

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

In the Matter of)
)
An Allocation of Spectrum for the) **RM-9267**
Private Mobile Radio Services)

To: The Commission

**COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED
IN RESPONSE TO PETITION FOR RULE MAKING**

The American Radio Relay League, Incorporated (the League), the national association of Amateur Radio operators in the United States, by counsel and pursuant to Section 1.405 of the Commission's Rules (47 C.F.R. §1.405), hereby respectfully submits its comments in response to the Petition for Rule Making (the Petition), filed on or about April 22, 1998 by the Land Mobile Communications Council (LMCC). The Petition was placed on Public Notice by the Commission April 30, 1998 (See Report No. 2272) and therefore these comments are timely filed. For its comments, and specifically with respect to certain portions of the LMCC Petition relative to the frequency bands at 420-450 MHz, the League states as follows:

I. Introduction

1. LMCC's petition, first, seeks to establish a basis for additional frequency allocations for the Private Mobile Radio Services (PMRS). Second, it proposes a series of new PMRS allocations, some of which are proposed for allocation immediately, in order to fulfill the LMCC-projected future spectrum needs for the PMRS. Without establishing technical compatibility between PMRS operation

and incumbent radio services in any of the bands sought, LMCC requests additional primary allocations in a series of frequency bands below 2 GHz. Among these bands are two, 10-MHz segments between 420 and 450 MHz. This band is without a doubt one of the two most heavily utilized frequency bands among those allocated to the Amateur Service, and the fastest-growing amateur allocation in terms of new users and uses. There is no question but that incumbent Federal and Amateur uses are incompatible with the LMCC-proposed primary allocation for PMRS. The petition, therefore, to the extent that it calls for a specific allocation for PMRS at 420-430 MHz and 440-450 MHz, plainly does not warrant consideration by the Commission. At least that portion thereof should be dismissed without further consideration.¹

2. The petition, more fundamentally, is premature, and thus subject to dismissal, per the provisions of Section 1.401(e) of the Commission's Rules. This is because the Commission has just completed its "Refarming" proceedings in PR Docket 92-235.² That proceeding was specifically intended to substantially increase efficiency of use of existing PMRS bands below 800 MHz, thus to alleviate spectrum shortfalls for PMRS. The results of the Commission's actions in those proceedings in terms of PMRS efficiency, and thus the spectrum needs of PMRS licensees in the near term, are undetermined. It is therefore impossible at this juncture for the Commission to find that there are

¹ 47 C.F.R. §1.401(e).

² Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them and Examination of Exclusivity and Frequency Assignment Policies of the Private Land Mobile Services, PR Docket No. 92-235, *Report and Order and Further Notice of Proposed Rule Making*, 10 FCC Rcd. 10076 (1995); and *Second Report and Order*, 12 FCC Rcd. 14307 (1997).

additional allocation needs for the PMRS, much less to quantify such or propose specific allocations therefor.

3. As the League will show herein, the Petition fails to establish: (1) any basis whatsoever for an allocation for PMRS users at 420-450 MHz, to be withdrawn from Federal use; (2) any compatibility between PMRS operation and incumbent Federal government use thereof; (3) any compatibility between PMRS operation and incumbent amateur operation in either the 420-430 MHz or 440-450 MHz bands; or (4) any justification for displacing established Amateur operations in either segment of the band by the creation of a primary allocation for PMRS. The League will also show that the cost of any such amateur displacement would be devastating to the licensed radio amateurs who have substantial personal investment in equipment in regular use in that band, and who consistently use the facilities in that band for public service and public safety functions. In short, the League requests that the Commission dismiss at least that portion of the LMCC petition that requests a specific allocation for PMRS use in any portion of the 420-450 MHz band.

II. The LMCC Petition

4. The LMCC petition cites numerous authorities for the proposition that the Commission has given inadequate consideration to PMRS spectrum needs, in favor of an excessive series of allocations to the Commercial Mobile Radio Services (CMRS), which generate auction revenues. The League need not and does not dispute that the Commission has not addressed the concerns of non-public safety PMRS licensees in recent spectrum allocation decisions that provide substantial additions to CMRS allocations. That, however, is not directly relevant to the specific allocation proposals made in the

Petition. It is, rather, a separate issue that the Commission should undertake in a future proceeding addressing the broader issue of spectrum efficiency and needs of PMRS users.

5. LMCC reviews the perceived shortcomings of existing PMRS allocations at 25-50 MHz, 150-174 MHz, 450-470 MHz, 470-512 MHz, the use of 420-430 MHz in Buffalo, Cleveland and Detroit, and 800/900 MHz. It predicts difficulties in achieving spectrum efficiencies predicted in the "Refarming" proceeding, and predicts further that Refarming will not provide more than a 2:1 efficiency increase from conversion to narrowband emissions through the year 2010. It also suggests that, while shared-channel operation provides improved efficiency in terms of the number of stations accommodated at once, that is at the expense of forced degradation of communications quality. The goal of the instant petition is, ostensibly, to improve communications quality in crowded, urban environments. In addition, broadband PMRS channels are asserted to be necessary for such activities as mobile facsimile, data capabilities for customer database information, GPS location devices, slow scan and full motion video, remote interfaces with computer LAN systems, intranet and Internet interconnection, and other data transmissions.

