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

In the Matter of)
)
Allocation of Spectrum Below) ET Docket No. 94-32
5 GHz Transferred From)
Federal Government Use)

To: The Commission

REPLY COMMENTS OF
THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

The American Radio Relay
League, Incorporated
225 Main Street
Newington, CT 06111

Christopher D. Inlay
BOOTH, FRERET & INLAY
1233 20th Street, N. W.
Suite 204
Washington, D. C. 20036
(202) 296-9100

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List A B C D E

TABLE OF CONTENTS

	<u>Page</u>
Summary	i
I. Overview	2
II. The Commission Lacks the Statutory Authority to Create Spectrum Allocations By Competitive Bidding	5
III. Comments Generally Failed to Account for Amateur Use of the 2390-2400 MHz or 2402-2417 MHz Segments, and Most Proposed Non-Amateur Uses Have Been Rejected Already	9
IV. The Comments Almost Unanimously Support the Status Quo at 2402-2417 MHz	19
V. The Highest and Best Use of the 2300-2310 MHz and 2390-2400 MHz Segments is for Amateur Use on a Primary Basis	22
VI. Conclusions	25

SUMMARY

The American Radio Relay League, Incorporated (the League), the national association of amateur radio operators in the United States, submits its reply comments relative to the Notice of Proposed Rule Making (the Notice), FCC 94-272, 59 Fed. Reg. 59393, released November 8, 1994. The Notice proposes to allocate the first 50 MHz of spectrum that was preliminarily identified by the National Telecommunications and Information Administration (NTIA) as being subject to immediate reallocation from Federal Government use. These segments include 2390-2400 MHz, 2402-2417 MHz, and 4660-4685 MHz.

The comments which considered the competitive bidding proposal contained in the Notice are essentially unanimous in noting that the Commission cannot legally make frequency allocations by competitive bidding. Congress clearly did not absolve the Commission from making at least a preliminary determination of what radio services met the public interest test for the frequency allocation. Rather, it intended only that the Commission make frequency assignments with competitive bidding.

The Commission fairly asked in the Notice for comment from potential new users of the reallocated band segments on the extent to which such uses would be compatible with the Amateur Service. Precious few comments satisfied this obligation. The Commission can only conclude from the failure of those commenters to provide an analysis of the compatibility with continued amateur use of the segments that there is none. As a result, given the Commission's obligation under the Budget Reconciliation Act to protect amateur uses, there is no alternative but to reject these proposals for new uses. Indeed, the Commission's Notice already rejected some of the new uses suggested by commenters.

Only Apple Computer and In-Flight Phone Corporation attempted in good faith to demonstrate compatibility between amateur use of the bands currently under consideration and their proposed uses. The League is interested in exploring compatible sharing opportunities with these users, though in the time available, the details of such cannot be accommodated. For this reason, it is urged that the Amateur Service be given primary allocation status at 2300-2310 MHz, 2390-2400 MHz, and that the Amateur and Amateur-Satellite Services be given co-primary status at 2400-2417 MHz for the present. The Amateur Service remains the highest and best opportunity to promote "new and innovative technologies" for the benefit of the public.

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REPLY COMMENTS OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED

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 1.415(c) of the Commission's Rules, hereby respectfully submits its reply comments relative to the Notice of Proposed Rule Making (the Notice), FCC 94-272, 59 Fed. Reg. 59393, released November 8, 1994. The Notice proposes to allocate the first 50 MHz of spectrum that was preliminarily identified by the National Telecommunications and Information Administration (NTIA) as being subject to immediate reallocation from Federal Government use. These segments include 2390-2400 MHz, 2402-2417 MHz, and 4660-4685 MHz. In the interests of the Amateur Radio Service in the continued public service use of the 2390-2400 MHz and 2402-2417 MHz segments, which stand to be adversely affected by this proceeding, the League submits the following reply comments:¹

¹ The reply comment period in this proceeding, even as extended three days by recent Order, is not sufficiently long to permit any meaningful review of the comments filed. A large number of radio amateurs have filed comments in this proceeding, and,

I. Overview

1. The Comments in this proceeding are, with a few notable exceptions, not responsive to the Commission's Notice proposal. The Notice, at paragraph 16, specifically asked commenters to "address the compatibility of the proposed service with the Amateur and other services." At paragraph 20, the Commission stated:

We recognize the importance of the amateur service and, in making our allocation decisions, we will take into account existing use of the spectrum by the amateur service. We therefore solicit information on several options. One approach for accommodating amateur service use of these bands is to maintain a secondary allocation for the amateur service in all or part of this spectrum. Another approach is to make the amateur service the primary user in a portion of this spectrum while either maintaining a secondary allocation in the remaining portions of the bands or eliminating the other portions from the amateur service. We request comment on these options, including the ability of various radio services to share spectrum with the amateur service.

