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October 3, 1994

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

Re: IC Docket No. 94-31, Preparation for International Telecommunication Union World Radiocommunication Conferences

Dear Mr. Caton:

It has been brought to my attention that, in the filing of the Reply Comments of Loral QUALCOMM Partnership, L.P., in the above-captioned proceeding, page 12 was inadvertently omitted. Consequently, attached is a new copy of the Reply Comments containing all pages.

Please contact the undersigned if you have any questions concerning this matter.

Sincerely yours,

Leslie A. Taylor

Leslie A. Taylor

Attachment

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

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In the Matter of

Preparation for International Telecommunication Union World Radiocommunication Conferences	)))	IC Docket No. 94-31

REPLY COMMENTS OF LORAL/QUALCOMM PARTNERSHIP, L.P.

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Preparation for International Telecommunication Union World Radiocommunication Conferences	)))	IC Docket No. 94-31

REPLY COMMENTS OF LORAL/QUALCOMM PARTNERSHIP, L.P.

Loral/QUALCOMM Partnership, L.P., (LQP) hereby submits its reply comments in response to the Commission's Notice of Inquiry, ("Notice"), in preparation for the 1995 World Radiocommunication Conference ("WRC-95").[1] As the Commission is aware, LQP is an applicant to construct GLOBALSTAR, a low-Earth orbit satellite telecommunications system (File Nos. 19-DSS-P-91(48) and CSS-91-014) to operate in the MSS/RDSS bands.

I. SUMMARY AND INTRODUCTION

WRC-95 provides a key opportunity for the United States to obtain revisions to the current Mobile Satellite Service (MSS) allocations in order to maximize the usefulness of the available frequency bands for new MSS systems, such as GLOBALSTAR. As LQP proposed in its Comments, the Commission should urge the United States to take steps to improve the usefulness of allocations in the 1610-1626.5 MHz and 2483.5-2500 MHz bands and to obtain allocations for feeder links to be used in conjunction with these frequency bands. Such actions are essential to ensure that multiple, successful MSS systems can be implemented in the latter part of this decade, enabling the provision of handheld mobile communications via satellite

[1] In the Matter of Preparation for International Telecommunication Union World Radiocommunication Conferences, IC Docket No. 94-31, FCC 94-96, released May 5, 1994.

in the extension of the terrestrial fixed and mobile infrastructure and for the provision of communications in locations where none is now available.

The key actions proposed by LQP are:

(1) identification and allocation of feeder link spectrum below 15 GHz for use by MSS systems, including GLOBALSTAR;

(2) removal of unnecessary constraints on user spectrum, including elimination of restrictions on the uplink band, increasing the PFD limit in the downlink band, and revising related provisions of the international table of allocations;

(3) proposing additional MSS allocations to accommodate the needs of second generation systems; and

(4) deferral of comprehensive consideration of the Report of the Voluntary Group of Experts until WRC-97.

The Comments filed by other parties recommend other useful positions to be adopted by the Commission, such as for the process for preparation for World Radiocommunication Conferences. LQP, in these Reply Comments, responds to these comments by other parties and recommends integrating some into the U.S. position for WRC-95.

II. THE UNITED STATES SHOULD PROPOSE ALLOCATIONS FOR MSS FEEDERLINKS IN A VARIETY OF FREQUENCY BANDS, INCLUDING BANDS BELOW 15 GHz

The Commission should recommend United States proposals to WRC-95 which include allocations for a variety of frequency bands for MSS feeder links, including bands below 15 GHz. Bands below 15 GHz are needed to ensure that LQP and other MSS system applicants are able to implement their systems as designed to provide low-cost, ubiquitous communications service. Numerous parties support the

allocation of C-band feeder links, including Comsat Mobile Communications, Constellation Communications, Ellipsat Corp., Motorola Satellite Communications, Inc. and Teledesic, Inc.