6. Finally, LMCC suggests that the Commission's effective reallocation of frequencies at 220-222 MHz for CMRS users (by virtue of the elimination of the non-commercial set-aside segment in favor of auctions for the channels among new applicants) disaccommodated PMRS users. The same is true, LMCC claims, at 800 MHz because of geographic area license auctions of the General Category channels. Thus, it asserts, it has been deprived of access to existing PMRS bands.

7. LMCC argues that PMRS users cannot substitute CMRS service for their own systems because of the need for immediate access to the channels, reliability, adequate capacity, specific geographic requirements, and the need for control of the communications network. It cites public safety applications of PMRS systems as evidence that CMRS service is not a substitute for PMRS systems.

8. Given all of the foregoing generalized claims and assertions, LMCC projects a need for a total of 125 MHz of spectrum by the year 2010, of which 15 MHz is allegedly required by the year 2000, and 44 MHz of which is allegedly required by the year 2004. To accommodate this, LMCC made an "assessment of the threshold characteristics of spectrum appropriate for allocation to the PMRS industry"³ below 2 GHz. Frequencies above that range are alleged to be generally unusable for PMRS due to cost, safe transmitter power levels, and propagation loss. The "recommendations" by LMCC are as follows:

Immediate needs be satisfied by a reallocation of 420-430 MHz, paired with 440-450 MHz, from Federal use to PMRS;

Immediate/mid-term needs be satisfied by FCC allocation of 1390-1400, 1427-1432, and 1670-1675 MHz to PMRS, pursuant to its reallocation to the private sector from the government;

Reallocate 85 MHz of the aeronautical band, 960-1215 MHz, to the PMRS by the year 2010 to satisfy longer term needs, shared with the developing DOD JTIDS/MIDS service.

Petition, at 29 (footnote omitted)

³ Petition, at 29.

According to the Petition, these bands were chosen because they are close to existing PMRS allocations where existing equipment operates. They are also "bands of Federal Government spectrum that were likely to become available as a result of evolutionary changes in Federal usage, such as military down-sizing and technological shifts."⁴ LMCC concedes that "partial continued use" of the Federal Government spectrum may be necessary, so sharing may be a viable alternative to outright reallocation in some cases. LMCC suggests that the list of bands recommended may not be the only ones that meet the criteria.

9. As to the 420-450 MHz band, the Petition notes that PMRS currently uses 420-430 MHz band in Buffalo, Cleveland and Detroit, due to the proximity to the Canadian border. Without citation, LMCC cavalierly claims that "(a) reduction in military use of this band (420-450 MHz) is foreseen and it could be that most PMRS services could co-exist in most significant geographical areas of the U.S. with perhaps PAVE PAWS (Precision Acquisition Vehicle Entry Phased Array Warning System) geographical restrictions in parts of California, Georgia, Massachusetts, and Texas."⁵ LMCC also claims that NOAA is "experimenting" with wind profiler radars at 449 MHz, which LMCC urges be "discouraged or at least minimized" if reallocation to PMRS is considered.

10. Relative to Amateur use of 420-450 MHz, the Petition merely states that the band is "generally popular with radio amateurs, currently on a secondary basis, with repeater use in 440-450

⁴ *Id.* at 30.

⁵ *Id.*, at 30.

MHz and satellite links and amateur television in 430-440 MHz (sic)."⁶ LMCC asks for pairing of the 420-430 MHz and 440-450 MHz segments because it would allow a 20 MHz spacing for duplex and repeater PMRS operation. Again without citation of any authority whatsoever, LMCC states:

It is recognized that these sub-bands are used on a secondary basis by the radio amateur community, as is 430-440 MHz. However, the LMCC believes that the 430-440 MHz sub-band is more important to the amateurs for use in emerging technologies such as links with spacecraft and amateur television applications. Amateur applications in the 420-430/440-450 MHz (sic) should remain secondary to PMRS. Furthermore, to the extent that new PMRS advanced services are implemented here, equipment availability and technology benefit amateurs pursuing such applications as compressed video television in the 430-440 MHz band. Though the most urgent need for PMRS is the more traditional voice and low speed data applications, ultimate band structuring might include a portion dedicated to these advanced services.

Petition, at 31.

11. The remainder of the Petition addresses the remaining allocations sought for PMRS use, which are not of concern to the League, and the proposed channel assignment procedures which might be employed for any additional PMRS allocations. However, it is noted that, at page 33 of the Petition, dealing with other allocation options, LMCC states:

Also, recognizing that amateur radio service (sic) will see a net constriction by the recommended reallocation of 420-430/440-450 MHz, some of this spectrum might be reallocated to amateur service (sic) to offset the constriction. This would of course reduce the amount of spectrum allocated to PMRS but might be of value to speed up net availability of the lower band. For example, 1390-1395/1427-1432 MHz might be allocated to amateur service (sic) with 1395-1400/1670-1675 MHz going to PMRS.

⁶ *Id.*, at 31. This is misleading. As will be shown, amateur television is conducted largely in the 420-430 MHz segment, not only in the 430-440 MHz segment.

There is no proposal by LMCC to reimburse radio amateurs with substantial investment in equipment for the 420-450 MHz band for the expense of re-creating stations in these substitute allocations.