Notwithstanding this rather clear instruction to commenters, the vast bulk of the comments filed are absolutely silent on the effect of a new proposed use, either at 2390-2400 MHz or 2402-2417 MHz, on the Amateur Service. Specific proposals for use of these segments do not discuss incumbent users of the segments, leaving but one possible inference: that there is no compatibility between the

because they do not have Washington counsel, have been practically deprived of the ability to file reply comments. The intervention of the Christmas and New Years' holidays have complicated an already difficult situation. The comments filed were not available in the Commission's public reference room until late in Christmas week. The Commission's timetable for comments in this complex proceeding, given the number of comments filed, makes it difficult for those outside the Washington area to prepare and file timely reply comments. It is hoped, under the circumstances, that the Commission will be liberal in accepting late-filed reply comments in this proceeding.

proposed use and amateur use of the segments. Notable exceptions are the comments of In-Flight Phone Corporation and Apple Computer, Inc. In-Flight has developed what may prove a workable plan for use of the 2390-2400 MHz band, and at the same time permit compatible shared use of the same frequencies by amateur radio operators, on a co-primary, coordinated basis. Apple urges that the 2390-2400 MHz segment be used for Part 15 data-PCS service, with the Amateur Service the primary user.

2. The one issue on which these disparate commenters agree is with respect to the use of auctions as an allocation tool, as opposed to an assignment tool. The League's comments noted that competitive bidding as a means of avoiding specific allocation planning by the Commission was inappropriate. It was also noted that such a plan was uniquely unworkable here, where shared spectrum is involved. Incumbent users would be particularly disadvantaged by non-specific allocation of the 2.4 GHz segments, as they would be at the mercy of the successful bidders, who would have no incentive whatsoever to accommodate incumbent users.

3. Other comments raised the issue of the Commission's statutory authority to conduct spectrum allocations by competitive bidding, as opposed to frequency assignments. The Commission itself has noted that it has no ability to substitute competitive bidding for rational decisionmaking in allocations matters. Indeed, the Commission cannot make allocation decisions which promote the safety of life and property, or improve the efficiency of spectrum use, or for that matter, any weighing of the public interest

benefits of various services, without first being able to identify the services which would be entitled to licensing in the segments in the first place.

4. It is apparent that the commenters acknowledge that the highest and best use of the 2402-2417 MHz segment is for incumbent users: Parts 18 and 15 devices, and the Amateur Service. While that segment, even if allocated on a primary basis to the Amateur Service (and used as well by Part 15 and Part 18 devices)², is not itself sufficient to accommodate the needs of the Amateur Service, it is the highest and best use of that segment that can be made, given the noise levels that exist, and the flexibility inherent in amateur radio operation.

5. Finally, it is noted that there is no record justification for any paired allocation of 2300-2310 MHz and 2390-2400 MHz at this time. The Amateur Service makes significant use of the frequencies around 2304 MHz, and any reallocation of that segment would inherently involve significant disruption of amateur operation in that band at the present time.

² Some comments misunderstand the allocation status of Part 15 devices. Part 15 devices are not a radio service and do not have any allocation status in any band. Those comments which urged that Part 15 be allocated on a "primary" or "secondary" basis are merely referring to the authorization of such devices on an "at sufferance" basis in the segment. This is not to say that Amateur and Part 15 use at 2402-2417 MHz is incompatible, or that the Commission should not leave the 2402-2417 MHz segment as-is, save for elevation of the Amateur allocation to non-government primary. The issue is principally one of form, rather than substance, but Part 15 advocates should not misapprehend the status of such devices in the conceptual framework of the Table of Frequency Allocations, or what should be expected by way of interference protection for Part 15 devices in any band.

