94-31

ORIGINAL

TO: Bill Caton
Acting Secretary

FROM: Ray LaForge
Frequency Allocation Branch

SUBJECT: IC Docket No. 94-31

DATE: May 12, 1994

The attached Petition for Clarification and Partial Reconsideration filed in ET Docket No. 92-28 should be placed in the subject docket due to the related issues involved.

94-31

Before The
Federal Communications Commission
Washington, DC 20554

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In the Matter of Amendment of Section 2.106 of the Commission's Rules to Allocate the 1610-1626.5 MHz and the 2483.5-2500 MHz Bands for Use by the Mobile-Satellite Service, Including Non-Geostationary Satellites	ET Docket No. 92-28

PETITION FOR CLARIFICATION AND PARTIAL RECONSIDERATION

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To: The Commission

PETITION FOR CLARIFICATION AND PARTIAL RECONSIDERATION

Pursuant to Section 1.429(d) of the Commission's Rules Loral Qualcomm Satellite Services, Inc. (LQSS), by its undersigned attorneys, hereby petitions for clarification and partial reconsideration of the Commission's Report and Order in the above-referenced docket. Report and Order, FCC 93-547 (released Jan. 12, 1994) ("MSS Allocation Order").[1] LQSS is an applicant to construct Globalstar, a low-earth orbit, satellite communications system, which would operate in the bands allocated in the MSS Allocation Order for the Mobile-Satellite Service (MSS), and has participated throughout this rulemaking.[2]

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[1] Public Notice of the Report and Order was published in the Federal Register on February 28, 1994. 59 Fed. Reg. 9413 (Feb. 28, 1994). Hence, this petition is timely filed in accordance with Section 1.429.

[2] See LQSS Petition for Rulemaking (Nov. 4, 1991). LQSS filed Comments (Dec. 4, 1992) and Consolidated Reply Comments (Jan. 6, 1993) on the issues raised in the Notice of Proposed Rule Making and Tentative Decision, 7 FCC Rcd 6414 (1992).

I. SUMMARY

LQSS supports the Commission's allocation of the 1610-1626.5 MHz and 2483.5-2500 MHz for co-primary use by the Mobile-Satellite Service (MSS) and Radio-Determination-Satellite Service (RDSS). This allocation will allow new global telecommunications services to become available for United States consumers, including mobile voice, data, and facsimile services. The Commission, however, should clarify and modify certain aspects of the Order in order to promote the timely introduction of new satellite communications services, facilitate the operation of LEO MSS systems within the United States, and make these services of greater benefit to the public.

First, the Commission should clarify that the MSS Allocation Order was intended only to allocate spectrum for MSS services and did not establish eligibility requirements for MSS licensees. LQSS submits that such a clarification will avoid any confusion between the MSS Allocation Order and the Notice of Proposed Rule Making, FCC 94-11 (released Feb. 18, 1994) ("MSS Licensing NPRM"), with respect to the potential use of these bands by low earth orbit (LEO) and geostationary orbit (GSO) satellite systems.

Second, in adopting certain international footnotes to govern the allocations in the MSS/RDSS bands, the Commission failed to resolve concerns raised by commentors about those provisions. Information has been developed recently in the international community which reinforces LQSS's previous

suggestions with respect to the power-flux density (PFD) values in Footnote 753F. With respect to the EIRP limits in Footnote 731E, the Commission's MSS Above 1 GHz Negotiated Rulemaking Committee provided recommendations which would improve the usefulness of the L-band for MSS operations, but its report was apparently not considered in this regard in the MSS Allocation Order. Reconsideration and revision of these footnotes to the United States Table of Allocations would enhance the ability of MSS systems to use the MSS/RDSS bands for the new communications services identified by the Commission.

Third, the MSS Allocation Order failed to address the adequacy of feederlink allocations for MSS systems. The Commission did not resolve the issues raised by LQSS and others -- supported by the MSS Above 1 GHz Negotiated Rulemaking Committee -- concerning the need for feederlinks in the 5/6 GHz band. And, although the Commission has indicated that all feederlinks for the MSS LEO systems could be assigned in Ka-band, it now appears that Ka-band may be too crowded to accommodate all the proposed MSS systems. Additional feederlink spectrum should be allocated to MSS LEO systems. Unless this critical issue is addressed, the Commission's ability to expedite development of MSS will be severely compromised.

