

Service (< 1 GHz) systems (including user transceivers subject to blanket licensing under Section 25.409) through the frequency assignment and coordination practices established by NTIA and the Interdepartment Radio Advisory Committee (IRAC). In order to facilitate such frequency assignment and coordination, applicants must provide the Commission with sufficient information to evaluate electromagnetic compatibility with the Federal Government use of the spectrum, and any additional information requested by the Commission. As part of the coordination process, applicants must show that they will not cause unacceptable interference to authorized Federal Government users, based upon existing system information provided by the Government. The frequency assignment and coordination of the satellite system shall be completed prior to grant of construction authorization.

(3) The Commission shall also coordinate with NTIA/IRAC with regard to the frequencies to be shared by those earth stations of Non-Voice, Non-Geostationary Satellite Service (< 1 GHz) systems that are not subject to blanket licensing under Section 25.409, and authorized Federal Government stations in the Fixed and Mobile services, through the exchange of appropriate systems information.

(c) Coordination among Non-Voice, Non-Geostationary Satellite Service (< 1 GHz) systems.

Applicants for authority to establish Non-Voice, Non-Geostationary Satellite Service (< 1 GHz) systems are encouraged to coordinate their proposed frequency usage with existing permittees and licensees in the Non-Voice, Non-Geostationary Satellite Service (< 1 GHz) whose facilities could be affected by the new proposal in terms of frequency interference or restricted system capacity. All affected applicants, permittees, and licensees shall, at the direction of the Commission, cooperate fully and make every reasonable effort to resolve technical problems and conflicts that may inhibit effective and efficient use of the radio spectrum; however, the permittee or licensee being coordinated with is not obligated to suggest changes or re-engineer an applicant's proposal in cases involving conflicts.

(d) Safety and Distress Communications

Stations operating in the Non-Voice, Non-Geostationary Satellite Service (< 1 GHz) may also be subject to the provisions of Sections 321(b) and 359 of the Communications Act of 1934, as amended, to the extent applicable. Licensees are advised that these provisions give priority to radio communications or signals relating to ships in distress and prohibit a charge for the transmission of maritime distress calls and related traffic.

§ 25.409. User Transceivers

(a) User transceivers need not be individually licensed and need not comply with Section 25.203(a)-(e). Service vendors may file blanket applications for transceiver units using FCC Form 493 and specifying the number of units to be covered by the blanket license. FCC Form 430 should be submitted if not already on file in conjunction with other facilities licensed under this subpart. Each applicant for a blanket license under this section shall demonstrate that transceiver operations will not cause unacceptable interference to other authorized users of the spectrum, based on existing system information publicly available at the Commission at the time of filing, and will comply with operational conditions placed upon the systems with which they are to operate in accordance with Section 25.408. This demonstration shall include a showing as to all the technical parameters, including duty cycle and power limits, under which the individual user transceivers will operate.

(b) Transceiver units associated with the Non-Voice, Non-Geostationary Satellite Service (< 1 GHz) may not be operated on civil aircraft. All portable or hand-held transceiver units (including transceiver units installed in other devices that are themselves portable or hand-held) having a receiver operating in the 137-138 MHz band shall bear the following statement in a conspicuous location on the device: "This device may not be operated while on board a civil aircraft. It must be turned off at all times while on board such an aircraft." This subsection shall not apply to transceiver units that are incapable of radiating in the 108-137 MHz frequency bands.

II. ADDITIONAL VIEWS

The additional views of Committee members are set forth in this section of the Committee's Report. These views should not be construed as those of the Committee itself, nor have other Committee members had an opportunity to respond to these comments.



DEPARTMENT OF THE AIR FORCE
USAF FREQUENCY MANAGEMENT CENTER (AFCC)
WASHINGTON, D.C. 20330-6340

16 SEP 1992

REPLY TO
ATTN OF: CA

SUBJECT: Conditions for Mobile Satellite Service (MSS) Mobile Stations

TO: Facilitator, Below 1 GHz LEO Negotiated Rulemaking Committee

We appreciate the technical and economic risks undertaken by proponents of MSS systems to develop their systems.