II. The Commission Lacks the Statutory Authority to Create Spectrum Allocations By Competitive Bidding

6. The League agrees with the commenters that competitive bidding is not appropriate as a spectrum allocation tool. Indeed, the Amateur Service would suffer from any shared use of frequencies which had been auctioned to the sharing partner with amateurs. There would not be any prior or real-time coordination possible, and no compatible sharing arrangement, except purely by accident. Auctions are useful only where there are no sharing partners.

7. In addition to the inapplicability of competitive bidding to frequencies such as the 2.4 GHz segments, which have multiple incumbent users, the comments argue strongly that the Commission has no statutory ability to substitute competitive bidding for public interest determinations in frequency allocation decisions. Indeed, the Commission itself acknowledged, at Paragraph 9, note 24 of the Notice, that its authority under Section 309(j) of the Communications Act to utilize competitive bidding is limited to awarding licenses and is not to be used for allocating spectrum. Yet, one major option raised in this Notice is to merely allocate all 50 MHz of the spectrum initially made available for private sector use for "fixed" or "mobile" service, with no operational guidelines,³ and to auction off blocks of the spectrum to the highest bidders. To do that is to abdicate the Commission's

³ Technical and operational rules would have to be enacted in order to permit any compatible sharing of the band segments between incumbent users such as radio amateurs and any new service using the segment.

statutory obligation to make spectrum allocation decisions based on the public interest. The "flexible allocation" plan would be, prima facie, in lieu of making any public interest determination at all as to the highest and best use of the spectrum.

8. At 47 U.S.C. §309(j)(6)(A), the Communications Act, as amended, states that "(n)othing...in the use of competitive bidding shall (A) alter spectrum allocation criteria and procedures established by other provisions of [the Communications Act]." Auctions were limited in the Act to those radio services where the "principal use of such spectrum will involve, or is reasonably likely to involve, the licensee receiving compensation from subscribers..." 47 U.S.C. §309(j)(2)(A). Furthermore, 47 U.S.C. §309(j)(7)(A) states that, "(i)n making a decision pursuant to Section 303(c) to assign a band of frequencies to a use for which licenses or permits will be issued pursuant to this subsection, and in prescribing regulations pursuant to paragraph 4(C) of this subsection, the Commission may not base a finding of public interest, convenience and necessity on the expectation of Federal revenues from the use of a system of competitive bidding under this subsection." Section 303 of the Act directs the Commission to classify uses of the spectrum, identify and define the type of service provided by different uses of the spectrum, and allocate portions of the spectrum to each class of use. The Commission's obligation, therefore, is to make an initial determination as to the use and purpose of licensing stations in each portion of the spectrum. The Commission cannot dodge this responsibility by

creating an allocation to "general fixed and mobile services", which is so broad that all terrestrial communications fit into the category, without violating the specific dictates of Section 303 of the Act.

9. It is obvious that Congress did not intend to permit competitive bidding to be used as an allocation methodology. Senator Inouye, in February of 1993, made this abundantly clear:

[I]t is time to give the concept of spectrum auctions a trial. Senator Stevens and I have thus crafted a compromise auction amendment that attempts to employ auctions as a way of distributing licenses without weakening any of the public interest obligations of radio licensees. This proposal does not, however, allow auctions to be used to allocate frequencies among different service categories. Frequency allocation decisions must continue to be made by the FCC, not by the private marketplace. But this amendment would allow the FCC to use auctions to assign licenses to particular users.

See, 139 Cong. Rec. S. 1438 (February 4, 1993, Remarks of Senator Inouye).

What the Commission said it intends to do in this proceeding, therefore, by way of protection and accommodation of the Amateur Service in the reallocated segments⁴, it could not possibly do if it was to adopt the proposed "general fixed and mobile" allocation "plan". This is because it would be impossible to determine any compatibility between amateur uses and successful bidders. Congress specifically sought to avoid this result, by requiring studies to determine "the extent to which, in general, commercial users could share the frequency with amateur radio licensees..." 47 U.S.C. §923(c)(3)(C).

⁴ See the Notice, at paragraph 20.