Accordingly, LQSS requests that the Commission clarify and reconsider the MSS Allocation Order in part and take the following actions:

1. Clarify that the order was intended to allocate spectrum for MSS and does not establish eligibility standards for MSS licensees;

2. Modify the power flux density values in Footnote 753F and clarify that these values represent triggers to determine whether coordination with terrestrial users is required rather than absolute limits;

3. Modify Footnote 731E to apply the -15 dBW/4 kHz EIRP limit to all MSS uplinks, and eliminate the ambiguous last sentence of the footnote regarding protection of aeronautical radionavigation systems; and,

4. Designate spectrum in the 5/6 GHz bands for MSS LEO feederlinks.

II. THE COMMISSION SHOULD CLARIFY THAT THE REPORT AND ORDER ADDRESSED ONLY THE ALLOCATION FOR MSS AND NOT ELIGIBILITY OF CERTAIN TYPES OF SYSTEMS TO PROVIDE MSS IN THE BANDS.

The Commission should clarify that, in allocating the 1610-1626.5 MHz and 2483.5-2500 MHz bands for MSS operations of both MSS LEO and MSS GSO satellite systems, see MSS Allocation Order, FCC 93-547, at ¶ 18, the Commission intended only to allocate the spectrum for MSS services generally rather than also to establish eligibility standards for MSS licensees providing such services. LQSS requests this clarification to avoid any confusion between the rules and policies adopted in the MSS Allocation Order and the rules and policies proposed for adoption in the MSS Licensing NPRM, FCC 94-11. Without such a clarification, the MSS Allocation Order could be interpreted as prejudging the LEO-only eligibility standard for this spectrum proposed in the MSS Licensing NPRM, FCC 94-11, at ¶¶ 20-22.

In the MSS Allocation Order, the Commission concluded that the "demand for additional MSS services" warranted the allocation

of the 1610-1626.5 MHz and 2483.5-2500 MHz bands for MSS and RDSS. FCC 93-547, at ¶ 17. The qualities described for "additional MSS services," however, are attributed to MSS LEO systems only, even though the Commission also recognized an interest in the use of GSO technology. Id. The Commission described the allocation as including LEO and GSO satellite operations based solely on its statement that it was "possible" for LEO and GSO systems to share this spectrum.[3] Id. at ¶ 18.

A few weeks after adopting the allocation order, the Commission adopted a Notice of Proposed Rule Making for licensing and service rules to govern the delivery of MSS in the MSS/RDSS bands. MSS Licensing NPRM, FCC 94-11 (released Feb. 18, 1994). In this decision, the Commission recognized that LEO systems have a technological advantage over GSO systems and can better provide the services for which the MSS/RDSS bands were allocated. See id. at ¶ 20 (LEO MSS systems "have the potential to contribute to the domestic and international public interest in manners which a GSO system may not").

Thus, the MSS Allocation Order and MSS Licensing NPRM address different matters. In the Order, the Commission found that the demand for additional MSS services warranted an allocation for MSS. The Commission did not make any specific findings in the Order that it is in the public interest to

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[3] Indeed, in describing the demand for additional MSS services, the Commission refers exclusively to LEO MSS systems. See MSS Allocation Order, FCC 93-547, at ¶ 17. The Commission did not specifically address any public interest benefits of GSO use of the allocation.

license both LEO and GSO systems for use of the MSS/RDSS spectrum.[4]

What type of MSS system to license for use of the bands is being addressed in the MSS Licensing NPRM. In evaluating the public interest, the Commission tentatively concluded, inter alia, that "a LEO-only design requirement should provide U.S. customers with maximum access to new, alternative voice-MSS technology" and that "a LEO industry may be uniquely positioned to foster social and economic benefits in the United States and throughout the world." MSS Licensing NPRM, FCC 94-11, at ¶¶ 20-21. Thus, the Commission proposed that the public interest would be best served by restricting licenses to use the MSS/RDSS bands to LEO systems only.

Given the importance of the new telecommunications services for which the MSS/RDSS bands are allocated, the Commission should ensure that the difference between its allocation and licensing proceedings is clear. On the one hand, the allocation proceeding only concerns designation of spectrum to meet demand for specific

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[4] Although it briefly mentioned development of GSO systems, MSS Allocation Order, FCC 93-547, at ¶ 10, the Commission made no findings that the public interest warranted allocating the spectrum for shared LEO/GSO use. The Commission simply remarked that it was "possible" for LEO and GSO systems to share the spectrum. The Commission noted that sharing the spectrum among LEO and GSO systems is "possible" only "if appropriate sharing constraints are applied to MSS operations," MSS Allocation Order, FCC 93-547, at ¶ 18, and noted the system applicants' acknowledgement that "using the same spectrum for both geostationary and non-geostationary operations will require substantial limitations on both power and frequency." Id. at ¶ 16. Thus, the Commission implicitly recognized that LEO/GSO sharing could impair rather than support the public interest benefits which can be achieved by MSS LEO systems.