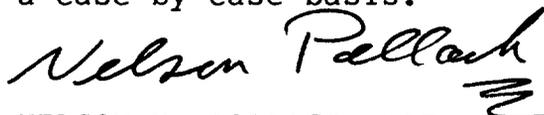
The WARC-92, in accordance with a United States proposal, added an allocation for MSS systems in several frequency bands. These frequency bands are used by the Military Departments to carry out a variety of critical missions. We must insure maximum military access to these frequency bands and that unacceptable interference does not occur to our operations.

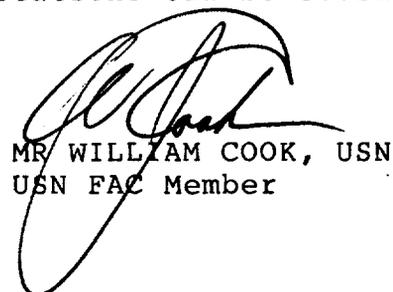
It is accepted practice that the newest users of a frequency band may have to accept conditions placed on their operation in order to maximize the utility of scarce spectral resources for all.

The WARC-92 adopted an International footnote that indicates MSS will not constrain operations of fixed and mobile systems. Realistically, fixed and mobile MSS earth terminals will restrict the deployment flexibility of our fixed and mobile 148-149.9 MHz systems. It is important that adequate safeguards be established prior to implementation of a national MSS allocation to ensure that the aggregate interference from millions of MSS earth terminals to military 148-149.9 MHz fixed and mobile operations is minimized.

Therefore, we believe that duty cycle restrictions, inter alia, are a necessary condition for 148-149.9 MHz user terminals in the Mobile Satellite Service. Further, the proper place for such duty cycle restrictions is in a footnote to the National Allocation Table, as indicated in FCC Docket 91-280.

We do not believe that duty cycle restrictions on fixed "Gateway" terminals are needed, since these stations can be coordinated on a case-by-case basis.


NELSON V. POLLACK, DAF
AF FAC Member


MR WILLIAM COOK, USN
USN FAC Member


MR EARL HOLLIMAN, HQDA
USA FAC Member



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In accordance with Section 586(f) of the Negotiated Rulemaking Act of 1990, LEOSAT Corporation respectfully submits its additional views in response to the "Report of the Below 1 Ghz LEO Negotiated Rulemaking Committee."

LEOSAT would first like to thank the Federal Communications Commission for allowing LEOSAT to serve as a party in its first negotiated rulemaking. We can only hope that our contributions have resulted in a report that will aid the Commission in establishing regulations that will ultimately bring low earth orbit satellite service to the American people as rapidly as possible.

We next wish to thank both the private sector and federal government parties for their commitment to the process and their efforts to meet an ambitious deadline. The Committee's open discussions, even in their most heated moments, were far superior to the extended paper process that is the typical rulemaking. We are confident that the Committee found the opportunity to engage in face-to-face talks far more satisfying than exchanging documents over several months time. Even in those instances when LEOSAT was in disagreement, we found the caliber of the debate to be uniformly high and well-reasoned. The Committee has set a worthy standard for those that follow.

We would be remiss if we did not applaud the exceptional efforts of several dedicated civil servants whose efforts made this rulemaking a success. Bill Luther, Richard Barth, Tom Tycz, Ed Jacobs, Harry Ng, Cecily Holiday and Kristi Kendall brought a wealth of needed patience, good humor and diligence to an otherwise arduous process. If we did not value their continued friendship and kindness, we would wholeheartedly recommend that they serve on the upcoming big LEO negotiated rule making.

This process confronted the parties with a singularly difficult task: melding competing private interests into proposed rules that will serve the broad public interest. LEOSAT can say without qualification that it was its intention to assist in fashioning rules that could serve both current applicants for and future users of the Non-Voice Non-Geostationary (NVNG) satellite service. LEOSAT believes that, to a large degree, the Committee was successful in this effort.

One area in which the Committee fell short of the Commission's goals was the Committee's failure to reach consensus on rules or policies providing for multiple entry of NVNG users beyond the current proponents.

LEOSAT Additional Views

In its April 16, 1992 Public Notice seeking comments on the need for a LEO negotiated rulemaking, the Commission stated that the proposed negotiated rulemaking was intended to develop rules necessary "to establish a new domestic satellite service in accordance with our allocation NPRM, supra., to define and regulate this service in such a way as to maximize use of these frequency bands and to protect existing users of these bands from harmful interference."¹ The Commission then identified in detail the issues to be addressed in developing the rules for small LEO services. Among these issues were the following:

(b) which modulation method should be employed by the parties in order to co-exist with other satellite and terrestrial systems in the band.