III. The LMCC Petition is Premature

12. As noted above, the LMCC Petition is premature, because neither near-term nor future PMRS spectrum needs can be determined at the present time, for several reasons. Principal among these is that the just-completed Refarming proceeding anticipates significant efficiencies in use of the PMRS bands below 800 MHz, which have yet to be realized.⁷ The Commission's goal in that proceeding was to encourage more effective and efficient use of PLMR spectrum and to facilitate the introduction of advanced technologies in the PMRS. It has every indication of doing exactly that, over a reasonable implementation period.⁸ While it is correct, as LMCC claims, that the transition to narrowband technologies in the PMRS was not mandated other than by means of equipment authorization procedures, thus delaying the full realization of the spectrum efficiencies anticipated from the transition to narrowband operation, that was the tradeoff necessary to accommodate incumbent users with investment in existing wideband systems. PMRS users, however, control their own destinies in this respect: they can realize the efficiencies of the refarming decisions sooner, rather than later. If they construct new systems using multimode (i.e. multiple bandwidth mode) equipment and use it in the wideband modes, this defeats the efficiencies of the Refarming plan. Conversely, there is

⁷ See, e.g. the *Second Report and Order, Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them*, 12 FCC Rcd. at 14307 (1997).

⁸ In fact, manufacturers of PMRS equipment have urged that the timetable for conversion to 6.25 kHz channel bandwidths is overly ambitious, rather than too slow.

narrowband equipment available right now that, if utilized, significantly expands existing and future licensees' capacity.

13. In any case, the efficiencies to be achieved from the Refarming decisions are yet to be determined. LMCC believes that they will not be as substantial as predicted, and the 4:1 capacity increase is not practically achievable. Yet, that is nothing more than conjecture at the present time. It is not merely the reduction in channel bandwidth that will determine the ultimate efficiencies from Refarming. Other factors will affect PMRS spectrum needs in the near future, such as the authority to implement VHF and UHF trunking in existing PMRS bands, and the inevitable conversion to digital modes for PMRS as the result of the narrowband efficiency requirements.

14. Furthermore, while LMCC has discounted completely the ability of businesses and industry to utilize CMRS providers in lieu of PMRS service, the effect of the recent initiation of new CMRS service by companies such as Nextel and other E-SMR carriers has yet to be determined. It is apparent to the League that a substantial amount of the anticipated growth of PMRS can be accommodated, and spectrum needs thus offset, by newly initiated CMRS service. This is especially true of the near-future wideband applications proposed by LMCC at page 17 of the Petition.

15. Thus, the timing of the LMCC petition is indeed poor. The additional spectrum needs of PMRS, if any, cannot be determined at this time, and additional allocations must await a more comprehensive evaluation of the effect of new CMRS service, of increased CMRS competition, and of the anticipated significant impact of the Refarming proceeding on existing PMRS allocations. While there may be additional spectrum needs for PMRS in the future, the LMCC Petition does not establish

such. The cumulative effects of the Refarming proceeding, and the increased availability of reasonably priced CMRS service must be evaluated at an appropriate future time. Thus, any additional specific allocation for PMRS is now premature. Accordingly, the petition should be dismissed.

IV. The Allocation Status of 420-450 MHz

16. The ITU Radio Regulations, International Table of Allocations allocates the band 420 – 430 MHz on a primary basis to the fixed and mobile (except aeronautical mobile) services and on a secondary basis to the radiolocation service. However, the footnote provisions are as follows:

S5.269—Different category of service: In Australia, the United States, India, Japan and the United Kingdom, the allocation of the bands 420 – 430 MHz and 440 – 450 MHz to the radiolocation service is on a primary basis (see No. S5.33).

S5.270—Additional allocation: In Australia, the United States, Jamaica and the Philippines, the bands 420 – 430 MHz and 440 – 450 MHz are also allocated to the amateur service on a secondary basis.

In the United States domestic allocation table, the band 420 – 430 MHz is allocated to the radiolocation service on a primary basis and the amateur service on a secondary basis. However, Section 97.303(f)(1) of the Commission's Rules states: No amateur station shall transmit from north of Line A in the 420-430 MHz segment. **(NG135)**

Line A. Begins at Aberdeen, WA, running by great circle arc to the intersection of 48° N, to the intersection of 95° W, thence by great circle arc through the southernmost point of Duluth, MN, thence by great circle arc to 45° N, 85° W, thence southward along meridian 85° W, thence southward along meridian 85° W, to its intersection with parallel 41° N, thence along parallel 41° N, to its intersection with meridian 82° W, thence by great circle arc through the southernmost point of Bangor, ME, thence by great circle arc through the southernmost point of Searsport, ME, at which point it terminates.

US Footnotes pertaining to the bands 420 – 430 MHz and 440 – 450 MHz are as follows:

(These footnotes, each consisting of the letters US followed by one or more digits, denote stipulations applicable to both Government and non-Government stations.)

US7--In the band 420-450 MHz and within the following areas, the peak envelope power output of a transmitter employed in the amateur service shall not exceed 50 watts, unless expressly authorized by the Commission after mutual agreement, on a case-by-case basis, between the Federal Communications Commission Engineer in Charge at the applicable district office and the military area frequency coordinator at the applicable military base. For areas (e) through (j), the appropriate military coordinator is located at Peterson AFB, CO.