MSS services. On the other hand, the licensing proceeding proposes rules and policies to govern eligibility for and delivery of those services. Clarification that the Report and Order was only concerned with the former would avoid confusion and leave for the MSS licensing proceeding the determination of the rules and policies for operation of MSS systems which would best serve the public interest.[5]

III. RR 753F SHOULD BE REVISED TO SPECIFY A HIGHER PFD AND CLARIFIED AS A TRIGGER FOR COORDINATION RATHER THAN A LIMIT.

In the MSS Allocation Order, the Commission adopted ITU Radio Regulation 753F, applicable to the 2483.5-2500 MHz band, for the United States Table of Allocations. As currently written, RR 753F does not promote the public interest in enhancing maximum flexibility in provision of MSS service in the United States. Accordingly, LQSS urges that the Commission make two revisions of RR 753F for the United States.

First, the Commission should adopt a modest increase in the power-flux density (PFD) values. Second, the Commission should clarify that these values are coordination triggers, rather than absolutes. These actions would serve the public interest by enhancing the capacity of MSS systems using the band, improving

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[5] In the alternative, the Commission may wish to reconsider the issue and designate the MSS/RDSS bands as allocated for LEO use only. This approach would be consistent with the Order, see supra notes 3-4, and would reinforce the findings in the MSS Licensing NPRM.

the intra-service sharing environment and minimizing potential coordination with terrestrial systems using the band.

A. To Achieve the Maximum Benefit of the New MSS Services, the PFD Levels Must Be Reconsidered.

Based on recent information, LQSS proposes that the Commission replace the values in RR 753F with the following:

> -152 dB(W/m^2) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;
>
> -152 + 0.65(δ - 5) dB(W/m^2) in any 4 kHz band for angles of arrival δ (in degrees) between 5 and 25 degrees above the horizontal plane;
>
> -139 dB(W/m^2) in any 4 kHz band for angles of arrival between 25 and 90 degrees above the horizontal plane;
>
> These limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions.

Use of these slightly higher values will enable systems such as Globalstar to proceed without the need for time-consuming and unnecessary coordinations with terrestrial systems.

A recent analysis of the impact of proposed Globalstar operations on fixed services operating in the 2483.5-2500 MHz band suggests that MSS LEO operations at the higher PFD values proposed above would not cause interference. Output Document 2-2/TEMP/1(Rev.5)-E, at 3, (Feb. 8, 1994) (Exhibit A), from the recent international meeting of Radiocommunication Sector Task Group 2-2, states:

> there appears to be some sharing margin available between certain MSS and fixed service systems which [has] not been fully exploited. First, Non-GSO MSS satellite systems have more system[ ] design variables than GSO MSS systems. For example, Doc. 2-2/26

indicates the influence of spot beam use on non-GSO MSS satellites in improving the possibility of sharing. Also, Doc. 2-2/31 shows how system pfd levels can be improved by taking account of the orbital transmission characteristics of a particular system. Doc. 2-2/27 indicates how the pfd level can be improved as a consequence of the statistical properties of the system implemented.

Input document 2-2/27 referred to in Sector Task Group 2-2's report contains the results of a simulation of interference into analog radio-relay routes from LEO satellites of the Globalstar system. This computer simulation of possible interference from the Globalstar system into terrestrial fixed stations indicates that, at the three latitudes sampled, the interference levels into the fixed service network are at or below the limits stated in Recommendation 357, which defines both short- and long-term limits of interference allowed into analog angle/modulated radio-relay systems in bands shared with the fixed satellite service (FSS). The paper concludes that it may be possible to impose PFD limits on MSS satellites which are higher than those specified in Radio Regulation No. 2566 (see RR 753F).