A. THE COMMENTS SUPPORT MULTIPLE ALLOCATIONS FOR FEEDERLINKS

In addition to various satellite service providers and applicants, a United States MSS service provider, AirTouch Communications, urged the Commission to seek allocations for C-band feeder links. AirTouch points out the advantages, from a service provider's perspective, of operating feeder links in the C-band, including, "propagation characteristics, spectrum efficiencies and cost advantages" as well as the availability of fully developed equipment.[2]

Comsat Mobile Communications, Inc., (CMC), in supporting allocation of C-band feeder links, identifies the necessity of such bands to provide adequate feederlink coverage of rain fade regions within spot beams and to enable the use of cross-polarization techniques not available at higher frequencies.[3] Ellipsat points out that requiring all systems to use feederlinks above 15 GHz would require substantial and costly system redesign, resulting in higher cost of service to the public.[4] Ellipsat, along with CMC, Teledesic, Motorola and LQP, recognize that placing all feeder links in the Ka-band, as initially proposed by the Commission, would result in substantially higher spectrum requirements.[5]

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[2] AirTouch Comments, at pp. 4-5.

[3] Comsat Mobile Communications Comments, at p. 20.

[4] Ellipsat Comments, at p. 5.

[5] Comsat Mobile Communications Comments, at p. 20; LQP Comments, at p. 10; and Teledesic Comments, at p. 12 .

Although CMC concurs with the Commission's determination, in the Notice,[6] that the bands 3700-4200 MHz, 5925-6415 MHz, 11.7-12.2 GHz, 12.2-12.7 GHz and 14.0-14.5 GHz are too congested for non-GSO feederlink use,[7] CMC urges:

> that consideration be given to the 5000-5250 MHz ARNS band and to lightly used FSS bands, such as the 6650-6725 MHz or the 7025-7075 MHz band. The Commission also may wish to propose the use of C-band (6725-7025 MHz) and Ku-band (10.7-10.95 GHz or 11.2-11.45 GHz) frequencies from the Allotment Plan bands in the RBW (reverse-band working) mode, which TG 4/5 has shown are good candidates for non-GSO MSS feederlinks because sharing with MSS is technically feasible.[8]

CMC also proposes that the United States identify additional C-band or Ku-band FSS allocations in which it will be feasible to operate MSS feederlinks in the reverse band mode.[9] LQP believes that the Commission should adopt the approach proposed by CMC as well as LQP, Motorola, Constellation and Ellipsat, of seeking allocations in several frequency bands, designating where appropriate, the use of reverse-band working for non-GSO MSS feeder links, and identifying bands where non-GSO MSS feeder links would have a priority status.[10]

GE Americom, a provider of domestic fixed-satellite service, recommends that the Commission not propose for non-GSO MSS feederlinks the bands 3700-4200 MHz, 11.7-12.2 GHz, 5925-6425 MHz and 14-14.5 GHz, because these frequencies are heavily used for fixed-satellite service.[11] Although GE Americom's insight regarding

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[6] WRC-95 Notice, at para. 23, note 22.

[7] Comsat Mobile Communications Comments, at p. 20.

[8] Comsat Mobile Communications Comments, at pp. 20-21.

[9] Id.

[10] See Motorola Comments, at pp. 14-15; Constellation Comments, at p. 10; Ellipsat Comments, at pp. 4-7

[11] GE Americom Comments, at p. 2.

these FSS bands may be useful, the Commission should disregard the blanket statements concerning the infeasibility of spectrum sharing by non-GSO MSS feederlinks and FSS systems.[12] GE Americom, in its comments, provides no analysis to support its assertion, nor does it evaluate interference when the MSS feederlink is operating in a reverse band mode with respect to the FSS operation. The Commission, the WRC-95 Industry Advisory Committee, and ITU-R TG 4/5 should continue to evaluate which bands are most promising for MSS feederlinks. Americom's proposed dismissal of FSS bands from consideration, which is not based on any supporting analysis, can and should be disregarded.