(a) Those portions of Texas and New Mexico bounded on the south by latitude 31° 45' North, on the east by 104° 00' West, on the north by latitude 34° 30' North, and on the west by longitude 107° 30' West;

(b) The entire State of Florida including the Key West area and the areas enclosed within a 322 kilometer (200-mile) radius of Patrick Air Force Base, Florida (latitude 28° 21' North, longitude 80° 43' West), and within a 322 kilometer (200-mile) radius of Eglin Air Force Base, Florida (latitude 30° 30' North, longitude 86° 30' West);

(c) The entire State of Arizona;

(d) Those portions of California and Nevada south of latitude 37° 10' North, and the areas enclosed within a 322 kilometer (200-mile) radius of the Pacific Missile Test Center, Point Mugu, California (latitude 34° 09' North, longitude 119° 11' West).

(e) In the State of Massachusetts within a 160-kilometer (100 mile) radius around locations at Otis Air Force Base, Massachusetts (latitude 41° 45' North, longitude 70° 32' West).

(f) In the State of California within a 240-kilometer (150 mile) radius around locations at Beale Air Force Base, California (latitude 39° 08' North, longitude 121 26' West).

(g) In the State of Alaska within a 160 kilometer (100 mile) radius of Clear, Alaska (latitude 64 degrees, 17' North, longitude 149 degrees 10' West).

(h) In the State of North Dakota within a 160 kilometer (100 mile) radius of Concrete, North Dakota (latitude 48 degrees 43' North, longitude 97 degrees 54' West).

(i) In the States of Alabama, Florida, Georgia and South Carolina within a 200 kilometer (124 mile) radius of Warner Robins Air Force Base, Georgia (latitude 32° 38' North, longitude 83° 35' West).

(j) In the State of Texas within a 200-kilometer (124 mile) radius of Goodfellow Air Force Base, Texas (latitude 31° 25' North, longitude 100 24' West).

US217--Pulse-ranging radiolocation systems may be authorized for Government and non-Government use in the 420-450 MHz band along the shorelines of Alaska and the contiguous 48 States. Spread spectrum radiolocation systems may be authorized in the 420-435 MHz portion of the band for operation within the contiguous 48 States and Alaska. Authorizations will be granted on a case-by-case basis; however, operations proposed to be located within the zones set forth in US228 should not expect to be accommodated. All stations operating in accordance with this provision will be secondary to stations operating in accordance with the Table of Frequency Allocations.

US228--Applicants of operation in the band 420 to 450 MHz under the provisions of US217 should not expect to be accommodated if their area of service is within the following geographic areas:

(a) Those portions of Texas and New Mexico bounded on the south by latitude 31° 45' North, on the east by longitude 104° 00' West, on the north by latitude 34° 30' North, and on the West by longitude 107° 30' West.

(b) The entire State of Florida including the Key West area and the areas enclosed within a 322 kilometer (200-mile) radius of Patrick Air Force Base, Florida (latitude 28° 21' North, longitude 80° 43' West), and within a 322 kilometer (200-mile) radius of Eglin Air Force Base, Florida (Latitude 30° 30' North, Longitude 86° 30' West).

(c) The entire State of Arizona;

(d) Those portions of California and Nevada south of latitude 37° 10' North, and the areas enclosed within a 322 kilometer (200-mile) radius of the Pacific Missile Test Center, Point Mugu, California (latitude 34° 09' North, longitude 119° 11' West).

(e) In the State of Massachusetts within a 160-kilometer (100-mile) radius around locations at Otis Air Force Base, Massachusetts (latitude 41° 45' North, longitude 70° 32' West).

(f) In the State of California within a 240-kilometer (150-mile) radius around locations at Beale Air Force Base, California (latitude 39° 08' North, longitude 121° 26' West).

(g) In the State of Alaska within a 160 kilometer (100-mile) radius of Clear, Alaska (latitude 64 degrees, 17' North, longitude 149 degrees 10' West).

(h) In the State of North Dakota within a 160-kilometer (100-mile) radius of Concrete, North Dakota (latitude 48 degrees 43' North, longitude 97 degrees 54' West).

(i) In the States of Alabama, Florida, Georgia and South Carolina within a 200-kilometer (124-mile) radius of Warner Robins Air Force Base, Georgia (latitude 32° 38' North, longitude 83° 35' West).

(j) In the State of Texas within a 200- kilometer (124-mile) radius of Goodfellow Air Force Base, Texas (latitude 31° 25' North, longitude 100° 24' West).

US230--Non-government land mobile service is allocated on a primary basis in the bands 422.1875-425.4875 and 427.1875-429.9875 MHz within 80 kilometers (50 statute miles) of Detroit, MI, and Cleveland, OH, and in the bands 423.8125-425.4875 and 428.8125-429.9875 MHz within 80 kilometers (50 statute miles) of Buffalo, NY.

G8—Low power government radio control operations are permitted in the band 420 – 450 MHz.