(d) the extent to which the spectrum may be shared by future applicants.²

In accordance with the Commission's direction, the Committee adopted a "Work Program" at its first meeting of August 10, 1992 (LEOAC-2). Among its provisions was the following:

B. Since there are other existing space and terrestrial radio services operating in the proposed frequency bands and the total spectrum allocated, recommend rules to promote multiple entry and to avoid mutual exclusivity among the applicants while maintaining the economic viability of the systems. If rules cannot be developed to avoid mutual exclusivity and to

¹ "FCC Asks for Comments Regarding the Establishment of an Advisory Committee to Negotiate Proposed Regulations," CC Docket No. 92-76, Public Notice DA 92-443, released April 16, 1992.

² Public Notice, supra.

LEOSAT Additional Views

accommodate all the applications before the FCC or to be submitted in any subsequent round of submissions, recommend technical rules necessary to select and authorize specific applicants among the competing mutual exclusive applications.³

In light of this explicit guidance and the obvious importance of these issues, the Commission must wonder why, in the words of the Committee Report, "[the Committee] neither agreed nor attempted to agree on how such sharing should be implemented, or which sharing plan represented the most efficient use of the spectrum." (Committee Report at 7).

LEOSAT would like to set the record straight in this regard. This company made repeated good-faith attempts to move the private sector parties beyond posturing to a detailed technical negotiation among our respective engineering experts. In addition to several oral statements to this effect, LEOSAT placed the following written options before the Informal Working Group.

1. Establish a Technical Coordinating Committee to review the plans and modulation schemes. This Committee would consist of engineers from each member of the FACA that wishes to participate. The Committee would be directed to report back to the Advisory Committee within two weeks with a sharing plan or indication of no agreement.
2. Submit all technical materials to an agreed upon neutral technical expert with direction to provide guidance as to the possibilities for sharing and the appropriate modulation scheme(s). the cost of this analysis, if any, would be shared by the parties.
3. Propose a rule to shift some of the burden of interference protection away from future applicants and place it upon existing applicants and

³ In an on-the-record colloquy held at the August 18, 1992 Federal Advisory Committee Meeting, Mr. Bill Luther, the Committee Facilitator, assured counsel for LEOSAT that this portion of the Work Statement subsumed the Commission's guidance as to issues "(b)" and "(d)" of the Public Notice.

LEOSAT Additional Views

operators by requiring that an applicant or operator demonstrate that its modulation and other spectrum sharing techniques ensure maximum effective use of this spectrum. This rule would be an equitable accommodation between LEO operators, who would be given maximum technical flexibility to design a satellite system, and future users, who might be confronted with LEO systems that were no longer spectrum efficient as judged by current technical standards. Thus, the Commission would not require any particular modulation technique, but the spectrum user would be required to upgrade to the most spectrum efficient technologies as a condition of receiving maximum technical flexibility.

Despite our best efforts, the Committee was unwilling or unable to move beyond the proposals set forth in the agreement reached by three proponents on the eve of the negotiations (LEOAC-15) and the LEOSAT alternative provided to the Committee on September 1, 1992. As we previously told the Committee, LEOSAT believes that consensus on a compromise plan was impossible because three of the parties to the negotiated rulemaking reached a private technical settlement (LEOAC-15) before the negotiations began as a means of precluding future competition. (See, Statement of LEOSAT Corporation to the Below 1 Ghz Negotiated Rulemaking Committee, Minutes of the August 18, 1992 meeting).

As a result of the Committee's failure to reach a consensus on this matter the Commission is left with a vexing issue: which modulation technique, Code Division Multiple Access (CDMA) or Frequency Division Multiple Access (FDMA), will provide for the most efficient use and reuse of this NVNG spectrum and provide for the most number of commercially viable LEO operators in this very limited amount of bandwidth? We will not continue the debate in this statement. We have had an opportunity to submit our views to the Committee and have filed comments in Common Carrier Docket 91-280. To add more in this venue would be unfair to the other parties. LEOSAT will provide more comments in the next phase of this proceeding.