B. THE INTERNATIONAL COMMUNITY RECOGNIZES THE NEED FOR FEEDERLINK ALLOCATIONS.

Since LQP filed its Comments, ITU-R TG 8/3 concluded an international meeting in which the following spectrum requirements for non-GSO feederlinks were developed, based on the stated requirements for some MSS systems:

Current Estimates for Feederlink Requirements for non-GSO MSS Systems

Frequency Range	Spectrum (each direction) Sharing Possible**	Spectrum (each direction) No Sharing
4-8 GHz	200 MHz	400 MHz
10-16 GHz	200 MHz	400 MHz
16-30 GHz	200 MHz ***	500 MHz***

****Assumes ability of spectrum sharing by multiple non-GSO MSS systems.**

*****Use of dual polarization is not feasible.**

[12] Id.

This table is contained in Document 8-3/TEMP/22(Rev.1)-E, dated July 27, 1994 and is a part of a draft contribution to the WRC-95 Conference Preparatory Meeting Report. Ultimately, such requirements will be included in the CPM Report to WRC-95 to guide the conference in its allocation decisions.

LQP urges that the Commission utilize this information as a basis for a minimum amount of spectrum to be allocated for non-GSO MSS feederlinks at WRC-95. Allocations in addition to these amounts are preferable, especially in light of the fact that the impact of sharing of feederlink spectrum has not yet been fully analyzed and the table does not reflect the requirements of all currently proposed systems.

Within the international forum of the ITU-R, the need for feederlink spectrum in several frequency bands has thus already been recognized. The United States should build on this international acceptance. Now that several MSS applicants are ready to proceed with system construction and implementation, the Commission should take every action possible to ensure that adequate feederlink spectrum will be identified at WRC-95.

C. THE COMMENTS CONFIRM THAT 5 GHZ SHOULD BE ALLOCATED FOR FEEDERLINKS.

One of the bands which the Commission should propose for allocation for non-GSO MSS feeder uplinks is 5000-5250 MHz. As stated in Doc. 8-3/TEMP/22(Rev.1), "(B)ecause there is no current FSS use pursuant to 797 by the aeronautical services in the 5000-5250 MHz band, it is particularly attractive for non-GSO MSS feeder links in the uplink direction."[13] While the document discusses the issue of sharing between MSS feederlinks, the microwave landing system (MLS), and other aeronautical radionavigation systems, it also states that "the feasibility of locating ARNS operations in the lower part of the 5000-5250 MHz band should be studied so

[13] Document TG 8-3/TEMP/22(Rev.1)-E, at p. 3.

that MSS feeder links could operate in the upper part of the band."[14]

This document recognizes, as has LQP and others, that the 5000-5250 MHz band is very promising for non-GSO MSS feederlinks. LQP urges the Commission to recommend that the United States propose allocation of the band, subject to appropriate sharing arrangements with MLS. As MLS installations are very limited in number, separation distances and mitigation techniques such as shielding would provide adequate protection from MSS uplinks. LQP already has provided substantial analysis of this sharing situation to the Commission and will provide additional information as it becomes available.[15]

In lieu of LQP's proposed revision to RR797A to make available the 5000-5250 MHz band for non-GSO MSS feeder links, a preferable approach would be to propose a new footnote for this band providing:

ADD **797x** The band 5000-5250 MHz is also allocated for non-GSO feederlinks in either the Earth-to-space or the space-to-Earth direction on a primary basis.

This revision to the Radio Regulations would provide for non-GSO feeder uplinks in a frequency band which would enable the extension of the benefits of low-cost handheld MSS to people throughout the world, including those located in high rain climatic zones.

III. THE COMMISSION SHOULD SEEK REVISION OF RR731E AND RR734E TO ENHANCE THE USEFULNESS OF THE 1610-1626.5 MHz BAND

The United States should seek a revision to RR731E which would eliminate the

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[14] Id.

[15] See Notice of Proposed Rulemaking, CC Docket No. 92-166, 9 FCC Rcd 1094 (1994) ("MSS NPRM"); LQP Reply Comments on MSS NPRM, Technical Appendix, filed June 20, 1994.

requirement to protect GLONASS system receivers within the 1610-1626.5 MHz band.[16] LQP, TRW Inc., Constellation, Ellipsat and AirTouch Communications agree that clarification of the primary status of MSS in the 1610-1626.5 MHz band is a United States priority at WRC-95.[17] Maintaining the final sentence of this footnote only serves to perpetuate confusion concerning the primary status of MSS and the obligation of MSS to "protect" a system when the ultimate frequencies the system will utilize, the protection requirements, and the use of the system for aviation navigation, including precision landing, remain unknown.