Thus, it is apparent that there are significant geographic limitations on any non-government use of the 420-450 MHz band contained in the International and domestic table of allocations. The LMCC petition is silent on the subject of compliance with these limitations, and relative to compatibility with existing Federal uses, other than to suggest that those Federal uses are likely to diminish.

V. Existing Federal Uses Preclude PMRS Operation at 420-450 MHz

17. In March of 1995, the National Telecommunications and Information Administration (NTIA) released Special Publication 94-31, entitled *U.S. National Spectrum Requirements: Projections and Trends*, which delineated Federal spectrum uses and needs generally. At pages 125-

126 of that publication, NTIA clearly established that the band 420-450 MHz is unavailable for PMRS use due to continuing Federal needs. LMCC's unsupported assumptions of reductions in Federal use of the band are clearly rebutted by the report. The report states that the 420-450 MHz band is excellent for long-range search and surveillance and, to a lesser extent, target tracking. It is now, and will for at least the next ten years, be used for the Air Force Ballistic Missile Early Warning System (BMEWS). That system will undergo improvements during the next five to ten years. The band is also used by the Air Force Pave Paws (AN/FPS-115) radars for detection of submarine-launched ballistic missiles and satellite tracking. Pave Paws also includes the Perimeter Acquisition Radar, an anti-ballistic missile radar, and as well the AN/FPS-85 SPACETRACK radar. Shipborne AN/SPS-40(V) radars are still used by the Navy and Coast Guard for air search and surveillance of air targets at long ranges, have been modernized, and are expected to be used for the next ten years.

18. The report also notes that the frequency 449 MHz is allocated for use by wind profiler radars, which are useful for aviation. NOAA is planning a network to cover the United States. LMCC urges that wind profiler radars be "discouraged" at 449 MHz. However, that decision is principally not for the Commission to make; the 449 MHz allocation for wind profiler radars was the result of long study, and the fact that the devices had to be removed from the vicinity of 404 MHz due to interference to safety of life services. It is not possible at this stage for the Commission to "discourage" use of 449 MHz for wind profiler devices, as it was the solution to a longstanding problem reached after extensive study. Finally, the NTIA report stated that the Department of Defense (DOD) is conducting advanced research in radiolocation in the bands 400-500 MHz and 390-940 MHz. DOD has long range spectrum

requirements for UHF radars for anti-stealth and foliage penetration radars. NTIA concludes, in light of the above, that "considering all of the classified and unclassified current and planned systems, it can be concluded that the military agencies are expected to continue their extensive use of the 420-450 MHz band for long-range search and surveillance radars for at least the next 10 years."⁹ The A copy of that portion of the report is attached hereto as **Exhibit A**.

19. In its February, 1994 "Preliminary Spectrum Allocation Report", NTIA publication 94-27, the NTIA noted that there were in the 420-450 MHz band: 52 land-based military radiolocation systems, 13 mobile land-based systems, 257 shipborne systems, and 161 airborne systems. The estimated Federal investment for the Radiolocation service in the 420-450 MHz band was \$13.1 billion at that time. These estimates include the cost of the airborne platforms, for example, because they are associated inextricably as support facilities with the radar system. The same report concluded, with respect to "reallocation options", as follows:

Because of the criticality of these bands to national defense and other Federal functions, the extremely high Federal investment in these bands, and the extensive amateur radio use, reallocation of the 420-450, 1215-1300, and 3100-3600 MHz bands for non-Federal use is not considered to be a viable option.

Preliminary Spectrum Reallocation Report, at 4-7
(emphasis added)

20. It is therefore apparent that the assumption made by LMCC of reductions in Federal use of 420-450 MHz that formed the basis for LMCC's proposed 420-430/440-450 MHz allocation to PMRS was faulty, and the band is unavailable for additional primary uses. Even the Amateur Service as a

⁹ *U.S. National Spectrum Requirements: Projections and Trends*, NITA, March, 1995, at 125.

secondary user, a service which has a unique capacity to adapt operations to primary Federal uses, has significant limitations in its use of the 420-450 MHz band. The League recently explored with NTIA opportunities for a co-primary allocation for the Amateur Service at 420-450 MHz, but such was determined not possible at this time, due to the extensive Federal uses in the band. As the 1995 NTIA study stated, relative to additional amateur allocations, at page 169:

However, any sharing of military radiolocation spectrum (e.g. 430-440 MHz) with the amateur services on a co-primary basis in current Federal radiolocation bands is not feasible because of the potential loss of operational flexibility for military radar systems...

It is obvious from this conclusion that the density of PMRS use of the band makes a PMRS primary allocation impossible for the same reason.

21. Federal Radiolocation operations at 420-450 MHz were described by NTIA more recently in unequivocal terms. In an NTIA publication entitled *Spectrum Use Summary, 137 MHz - 10 GHz* dated July 15, 1996 (relevant portions of which are attached hereto as **Exhibit B**), NTIA described the Government radiolocation operations¹⁰ as follows:

This band is used for long-range surveillance on land-based, ship and airborne platforms. These uses are essential to the nation's early warning capability, law enforcement, and tracking objects in space. These systems operate with very high power and wide bandwidths. This band is becoming increasingly important for detection of low, observable targets. This band is the only military radiolocation band

¹⁰ Internet information about the AN/APS-145 radars is illuminating. These devices are operated, *inter alia*, aboard high-altitude aircraft at up to 30,000 feet, which permit long range surveillance radar coverage at up to 300 miles. These are used for both strike and interceptor missions, search and rescue missions, and communications relay. They are also used to assist law enforcement in drug interdiction operations. The radars provide fully automatic overland detection and tracking and surface plotting. It is also apparent that remotely piloted aircraft (drones) are operated in the 420-450 MHz band.

currently available for this frequency-sensitive function. The frequency 449 MHz has been authorized for Federal use of wind profilers. Rapid implementation of this use is expected. NASA and military use of telemetry and telecommand is also extensive.