Information previously submitted to the Commission during the MSS Above 1 GHz Negotiated Rulemaking Committee also indicates that operation at higher PFD limits results in an increase in capacity for MSS systems. See Report of the MSS Above 1 GHz Negotiated Rulemaking Committee, Attachment 1 to Annex 1, at § 5.1.3.2. The less restrictive PFD levels proposed above thus would benefit users by increasing the availability and utility of MSS services from operational systems. Accordingly, to promote the development of U.S. MSS systems, as well as

provide for maximum capacity on these systems, the Commission should modify RR 753F to allow more flexible values proposed above.

B. To Allow Efficient and Effective Coordination, Footnote 753F Should Be Designated a "Trigger."

The Commission should clarify that any PFD "value" adopted is intended to be a "trigger," rather than an absolute limit. This is the approach taken in a United States submission to Radiocommunication Sector Task Group 2-2 as well as in the output of the most recent international meeting of Task Group 2-2. Annex 1 to Document 2-2/TEMP/3-E (Feb. 3, 1994) (Exhibit B), provides that, in the case of non-GSO MSS systems, "RR 726 requires use of Resolution 46 procedures to bring into service non-GSO MSS systems for coordination with terrestrial services if the pfd exceeds the limits in No. 2566."

Document 2-2/TEMP/1 (Rev. 5). Annex 1 (Exhibit A) recommends a three-step approach for coordinating non-GSO MSS systems with terrestrial systems. This process would utilize the PFD as a preliminary determination to determine if further steps would need to be taken. As proposed, the PFD value would be higher than that currently in RR 2566. If the non-GSO MSS system met this level, no further action would be required. If the non-GSO MSS system did not meet the level, a technical examination would be undertaken, taking into account the individual system characteristics, to determine if actual interference to terrestrial systems might occur. This examination may enable the

non-GSO system to go forward without the need for coordination with numerous administrations. Only if FSS protection levels were exceeded in the second step would coordination be required.

The flexible "trigger" procedure described in this document would serve the public interest by allowing MSS systems to minimize time-consuming and costly coordinations for fixed service interests as well as other MSS systems. The Commission should, therefore, clarify RR 753F to follow this approach.[6]

IV. THE COMMISSION SHOULD CLARIFY THAT FOOTNOTE 731E DOES NOT ENTITLE AERONAUTICAL RADIONAVIGATION SERVICES TO LEVELS OF PROTECTION BEYOND THAT WHICH CAN BE ACHIEVED WITH THE ALLOWABLE EIRP LIMITS.

In its comments in this proceeding,[7] LQSS stated that MSS systems should be permitted to operate uplinks within the uplink e.i.r.p. limit of -15 dBW/4 kHz prescribed in Footnote 731E, notwithstanding other, seemingly contradictory language in the footnote. The footnote on the one hand provides for uplink e.i.r.p. limits for MSS systems operating in the 1610-1626.5 MHz band, but on the other hand, states that "[s]tations of the mobile-satellite service shall not cause harmful interference to, or claim protection from, stations in the aeronautical

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[6] In the alternative, the Commission could adopt an additional footnote for U.S. operations. This footnote could provide for the PFD limits proposed above, as well as for the three-step coordination process which could eliminate many unnecessary coordinations between MSS systems and terrestrial systems within the United States.

[7] See LQSS Consolidated Reply Comments, at 30; see also LQSS Comments on Preparation for ITU World Radiocommunication Conferences (ET Docket No. 93-198), at 14-18 (filed July 19, 1993).

radionavigation service, stations operating in accordance with the provision of No. 732 and stations in the fixed service operating in accordance with the provisions of No. 730." Addendum and Corrigendum to the Final Acts of the World Administrative Radio Conference, RR 731E (then 731X) (Malaga-Torremolinos 1992).

Based on information now available, LQSS submits that this language in RR 731E should be deleted. Its purpose was to reassure administrations with specific systems in the band (Sweden and Russia) that MSS systems would not cause them harmful interference. In the case of Sweden, the systems involved are radar systems of limited geographic scope. In the case of Russia, the system encompassed by RR 732 is the GLONASS system which operates in the 1610-1616 MHZ band as coordinated under Article 14 of the Radio Regulations.