We do, however, wish to state here our view, as we previously provided it to the Committee, on the technical aspects of promoting future entry. LEOSAT does not believe that FDMA-based systems provide for the most efficient use of limited spectrum. CDMA techniques have advanced far enough to provide a much more efficient means of sharing spectrum. This is not only our view, but that of another party to this proceeding. Finally,

LEOSAT Additional Views

LEOSAT strongly believes that it is up to the Commission to establish the appropriate number of LEO providers, not the existing applicants through the use of a private settlement that adopts a less efficient modulation technique.

LEOSAT again thanks the Commission for the opportunity to participate in its inaugural negotiated rulemaking. We look forward to commenting further on these important matters when the Commission releases a Notice of Proposed Rulemaking. LEOSAT's goal mirrors that of the Commission: to bring a competitive LEO service to the public as rapidly as possible.

**Joseph Roldan
President and Chief Executive Officer**

LEOSAT Corporation

APPENDIX 1

Charter of the Below 1 GHz LEO Negotiated Rulemaking Committee

CHARTER FOR THE BELOW 1 GHz LEO NEGOTIATED RULEMAKING COMMITTEE

A. The Committee's Official Designation

The official designation of the advisory committee will be the "Below 1 GHz LEO Negotiated Rulemaking Committee."

B. The Committee's Objective and Scope of its Activity

The purpose of the committee is to provide recommendations to the Federal Communications Commission to be used in the formulation of technical rules governing the provision of low-Earth orbit satellite services operating below 1 GHz (little LEOS). The committee will also assist the FCC in resolving questions relating 1) to the maximum sharing of available frequencies for low-Earth orbit services, and 2) to coordination of little LEO services with existing and future terrestrial and/or satellite services, domestically and internationally. The scope of the activity of the committee will include all steps necessary to assemble data, perform analyses and provide advice to the FCC concerning the technical, licensing and coordination issues presented by this new satellite service.

C. Period of Time Necessary for the Committee to Carry Out Its Purpose

The committee will require 37 days to carry out its purpose.

D. Official to Whom the Committee Reports

Chief, Common Carrier Bureau, Federal Communications Commission.

E. Agency Responsible for Providing Necessary Support

The Federal Communications Commission will provide the necessary support for the committee, including facilities needed for the conduct of the meetings of the committee. Private sector members of the committee will serve without any government compensation, nor will they be entitled to travel expenses or per diem subsistence allowances.

F. Description of the Duties for Which the Committee is Responsible

The duties of the committee will be to gather and discuss information necessary to form recommendations to the FCC for the regulation, licensing and coordination of little LEO satellite services.

G. Estimated Operating Costs in Dollars and Staff Years

Estimated staff years that will be expended by the committee are .04 for the FCC staff and .2 for the private sector and other governmental representatives. The estimated cost to the FCC of operating the committee is \$3,000.

H. Estimated Number and Frequency of Committee Meetings

We expect that there will be 6 meetings, with possibly more meetings of informal subcommittees.

I. Committee's Termination Date

The committee will terminate September 16, 1992.

J. Date Original Charter Filed

August 10, 1992.

APPENDIX 2

Advisory Committee Membership

COMMITTEE MEMBERS
BELOW 1 GHz LEO NEGOTIATED RULEMAKING COMMITTEE

<u>Organization</u>	<u>Representative</u>
1. Aeronautical Radio, Inc. (ARINC)	Richard Neat
2. Federal Aviation Administration (FAA)	Carroll Sturm
3. Federal Communications Commission (FCC)	Thomas S. Tycz
4. LEOSAT Corporation (LEOSAT)	Brent Weingardt
5. Nat'l Aeronautics and Space Admin. (NASA)	David Struba
6. Orbital Communications Corp. (ORBCOMM)	Alan L. Parker
7. STARSYS Global Positioning, Inc. (STARSYS)	Alan Renshaw
8. U.S. Air Force	Nelson Pollack
9. U.S. Army	Thomas T. Trimmer
10. U.S. Dept. of Commerce/NOAA	Richard Barth
11. U.S. Navy	William Cook
12. Volunteers in Technical Assistance (VITA)	Joseph Sedlak

FACILITATORS: William A. Luther (8/10/92-9/4/92)
Richard Barth (9/8/92-9/16/92)