In this regard, LQP commends the Commission and other U.S. government agencies, for their efforts to obtain agreement from the Russian Administration to revise the GLONASS frequency plan so that it will not operate co-channel with MSS systems. Gaining a commitment from Russia to make frequency revisions by a date certain will facilitate licensing United States MSS systems to use the full 16.5 MHz of the RDSS/MSS uplink spectrum.

Apart from these efforts, LQP urges the Commission to consider that the United States has made no commitment to use the GLONASS system for aviation navigation and, consequently, there is no supportable basis for imposing requirements on U.S. MSS systems to protect GLONASS receivers. As LQP has detailed in its Technical Appendices to its Comments and Reply Comments on the Commission's Notice of Proposed Rule Making to establish licensing and service rules for MSS, use of GLONASS satellites along with GPS within a Global Navigation Satellite System

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[16] LQP Comments, at pp. 15-18. Suitable out-of-band emission limits can be considered when MSS providers apply for blanket authority to operate their mobile earth terminals.

[17] See TRW Comments, at pp. 6-7; Constellation Comments, at p. 5; Ellipsat Comments, at pp. 9-10; AirTouch Comments, at 7.

(GNSS) would not require protection of receipt of GLONASS signals above 1608 MHz.[18]

Moreover, for service within the United States, there is no justification for requiring protection of receipt of GLONASS signals within the 1610-1626.5 MHz band. As LQP has advised the Commission, requiring protection above 1610 MHz would send the wrong signal to avionics manufacturers, possibly resulting in substantial investment in equipment which would be unable to filter out MSS signals in the lower part of the 1610-1626.5 MHz band. If such investments were made, the ability of MSS systems ever to utilize the lower portion of the band may be jeopardized.

Therefore, the United States should proceed with its efforts to finalize an agreement with Russia concerning revision of the GLONASS frequency plan and should also seek revision of Footnote 731E at WRC-95 to clarify the status of MSS vis a vis GLONASS.

Other parties to this proceeding made useful proposals concerning the 1610-1626.5 MHz band For example, LQP supports Motorola's proposal that the United States, at WRC-95, seek to clarify that the uplink e.i.r.p. of MSS systems in the 1610-1626.5 MHz band should be evaluated on an "averaged" rather than a "peak" basis.[19] This approach will more accurately reflect the operating environments for mobile earth terminals and should provide a more representative indication of the potential for interference. Additionally, LQP agrees with Constellation Communications and TRW that RR733E should be deleted because it is no longer necessary as a result of the upgrade to primary of the radioastronomy allocation in the 1610.6-1613.8 MHz band.

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[18] LQP Comments on MSS NPRM, Technical Appendix, and LQP Reply Comments on MSS NPRM, Technical Appendix.

[19] Motorola Comments, at pp. 5-6.

IV. THE UNITED STATES SHOULD SEEK A REVISION OF FOOTNOTE 753F TO INCREASE THE PFD FOR MSS SYSTEMS IN THE 2483.5-2500 MHz BAND

LQP, in its Comments in this proceeding, proposed that the United States seek a revision to Footnote 753F to increase the PFD for MSS systems in the 2483.5-2500 MHz band.[20] Ellipsat and Constellation also support an increase in this level and TRW asks the Commission to seek clarification that the PFD is a trigger, rather than an absolute limit.[21]

LQP has continued to analyze the sharing situation between MSS and FS systems and, on August 4, 1994 submitted a revised "Preliminary Draft New Recommendation concerning Criteria for Sharing Between the Mobile-Satellite (Space-to-Earth) Non-GSO Systems and the Fixed Service in the 2483.5-2500 MHz Band." USTG 2-2/2(Rev.3). This submission proposes the following PFD values as a coordination threshold in determining when coordination between non-GSO MSS downlinks and fixed service systems in this band is required:

-150 dB(W/m^2) in any 4 kHz band for angles of arrival between 0 and 5 degrees above the horizontal plane;

-150-0.65 (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;

-137 dB(W/m^2) in any 4 kHz for angles of arrival between 25 and 90 degrees above the horizontal plane.