22. There is no evidence whatsoever that any PMRS use of the 420-450 MHz band is possible, much less a primary allocation, consistent with Federal Government use of the band. Nor is LMCC's wishful claim of decreasing Federal uses evidenced or supported whatsoever. It is possible for amateurs to make use of this band without disruption of any Federal uses, and it is possible for amateurs to tolerate interference from Federal uses. Indeed, Federal/Amateur sharing of Government allocations is a success story.¹¹ LMCC, attempting to establish in its Petition that PMRS applications cannot be supplanted by CMRS service, alleges that PMRS licensees and eligibles require a great deal of reliability, control and instant access to the channels. That argument, however, proves that 420-450 MHz is unsuitable for PMRS use, because the incumbent Federal uses there preclude any opportunity for control, reliability of communications, or instant access by PMRS users. Thus, the band is completely useless for PMRS purposes for the exact same reasons that LMCC claims it cannot use CMRS facilities to alleviate claimed spectrum shortages.

VI. Incumbent Amateur Operations Would Be Precluded By PMRS Operation at 420-430 MHz and 440-450 MHz

23. The Amateur Service makes extensive use of both the 420-430 MHz segment and the 440-450 MHz segment. There are approximately 6,300 FM voice repeaters in the United States in the band, and at least that number of fixed control and auxiliary point-to-point links there as well. It is impossible

¹¹ The successful sharing exists because of the loading characteristics of each service, geographical distribution, and local coordination between amateurs and certain military installations.

to provide an accurate count of the control links in the band, since the locations and frequencies are not published by the licensees or the volunteer coordinators. More urgently, the 420-430 MHz band has experienced significant growth in Amateur Television (ATV) use, both point-to-point and via ATV repeaters, in recent years. The League has 203 ATV repeaters listed in its 1998 directory in the 420-430 MHz band, which represents only a portion of the actual number. The national band plan for amateur use of the 420-450 MHz band includes ATV repeater or ATV simplex operation, ATV control links and experimental amateur operation at 420-426 MHz, and ATV simplex between 426 and 432 MHz. Video carriers are typically centered at 421.25 and 427.25 MHz.

24. The growth in amateur voice repeater operation at 440-450 MHz is substantial, and in many areas of the country, especially in urbanized areas, amateurs are unable to establish new repeater facilities, as all available channel pairs are full. Increased linking of repeaters in the 420-450 MHz band, and in other bands, has led to increased use of link channels and increases in numbers of users. Most active amateurs utilize dual band base, portable and mobile transceivers which operate in the 144-148 and 440-450 MHz bands. The transceivers alone (exclusive of antennas, feedlines, amplifiers and accessories) cost between \$350 and \$1700 each. To offer some additional idea of the investment of radio amateurs in post-tax dollars in the repeater systems and television systems in the 420-450 MHz band, the following estimates of station construction costs are provided:

Basic ATV simplex system	(simplex or repeater)	\$1,200 to \$3,000
Basic FM Repeater system		\$10,000 to \$15,000
Typical Control Link site		\$750 to \$2,000

(not including feedline or antenna)

The above estimates do not include transmitter site rental for repeaters or links. Multiplied by the number of FM repeaters and links estimated to be in place at the present time, LMCC stands to render valueless a large portion of the huge investment of radio amateurs in equipment for public-service communications.

25. Relative to the 420-430 MHz segment, LMCC makes much of the fact that PMRS use is already made of that band in the "Line A" cities of Buffalo, Cleveland and Detroit. That authorization, however, offers nothing by way of precedent for PMRS use of that band elsewhere. First of all, PMRS use of 420-430 MHz in those areas was authorized by virtue of an arrangement between the United States and Canada by the exchange of diplomatic notes in April of 1982. This agreement¹² which was intended to allow interference-free operation by both nations of their primary services in the border areas, permitted PLMR operation in Buffalo, Cleveland and Detroit, without further disruption of amateur operations beyond that already necessary in the area above Line A.¹³ Furthermore, shared use of the 421-430 MHz segment between PMRS and Government Radiolocation was possible pursuant to a specific agreement between NTIA and the Commission, relative to those three cities only. NTIA reserved the primary Radiolocation allocation in the United States, but agreed to avoid use of those frequencies to the extent possible, within the interference range of the three cities. Emergencies were

¹² *Arrangement Between the Department of Communications of Canada and the National Telecommunications and Information Administration and the Federal Communications Commission of the United States Concerning the Use of the 406.1 to 430 MHz Band in Canada/United States Border Areas.* April 7, 1982.