APPENDIX 3

Meeting Schedule

SCHEDULE
Below 1 GHz LEO Negotiated Rulemaking Committee
and Informal Working Groups

Mon., August 10 -- 9:30-12:00 at 1919 M (Full Committee)
Tue., August 11 -- 9:30-12:00 at 2000 K (Full Committee)
Wed., August 12 -- 9:30-12:00 at 2000 K (Informal Working Group (IWG))
Thu., August 13 -- 9:30-12:00 at 2000 L (IWG)
Fri., August 14 -- 9:30-12:00 at 2000 L (IWG)

Mon., August 17 -- 9:30-12:00 at 2000 K (IWG)
Tue., August 18 -- 9:30-12:30 at 1919 M (Full Committee)
Wed., August 19 -- 9:30-12:00 at 1919 M (IWG)
Thu., August 20 -- 9:30-12:00 at 1919 M (IWG)
Fri., August 21 -- 9:30-12:00 at 1919 M (IWG)

Mon., August 24 -- 9:30-1:00 at 1919 M (Full Committee)

Tue., September 1 -- 9:30-12:00 at 1919 M (Full Committee), 2:00-4:00 (EWG)
Wed., September 2 -- 2:00-4:00 at 1919 M (IWG)
Thu., September 3 -- 9:30-12:00 at 1919 M (IWG)
Fri., September 4 -- 9:30-12:00 at 1919 M (IWG)

Tue., September 8 -- 9:30-11:00 at 1919 M (Full Committee), 11:00-12:00
(Editorial Working Group (EWG))
Thu., September 10 -- 9:30-12:00 at 2000 K (IWG), 12:00-1:00 (EWG)
Fri., September 11 -- 9:30-12:00 at 2000 L (EWG)

Mon., September 14 -- 9:30-1:00 at 2000 K (EWG)
Wed., September 16 -- 9:30-5:00 at 1919 M (Full Committee)

Meeting Rooms: 2000 K -- Suite 600
2000 L -- Training Room, 2nd Floor
1919 M -- Rm. 856

APPENDIX 4

Work Program

WORK PROGRAM

BELOW 1 GHZ LEO NEGOTIATED RULEMAKING COMMITTEE

Develop recommendations for FCC Rules in CFR 25 that address the technical aspects related to selection and authorization of applicants to provide mobile satellite service in the frequency bands 137- 138 MHz and 400.15 - 401 MHz (space to Earth) and 148- 149.9 MHz (Earth to space) and potentially 149.9-150.05 MHz (Earth to space).

- A. Any recommendation should consider the potential sharing with the existing environment in each of the frequency bands. The rules should address:
- 1.) sharing with terrestrial services operating in the bands in the U.S. and other countries, i.e., Canada and Mexico; particularly the viability of the LEO satellite systems to operate in the presence of the existing terrestrial environment.
 - 2.) the coordination of and the ability of non-geostationary mobile satellite system to operate within the same frequency band with:
 - a.) other U.S. non-Geostationary mobile satellite systems;
 - b.) Non-U.S. non-Geostationary mobile satellite systems;
 - 3.) coordination of MSS satellite systems with other space services operating in the same frequency bands, including:
 - a.) Meteorological satellite
 - b.) Space Research
 - c.) Space operation
 - d.) Radionavigation satellite
 - e.) Other
- B. Since there are other existing space and terrestrial radio services operating in the proposed frequency bands and the total spectrum demand of all the applications appears to exceed the spectrum allocated, recommend rules to promote multiple entry and to avoid mutual exclusivity among the applicants while maintaining the economic viability of the systems. If rules cannot be developed to avoid mutual exclusivity and to accommodate all the applications before the FCC or to be submitted in any subsequent round of submissions, recommend technical rules necessary to select and authorize specific applicants among the competing mutual exclusive applications.

- C. In light of the fact that these applications are proposing to use these bands for feeder links from the base stations as well as the service links to and from the mobile units, is there any need for and if so propose, technical rules to differentiate base stations from mobile units. For example, is it necessary to segment the band for FDMA systems for base stations and mobile stations or to reduce the return link power density for CDMA systems?

- D. Recommend rules on power density etc., to comply with the international Radio Regulations (599A, 608X, 608Y, 647X) recognizing that these technical constraints are under study within the CCIR.