Analysis performed during the MSS Above 1 GHz Negotiated Rulemaking Committee indicated that the Swedish radar system would not be adversely affected by MSS.[8] However, with regard to the GLONASS system, the Advisory Committee reported to the FCC that operations at the uplink e.i.r.p. density limits recommended by WARC-92 in Footnote 731E (-15 dBW/4 kHz) could interfere with

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[8] "Swedish radars operating in the L-band, because of their sparse locations and pulsed operation, will not cause harmful interference to MSS operators with well designed receivers, nor will MSS operations interfere with them." Report of Drafting Group 2C to IWG-2 of the MSS Above 1 GHz Negotiated Rulemaking Committee, at § 2.4 (April 1993).

receipt of GLONASS signals by receivers operating in the same vicinity as mobile earth stations.[9]

The United States currently is discussing with the Russian Federation the desirability of moving the operation of GLONASS to frequencies below 1606 MHz. This frequency shift would eliminate co-channel operation of GLONASS with MSS systems and ensure that MSS systems would be able to operate within the uplink e.i.r.p. limits specified in the RR 731E without causing interference into GLONASS receivers. Various testing programs also are underway to assess interference from MSS mobile earth terminals into GLONASS receivers, both for purposes of evaluating the co-channel case as well as determining appropriate out-of-band emission requirements.

Within the United States, no policy has been adopted which specifies that GLONASS will be used for precision landing of aircraft. Consequently, LQSS believes that it is unnecessary, and unwise policy, for the FCC to adopt the last sentence of the RR 731E for applicability to MSS systems operating in the United States. Subjecting MSS systems to the possible restrictions of complying with the final sentence of Footnote 731E is not based

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[9] At the present time, the international aviation community is considering the use of both the U.S. Global Positioning System and GLONASS for navigation, including possible gate-to-gate navigation, and whether use of both of these systems is needed to provide the level of integrity for "sole means" navigation. See generally LQSS Comments on Preparation for ITU World Radio-communication Conferences (ET Docket No. 93-198), at 15-18 (filed July 19, 1993).

on any expressed U.S. policy, and in fact, is contrary to the U.S. policy of promoting the new MSS systems.

Based on this information, LQSS urges the Commission to reconsider the adoption of Footnote 731E in its entirety. At a minimum, the Commission should consider a U.S. footnote which would not include the final sentence of 731E.

V. THE COMMISSION SHOULD ADOPT A POLICY OF USING MULTIPLE FREQUENCY BANDS FOR MSS FEEDERLINK ASSIGNMENTS.

Although the Commission adopted spectrum allocations for MSS/RDSS user links, the Commission declined to either propose new allocations for feederlinks between the satellites and gateway stations or to identify currently allocated FSS bands for feederlink use by MSS systems. See MSS Allocation Order, FCC 93-547, at ¶¶ 27-29. This omission must be rectified, particularly in light of recent developments in the proposed use of Ka-band.

The Commission itself notes the critical importance of feederlinks to MSS systems. MSS Licensing NPRM, FCC 94-11, at ¶ 70. For this reason, all the MSS LEO applicants have consistently sought feederlinks in frequencies most appropriate for their proposed systems. On the one hand, Motorola and TRW applied for feederlinks in Ka-band. LQSS, Constellation and Ellipsat, on the other hand, urged the Commission in this docket to make available the 5150-5250 MHz band for feeder links,[10] or

[10] The Commission indicated that it had approached NTIA on the issue of using the 5150-5250 MHz band for MSS feederlinks, but that "NTIA stated in a letter on October 15, 1993, that they oppose use of this band for MSS feeder links." MSS Allocation

to identify alternative bands in the 5/6 GHz range which could be used.[11]

In declining to consider the specific feederlinks requests, the Commission ignored these comments as well as the recommendations on the issue of its own federal advisory committee.[12] As the Commission points out, the MSS Above 1 GHz Negotiated Rulemaking Committee proposed that feederlink spectrum be made available for the proposed MSS systems below 15 GHz, and preferably below 10 GHz. See Final Report of the MSS Above 1 GHz Negotiated Rulemaking Committee, at 30-31 (Apr. 6, 1993). Despite these recommendations, the Commission simply stated that "MSS LEO feeder links would need to operate in FSS frequency bands that are not heavily used by GEO FSS systems." MSS Allocation Order, FCC 93-547, at ¶ 19 (footnote omitted).

The MSS Allocation Order fails to evaluate critically the need for MSS feederlinks. Nor does it assess the suitability of various FSS bands for feederlinks. Moreover, the Commission provides no explanation of why it is declining to identify specific frequency bands for MSS feederlink use as LQSS, Ellipsat and Constellation requested. In short, the Order's work was

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Order, FCC 93-547, at n.32.