¹³ See, *Private Mobile Radio Services (Detroit, Cleveland and Buffalo Allocations)*, 58 RR 2d 1566 (1985).

excepted, and the ability to conduct radiolocation on fixed-wing aircraft was reserved to the Government. The arrangements were unique to the border area, and the same considerations do not apply in the remainder of the United States.

26. Because there is no way to accommodate additional facilities in many areas of the country, especially urban areas, a significant number of amateur repeater stations, most ATV systems, and control and auxiliary links would be displaced by the proposed PMRS allocation. Coordination of mobile facilities in one service with mobile and fixed facilities in another service is virtually impossible, and LMCC apparently has no plan to coordinate with incumbent amateurs in the band, inasmuch as it requests a primary allocation and proposes that amateurs would remain secondary. While LMCC speaks of "some constriction" of amateur use of the 420-450 MHz band after the proposed reallocation, there is really no compatibility whatsoever between PMRS and Amateur operation in this context: the amateur operations would simply have to cease.

27. The 420-450 MHz band is used for both video and voice transmissions in support of emergency, disaster relief and public service communications. The amateur ATV repeaters are employed to assist public safety communications in fires and other disasters, especially in the west. As there is no compatibility between PMRS users and Amateur operations, this emergency communications capability will be lost if the LMCC proposal is implemented.

VII. Conclusions

28. The League would like to understand the LMCC Petition as a means to open a public dialogue on the character and needs of the PMRS industry. Indeed, the League would tend to agree

that the PMRS industry has not captured the Commission's attention in recent years, due to a Commission focus on CMRS providers and spectrum auctions. LMCC has not limited its proposal to such a dialogue, however. Instead, it has made specific allocation proposals, at least one of which is ill-conceived and, for that reason, poorly justified in the Petition. NTIA has made it quite clear on numerous occasions that there is no possibility of additional sharing of the 420-450 MHz band, and the unique relationship between Federal radiolocation uses at 420-450 MHz and the Amateur Service cannot be duplicated by PMRS users.

29. Nor is it an efficient proposal, given the cost of the displacement of amateur uses at 420-430 and 440-450 MHz that would result even if there was some compatibility between PMRS and Federal uses. The League takes no position on the other specific allocation proposals in the Petition. It is obvious, however, that LMCC's Petition is premature. From one perspective, the Petition is a request for additional spectrum to address the fact that PMRS users are unwilling to implement the spectrum efficient technologies that are available, and which stand to multiply their channel capacities by 400 percent. Those with entrenched wideband systems are understandably reluctant to purchase CMRS service as an alternative, but the ready availability of CMRS facilities and increasingly competitive cost of such services inescapably reduce the need of the PMRS for additional spectrum. Prior to consideration of any specific additional allocation must come a full and complete evaluation of the success or failure of the Refarming proceeding, and of the extent to which the radical increases in CMRS facilities are an effective substitute for PMRS facilities. The League would urge the commencement of a proceeding to test the basic assumptions of LMCC's petition in the foregoing

respects, but strenuously opposes any consideration of additional allocations for PMRS pending the outcome of such a proceeding. Under any circumstances, the League requests that the portion of the LMCC Petition proposing the allocation of portions of the 420-450 MHz band be immediately dismissed without further consideration.

Therefore, the foregoing considered, and as indicated herein, the American Radio Relay League, Incorporated respectfully requests that the Petition for Rule Making be denied or dismissed.

Respectfully submitted,

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EXHIBIT A

RADIOLOCATION USAGE AND REQUIREMENTS IN THE 420-450 MHZ BAND

The 420-450 MHz band is excellent for long-range search and surveillance and, to a lesser extent, target tracking. The large antennas required for good angular resolution generally limit operations to land or ship-based installations.

The Air Force Ballistic Missile Early Warning System (BMEWS) has been the backbone of the U.S. missile defense system for over 30 years. The BMEWS radars are located in Clear, Alaska; Flyingdales, UK; and Thule and Sondrestrom AFB, Greenland, and are used for search and tracking. The radars operate in the 420-450 MHz band, and they have been modernized over the years. Technical improvements on the BMEWS radars may continue over the next 5-10 years. Spectrum requirements will continue over the next 10 years for the BMEWS. In the future, the BMEWS spectrum requirements for the 420-450 MHz band may be reduced if spaceborne radars can perform the early warning function.

The Air Force Pave Paws, or AN/FPS-115, radars are used for detection and tracking of submarine launched ballistic missiles (SLBM), and for satellite tracking. Four phased array radars were installed between 1982 and 1987 in the United States. Other elements of the Pave Paws system are the Perimeter Acquisition Radar which was developed in the 1960's and 1970's as a Safeguard anti-ballistic missile (ABM) radar and the AN/FPS-85 SPACETRACK radar.

The AN/FPS-115 Pave Paws radars and the Perimeter Acquisition Radar use the 420-450 MHz band, and are expected to operate for the next 10 years. The older AN/FPS-85 may be phased out. Some modernization may occur to these radars, and the spectrum requirements will likely continue.

The shipborne AN/SPS-40(V) is an older radar used by the Navy and USCG for air search and surveillance of air targets at long-ranges. The AN/SPS-40(V) radar has been modernized, and it can be expected to be used for the next 10 years.