- E. Recommend rules for any out of band emission requirements to protect adjacent band services and operations.

APPENDIX 5

List of Documents

List of Documents*

- LEOAC-0 (Rev.5) List of Documents
- LEOAC-1 Public Notice "Below 1 GHz Negotiated Rulemaking Committee"
- LEOAC-2 (Rev.1) Work Program - Below 1 GHz LEO Negotiated Rulemaking Committee
- LEOAC-3 VITA's application - File No. ***
- LEOAC-4 ORBOCOMM's application - File No. 22-DSS-P-90(22)
- LEOAC-5 Amendment to ORBOCOMM application
- LEOAC-6 STARSYS's application - File No. 33-DSS-P-90(26)
- LEOAC-7 LEOSAT's application - File No. 12-DSS-P-91(2)
- LEOAC-8 List of IFRB Publications
- LEOAC-9 Federal Use of the 148-149.9 MHz band
- LEOAC-10 Extract from "DOC's Spectrum Sharing Study Phase 2 (Final Report)"
- LEOAC-11 CCIR Doc. 8D/TEMP/13 "Method for Determining Sharing between Stations in the Mobile Service below 1 GHz and FDMA Non-GSO Mobile Earth Stations"
- LEOAC-12 CCIR Doc. 8D/TEMP/36 "Methods for Analyzing Sharing between existing Fixed and Mobile and Meteorological Systems and Spread-Spectrum CDMA LEO MSS below 1 GHz"
- LEOAC-13 Charter for the Below 1 GHz LEO Negotiated Rulemaking Committee
- LEOAC-14 "Jointly Filed Comments of ORBOCOMM, STARSYS and VITA"
CC Docket No. 92-76, dated May 18, 1992
Addendum 1 - Identification of technical service proposals
- LEOAC-15 "Jointly Filed Supplemental Comments of ORBOCOMM, STARSYS and VITA", CC Docket No. 92-76, dated August 7, 1992
Addendum 1 - Graph, Uplink Band
Addendum 2 - LEO Possible Sharing Scenario (ORBOCOMM, STARSYS & VITA)
Addendum 3 - Graph, Downlink Channelization Plan
- LEOAC-16 LEOSAT Reply Comments dated May 29, 1992
- LEOAC-17 Notice of Proposed Rule Making, ET Docket No. 91-280
- LEOAC-18 Extracts from Final Acts of the World Administrative Radio Conference (WARC-92), Addendum + Corrigendum to the Final Acts and from the Radio Regulations
- LEOAC-19 Chapter 10, NTIA Regulations
- LEOAC-20 Part 25, FCC Regulations
- LEOAC-21 Public Notice dated August 4, 1992
- LEOAC-22 FAA's Letter of August 14, 1992 re: VHF AM(R)S
- LEOAC-23 CCIR Report (Excerpts) "Technical and Operational Bases for WARC-92
- LEOAC-24 Reply Comments of ORBOCOMM, ET Docket No.91-280 dated January 23, 1992
- LEOAC-25 Possible STARSYS Earth Station Locations
- LEOAC-26 Comments of STARSYS, ET Docket No.91-280 dated December 24, 1991
- LEOAC-27 IWG draft language, §§25.401, 25.407
- LEOAC-28 IWG draft language, §§25.202(f) and (g), 25.203
- LEOAC-29 Public Notice dated August 14, 1992 re: Aug. 28 meeting
- LEOAC-30 Comments of LEOSAT, ET Docket 91-280 dated December 24, 1991
- LEOAC-31 Minutes of the August 10-11, 1992 Committee Meeting
- LEOAC-32 Minutes of the August 18, 1992 Committee Meeting
- LEOAC-33 (Rev.1) IWG Draft Service Rules Forwarded for Consideration by the Advisory Committee
- LEOAC-34 Statement of the Navy dated Aug. 24, 1992

LEOAC-35 Minutes of the August 24, 1992 Committee Meeting
LEOAC-36 Minutes of the September 1, 1992 Committee Meeting
LEOAC-37 Minutes of the September 8, 1992 Committee Meeting
LEOAC-38 Submissions re: service availability/spectrum efficiency
LEOAC-39 Minutes of the September 16, 1992 Committee Meeting

*** All documents, including the summary Minutes, are available in Docket 92-76.**