode because, with rain attenuation, the C/I values (which are acceptable in clear weather) degrade by 30 db to an unacceptable level. If one accepts this conclusion, that the adjacent beams cannot be used when high rain rates occur, then considering that a one degree beam size, as shown in Figure 1 in this Analysis has a diameter equal to approximately 360 miles, based on the locations of the proposed Iridium Gateways, one would conclude that the GSO system would not be able to operate in the 29.25 to 29.5 GHz band over most of CONUS. This includes both the East and West coasts, most of the Southwest and Southeast, as well as most of the Northeast, as shown in the accompanying Figure 1 where the shaded area represents the area not useable to the GSO system. Clearly the loss of service over most of CONUS cannot be deemed a feasible method of sharing for the GSO FSS.

The frequency/polarization plan suggested by Hughes as a means for sharing with MSS feeder links was for an MSS system with **two** gateways in the U.S., and was based on the fact that the adjacent beams to the one containing the gateway were useable by the GSO FSS system. It is not feasible to design a GSO FSS beam pattern where 10 beams covering MSS gateways are not to be used in the given frequency band in the U.S. Therefore, loss of operation by the GSO system of many additional adjacent beams, and therefore loss of the ability to service traffic in those beams, as shown in the attached Figure 1, makes this approach even less suitable for the LEO Iridium system. Since the GSO system will not only be restricted from using the ten beams containing the MSS Gateways, but also a large number of other GSO beams, one must conclude that some other interference mitigation technique should be employed, if ten MSS gateways are going to be used by Iridium and the assumptions made by Dr. Miller are in fact correct.

Study Groups 4A and 4-9S in the ITU have been carrying out extensive studies of interference mitigation techniques to facilitate sharing of spectrum between NGSO and GSO satellite systems. A number of interference mitigation techniques have been proposed as given in ITU Document S.1419. The technique that has been the preferred technique as discussed in ITU document 4A/34, is the Avoidance of In-Line Interference, through the use of satellite diversity or band segmentation. This a technique where an exclusion angle (typically 5 or 10 degrees) is identified, where when the Gateway antenna gets within this angle of the GSO satellite it switches to another LEO satellite in the Iridium constellation and thereby avoids any interference problems. The use of this mitigation technique would permit full use of the 29.25 to 29.5 GHz band by both the NGSO and GSO systems and permit the use of a larger number of gateways by Iridium, if that is desirable. It is recommended that this established and recognized mitigation technique would be an acceptable solution to the band sharing problem.

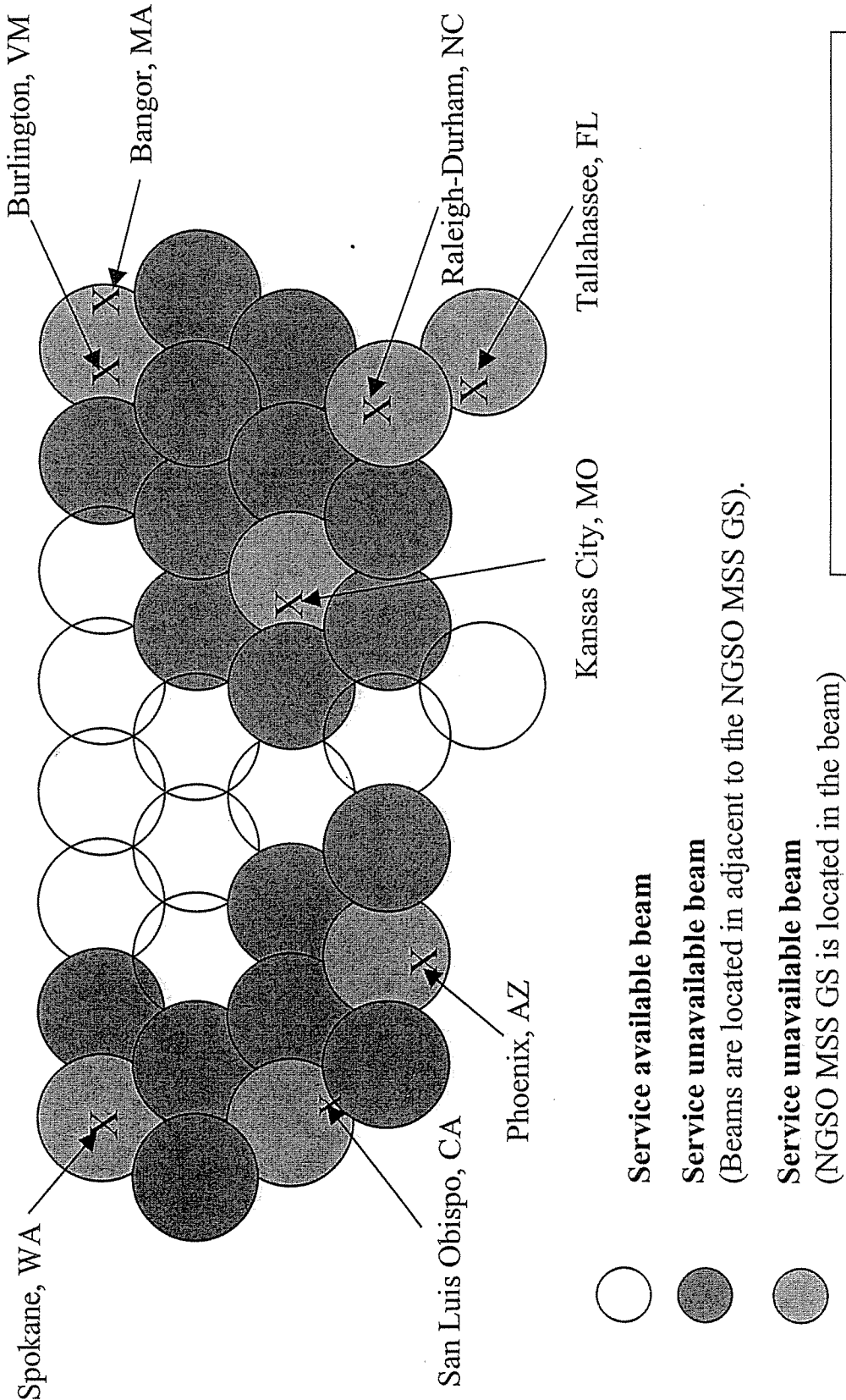
Hughes Network Systems

By: 
Leonard Golding

Vice President

September 17, 2001

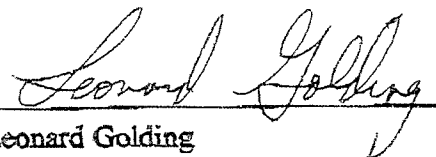
Figure 1



Note: Two NGSO MSS Feeder Link Complexes, Honolulu, HI, and San Juan, Puerto Rico, are not shown in above figure.

Technical Certificate

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this Reply to Opposition, that I am familiar with Part 25 of the Commission's Rules, that I have either prepared or reviewed the engineering information submitted in this filing, and that it is complete and accurate to the best of my knowledge.



Leonard Golding
Vice President
Hughes Network Systems

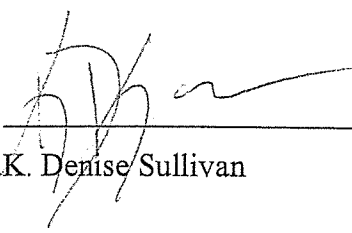
September 17, 2001

CERTIFICATE OF SERVICE

I hereby certify that I have this seventeenth day of September, 2001, caused a true copy of the foregoing "Reply to Opposition" to be served by first class mail, postage prepaid, on the following:

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