The frequency 449 MHz is allocated for use by wind profiler radars to measure the atmosphere near the surface of the Earth. The radars measure wind speed and direction as a function of time and altitude, information that is useful to aviation. NOAA is planning a network to cover the United States.⁴²⁰

The DOD indicated in its comments on our Inquiry that "[A]dvanced research in radiolocation is being performed in the bands ... 400-500; 390-940 ...MHz."⁴²¹ As discussed in the VHF sub-section, DOD has long-range spectrum requirements for UHF radars for anti-stealth and foliage penetration radars. When considering all of the classified and unclassified current and planned systems, it can be concluded that the military agencies are expected to continue their extensive use of the 420-450 MHz band for long-range search and surveillance radars for at least the next 10 years.

⁴²⁰ Markey, supra note 125, Enclosure at 13.

⁴²¹ DOC Comments at 9.

EXHIBIT B

SPECTRUM USE SUMMARY
137 MHz - 10 GHz

Compiled by

NATIONAL TELECOMMUNICATIONS
AND
INFORMATION ADMINISTRATION

as of July 15, 1996

FREQUENCY (MHz)	NONGOVERNMENT ALLOCATION	NONGOVERNMENT USE	GOVERNMENT ALLOCATION	GOVERNMENT USE
			Space Research ((space-to-space) 410-420)	Fixed links are used in this band for transmission of airport windshear data, flood warning and other environmental data, for law enforcement, for public dissemination of weather warning and disaster information, and for other critical activities. There are also radio astronomy observations at several sites across the U.S.
<u>420-450</u>	Amateur Amateur Satellite (FN664 435-438)	Amateur weak signal modes (432-433), television (420-432, 438-444), repeaters (442-450), auxiliary links (433-435). There is also some use of spread spectrum and other modes. Amateur satellite activities are conducted (435-438) under RR 664. Land mobile systems are operated along the Canadian border in accordance with US 230.	RADIOLOCATION	This band is used for long-range surveillance on land-based, ship, and airborne platforms. These uses are essential to the nation's early warning capability, law enforcement, and tracking objects in space. These systems operate with very high power and wide bandwidths. This band is becoming increasingly important for detection of low observable targets. This band is the only military radiolocation band currently available for this frequency sensitive function. The frequency 449 MHz has been authorized for Federal use of wind profilers. Rapid implementation of this use is expected. NASA and military use of telemetry and telecommand is also extensive.
<u>450-470</u>	LAND MOBILE Earth Exploration-Satellite (US201 460-470) <i>Space Research and Space Operations (FN668 450 MHz)</i>	Remote pickup broadcast (450-451, 455-456) Public safety, industrial, land transportation (451-454, 456-459, 460-462.5375, 462.7375-467.5375, 467.7375-470) Domestic public (454-455, 459-460) Personal (462.5375-462.7375, 467.5375-467.7375)	Meteorological Satellite (460-470) Earth Exploration-Satellite (US 201 460-470) <i>Space Research and Space Operations (FN668 450 MHz)</i>	GOES and TIROS satellite downlinks for integration of data collection platforms operate in this band. Veteran's medical programs depend upon the use of biomedical telemetry and telecommunications in conjunction with nongovernment medical activities.
<u>470-512</u>	BROADCASTING LAND MOBILE	TV channels 14-20, Public safety, Industrial, Land transportation, Domestic public		
<u>512-608 and 614-806</u>	BROADCASTING	TV channels 21-36, and 38-69, Auxiliary broadcasting		
<u>608-614</u>	RADIO ASTRONOMY		RADIO ASTRONOMY	There are few Federal assignments in this band for other than experimental use. However, radio astronomy usually involves passive operations that do not require an assignment. This band is used for international collaborations in Very Long Baseline Interferometry and will continue to be used for this purpose as the VLBA antennas come on line. The band is also used for observations by the Air Force Radio Solar Telescope Network.
<u>806-902</u>	LAND MOBILE	Private land mobile (806-824, 851-869, 896-901) Domestic public land mobile (824-849, 869-894) Aeronautical public correspondence-airphone (849-851, 894-896) General purpose mobile (901-902)		This band is used for high-power U.S. Navy shipborne long-range search radars under footnotes US268 and G2. These radars serve a critical role in defense of the fleet.
<u>902-928</u>	Amateur	Amateur weak signal modes (902-904), digital communications, repeaters, spread spectrum and other modes (904-928). Automatic vehicle monitoring (902-912 and 918-928 as authorized by FN US218), ISM, and Part 15 spread spectrum devices. This band is also used for a variety of ISM applications, particularly industrial heating and food processing.	RADIOLOCATION Fixed (G11) Mobile (G11)	This band is used predominantly for military radiolocation systems. These include low-power devices, such as those for tactical and nontactical intrusion detection at military facilities, and high-power radars used for long-range search, many of which are employed on U.S. Navy ships and aircraft or at shore stations. These radars serve a critical role in defense of the fleet. Federal mobile communications applications include video surveillance for law enforcement missions, transmission of infrared scanner imagery during overflights of disaster areas, and use of high power packet radio systems. Fixed use includes point-to-point TV links for monitoring unmanned ports of entry along borders. Though most low capacity links will be moving to the 932-935 MHz and 941-