[11] See LOSS Comments, at 17-19; Constellation Reply Comments, at 6; Ellipsat Comments, at 8-9.

[12] Cf. MSS Licensing NPRM, FCC 94-11, at n. 26 (citing 5 U.S.C. § 583(a)(7): "Pursuant to the Negotiated Rulemaking Act, we are required to use to the maximum extent possible consistent with our legal obligations, the consensus of the Committee as the basis for the we propose for notice and comment."

incomplete and inconsistent with the NRC conclusions. These deficiencies must be addressed on reconsideration if the Commission's expectations for new MSS services are to be achieved.

Moreover, since the MSS/RDSS allocations were adopted, information has become available which suggests that the Commission's projections for the use of Ka-band by MSS systems are overly optimistic. With respect to Ka-band, the Commission has proposed establishment of a Negotiated Rulemaking Committee to consider use of the 27.5-29.5 GHz band by terrestrial and satellite systems. See Second Notice of Proposed Rule Making, FCC 94-12 (released Feb. 11, 1994). The Commission has stated its expectation that it will "be able to identify sufficient spectrum within the 27.5-30.0 GHz band to satisfy uplink feeder link requirements of all MSS Above 1 GHz licensees." Id. at ¶ 22.

However, over two dozen parties have expressed an interest representation on the 28 GHz Negotiated Rulemaking Committee. These parties include all the current "Big LEO" applicants, which need feederlinks, as well as the parties interested in terrestrial microwave uses of the band (e.g., Suite 12). Additionally, on March 21, 1994, Teledesic Corporation filed an application to use the 28 GHz spectrum for a LEO satellite communications system. Even a preliminary review of the comments suggests that the Ka-band may be vastly more crowded than the

Commission had anticipated when it decided to consider feederlink spectrum for MSS LEO systems in this portion of the spectrum.

Further, there are issues with respect to the suitability of the 28 GHz spectrum to accommodate multiple MSS licensees that the Commission did not address. In its comments on the 28 GHz NRC,[13] LQSS points out that if MSS feederlinks are located in the 20/30 GHz band, bandwidth requirements may be substantially greater than at lower frequencies. As a result, the ability for multiple systems to use the same feederlink spectrum could be diminished.

The failure of the Commission to consider and evaluate the availability of spectrum for feederlinks fails to serve the public interest. Accordingly, LQSS asks that the Commission reconsider the feederlink requirements of MSS systems in this docket. Specifically, LQSS requests that the Commission identify specific bands below 15 GHZ which can be used by MSS Above 1 GHz systems for their feederlinks.

VI. CONCLUSION

For the reasons set forth above, LQSS requests that the Commission take the following actions on reconsideration of the MSS Allocation Order:

1. Clarify that the order was intended to allocate spectrum for MSS and does not establish eligibility standards for MSS licensees;

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[13] Application for Membership and Comments of Loral Qualcomm Satellite Services, Inc., at 6 (Mar. 17, 1994).

2. Modify the power flux density values in Footnote 753F and clarify that these values represent triggers to determine whether coordination with terrestrial users is required rather than absolute limits;

3. Modify Footnote 731E to apply the -15 dBW/4 kHz EIRP limit to all MSS uplinks, and eliminate the last sentence of the footnote regarding protection of aeronautical radionavigation systems; and,

4. Designate spectrum in the 5/6 GHz bands for MSS LEO feederlinks.

Respectfully submitted,

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Dated: March 30, 1994

EXHIBIT A

INTERNATIONAL TELECOMMUNICATION UNION

RADIOCOMMUNICATION
STUDY GROUPS

Document 2-2/TEMP/1(Rev.5)-E
8 February 1994
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Task Group 2/2

WORKING DOCUMENT TOWARD A DRAFT NEW RECOMMENDATION

NON-GSO MSS SATELLITE TRANSMISSIONS INTERFERING TO FIXED SERVICE NETWORKS (1 - 3 GHz)

1 Non-GSO MSS pfd proposals

This report presents a summary of the documents presented in Task Group 2/2 on this subject. This is a quick analysis of the various documents which present pfd limits either to be used as absolute values by non-GSO MSS satellites or to be considered as trigger values* for further coordination. The different hypotheses proposed may be summarized as follows:

1a) pfd limits based on one particular non-GSO system, or

1b) aggregated data representing several possible systems;

2a) for non-GSO MSS a value of pfd applicable for all frequency bands, or

2b) different pfds for particular bands;

3a) only one interfering satellite, or

3b) several satellites or aggregated data representing them;

4a) only one radio-relay interfered with, or

4b) "typical" situation for a fixed network, as described by Working Party 9D.