These values should be proposed for inclusion in a revision to Footnote 753F, in lieu of application of the values in RR 2566.

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[20] LQP Comments, at pp. 13-15.

[21] Ellipsat Comments, at p. 8; Constellation Comments, at p. 6; and TRW Comments, at pp. 8-9.

LQP believes that this approach would provide non-GSO MSS systems with the PFD needed to achieve capacity requirements while still affording protection to terrestrial FS systems. LQP also agrees with Ellipsat that the three-step process proposed within the TG 2-2 may prove to be another useful tool to permit non-GSO MSS systems to operate at somewhat higher PFDs while still protecting terrestrial FS systems, and at the same time avoiding needless coordinations.[22]

V. THE UNITED STATES SHOULD PROPOSE ADDITIONAL FREQUENCY BANDS FOR GLOBAL MSS ALLOCATIONS

Substantial demand exists for handheld MSS service which will necessitate additional frequency bands beyond the RDSS/MSS allocations.[23] All the MSS proponents, including Motorola, AMSC, Constellation, Ellipsat, TRW and Comsat Mobile Communications, agree with LQP on this point.

The proposal by Motorola, that 35 MHz be allocated in both the Earth-to-space and the space-to-Earth directions, is a good starting point for spectrum allocations which should be sought at WRC-95. LQP believes that this amount is the minimum additional bandwidth that will be required to accommodate the requirements of second generation non-GSO MSS systems.[24] The bands identified by both Motorola

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[22] See Ellipsat Comments, at pp. 8-9.

[23] See Satellite Personal Communications and their Consequences for European Telecommunications, Trade and Industry, KPMG Peat Marwick Report to the European Commission, March, 1994; Wireless Electronic Mail and Facsimile Markets Worldwide, International Resource Development, Inc., November, 1993; The Market for Mobile Satellite Services: Prospects for LEOs and GEOs, Leslie Taylor Associates, June, 1994; Developments on the Mobile Data Communications Market, Arthur D. Little Inc., June, 1992; Portable Computers & Wireless Communications, DataComm Research, Third Quarter, 1993; INMARSAT in the 21st Century, Mary Ann Elliott and Betsy T. Kulick, 1994; and PCS Technologies Forecast, Personal Communications Industry Association, 1994.

[24] See Motorola Comments, at p. 10.

and AMSC, 1990-2025 MHz in the Earth-to-space direction, and 2165-2200 MHz in the space-to-Earth direction, are reasonable choices for these allocations.

LQP also notes that both Motorola and AMSC agree with LQP that the Commission should continue studying the feasibility of using the 2390-2420 MHz band for MSS, although all parties acknowledge the possible difficulties of sharing with ISM operations. [25]

The Commission will receive additional input on future MSS spectrum requirements as well as the feasibility of certain bands for MSS use, as the WRC-95 Industry Advisory Committee proceeds with its work in preparation for WRC-95. LQP will continue to be an active participant in this process.

VI. CONCLUSION

At WRC-95, the Commission should vigorously pursue frequency allocations for non-GSO MSS feederlinks, revision of various provisions relating to the RDSS/MSS frequency bands, and additional allocations for MSS. Such initiatives will ensure that WRC-95 can consider actions which will enable the important new MSS industry to achieve its fullest economic and public interest potential.

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[25] LQP Comments, at p. 19; Motorola Comments, at p. 13; and AMSC Comments, at pp. 15-16.

Respectfully submitted,

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I, Andrew F. Taylor, hereby certify that on this 5th day of August, 1994, copies of the foregoing "Reply Comments of Loral/QUALCOMM Partnership, L.P." were mailed, postage prepaid, to the following:

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