The following table indicates both the results obtained or proposals made for pfd limits and the hypothesis taken into account in each case:

- Block diagram;
- RB Report about how to apply Recommendation 46.

* The trigger value is the value of pfd at the Earth's surface, which, if exceeded, would indicate the necessity for coordination.

TABLE 1

Proposed pfd trigger values

	pfd limits (in dB (W/m^2/4 kHz))	1 492 - 1 530 MHz	2 160 - 2 200 MHz	2 483.5 - 2 535 MHz	Hypothesis taken into account
	RR	-152			
elevation angle < 5	12-4/42 (Digital)	-158			1b 2a 3b
	12-4/42 (Analogue)	-154	-154	-152	1b 3b
	2-2/6	-152			1b 2b 3a 4a
	2-2/27			-149	1a 2b 3b 4b
	2-2/29	-147			1b 2a 3b 4b
	2-2/31			-152	1a 2b 3b 4b
5° < elevation < 25° angle	RR	-152 + 0.5 (δ-5)			
	2-2/6	-152 + 0.4 (δ-5)	-152 + 0.65 (δ-5)	-152 + 0.75 (δ-5)	1b 2b 3a 4a
	2-2/27			-149 + 0.65 (δ-5)	1a 2b 3b 4b
	2-2/29	-147 + 0.5 (δ-5)			1b 2a 3b 4b
25° < elevation angle	RR	-142			
	12-4/42 (Digital)	-144	-139	-137	1b 3b
	12-4/42 (Analogue)	-135	-133	-131	1b 3b
	2-2/6	-144	-139	-137	1b 2b 3a 4a
	2-2/27			-136	1a 2b 3b 4b
	2-2/29	-137			1b 2a 3b 4b
	2-2/31			-128	1a 2b 3b 4b

2 MSS/fixed service sharing approaches

Working Party 9D (Fixed Service) has suggested the use of absolute pfd values in space-to-earth MSS allocations (1 - 3 GHz) as a basis for sharing criteria. On the other hand, Working Party 8D in Doc. 2-2/4 (8D/TEMP/110(Rev.1)), has indicated that the use of trigger values will lead to a more enhanced use of MSS/fixed service allocations, as they will allow for the application of more accurate models which can take account of individual MSS system implementations.

However, there appears to be some sharing margin available between certain MSS and fixed service systems which have not been fully exploited. First, Non-GSO MSS satellite systems have more systems design variables than GSO MSS systems. For example, Doc. 2-2/26 indicates the influence of spot beam use on non-GSO MSS satellites in improving the possibility of sharing. Also, Doc. 2-2/31 shows how system pfd levels can be improved by taking account of the orbital transmission characteristics of a particular system. Doc. 2-2/27 indicates how the pfd level can be improved as a consequence of the statistical properties of the system implemented.

Doc. 2-2/29 sets forth a pfd trigger and coordination concept which is a hybrid approach to sharing. It includes both a trigger value and an absolute value based on the operational implementation of individual systems through a "common methodology for single administration coordination" which can be confirmed by the Radiocommunication Bureau. Under such a concept, it is possible to exploit the margins available through use of particular NON-GSO MSS satellite system implementations.

3 Comment

a) A pfd trigger limit, plus an agreed common ITU procedure for coordination, is generally acceptable, provided that the pfd trigger is associated with a coordination procedure used at the same time. An explanation of such an approach is given in Annex 1.

b) Different space-to-earth MSS allocations can have different pfd trigger values.

c) NON-GSO and GSO MSS can have different pfd trigger values.

d) The model for the fixed service recommended by WP 9D should be retained (Interference allowance in digital systems, use of hops, antenna pattern assumptions, etc.) provided there are some modifications.

4 Questions which need to be answered

a) What are the trigger pfd values for NON-GSO MSS which should be used?

Task Group 2/2 was not prepared to make a determination of pfd levels, recognizing the range of such values indicated in the preliminary draft Recommendation in Annex 2. It was agreed that this must be agreed at the next meeting.

b) How should interference allocation be characterized for NON-GSO MSS systems, and how different system parameters contribute to it? (spot beams, orbital transmission characteristic, statistical properties).

This question is being addressed by Study Group 8 and TG 2/2 before the next meeting.