10. The Commission has already determined that there would be significant disruption of amateur use of the 2390-2400 MHz and 2402-2417 MHz segments. In the "Report From The Federal Communications Commission To Ronald H. Brown, Secretary, U.S. Department Of Commerce, Regarding The Preliminary Spectrum Allocation Report", FCC 94-213, released August 9, 1994 (the FCC Report), the Commission stated, with respect to both the 2300-2310 MHz and 2390-2400 MHz segments:

The largest factor affecting use of these bands is their existing availability for use by the Amateur Service (footnote omitted). Congress specifically sought to avoid disruption of existing use of Federal Government frequencies by amateur radio licensees (footnote omitted). We agree with commenters that there is a substantial likelihood that reallocation of the 2300-2310 MHz and 2390-2400 MHz bands to commercial or local government use could cause serious disruption to Amateur service use of these bands.

(FCC Report, at 17)

The FCC Report, with respect to the 2402-2417 MHz segment, stated as follows:

Considering the potentially adverse effects on the amateur radio service and on use of the band by devices operating under Part 15, as well as the difficulties in using this band because of the amount of noise from ISM devices, we believe that reallocation of this band presents less value to the private sector than any other band identified for reallocation in the Preliminary Report.

(FCC Report, at 20)

The damage to the Amateur Service from additional uses of the three segments has already been established by the Commission and publicly noted in a report to NTIA. It is impossible to reconcile those findings of fact with any proposal to auction the same bands to any fixed or mobile user with the money to bid on it. The

Commission is thus prohibited, both by Section 309 of the Communications Act of 1934, and by the terms of the Omnibus Budget Reconciliation Act, from proceeding with a competitive-bidding plan for frequency allocations in the 2.4 GHz segments.

III. Comments Generally Failed to Account for Amateur Use of the 2390-2400 MHz or 2402-2417 MHz Segments, and Most Proposed Non-Amateur Uses Have Been Rejected Already

11. As noted in the League's comments, Congress specifically stated its intent that there not be excessive disruption of amateur uses of the bands slated by NTIA for reallocation which are shared with amateur licensees. The Commission has acknowledged that intention, and stated that it would accommodate amateurs' use of these bands. It specifically, in the Notice, asked for comment on how amateur uses could be accommodated by those who would propose additional uses of the 2390-2400 MHz and 2402-2417 MHz segments. Yet, most of the comments filed completely ignored continued amateur use of the band at 2390-2400 MHz, and, in a few cases, 2402-2417 MHz, treating them as if they were devoid of other uses. For example, the County of Los Angeles simply asks that the entire 50 MHz be allocated to the police and fire radio services for airborne video.⁵ NYNEX Telephone Companies, Rochester Telephone

⁵ Separate comments filed by the Los Angeles County Sheriff's Department note that the same services that it and the County request are already being provided on a volunteer basis by both broadcasters and by amateur radio operators. The Sheriff's Department apparently would reward the Amateur Service for its public service efforts during emergencies by depriving amateurs of the frequencies it uses to provide this emergency and public service.

Corporation, and Bell Atlantic ask that the entire 2390-2400 MHz segment be reallocated "primarily" for use by local exchange carriers for fixed wireless loop service, paired with the entire 2300-2310 MHz segment. There is no justification offered for this proposal to use radio spectrum in the 2 GHz range, rather than a higher microwave frequencies, which are more suited to the proposed use.⁶ Nor has any effort been made by NYNEX, Rochester or Bell Atlantic to consider the effect of their proposal on the existing amateur use of those band segments.⁷ It can only be presumed that

⁶ The League suggests strongly that proponents of wireless local loop technology consider participation in the currently pending Docket 94-124, concerning use of radio frequencies above 40 GHz for new radio applications. Spectrum in this range is better suited for WLL technologies than is that in the 2 GHz range, due to the available bandwidths and greater frequency reuse possibilities.

⁷ Southwestern Bell at least admits, while staking a claim to the entire 2300-2310 MHz and 2390-2400 MHz segments, that sharing between wireless local loop service and Amateur Radio is "problematic" (an apparent euphemism for "impossible") and the Commission should consider allocation of another band (it suggests 2400-2410 MHz) to the Amateur Service on a primary basis. Southwestern Bell apparently thinks that this is an accommodation for the amateur service, to consolidate its operations into a segment that Southwestern Bell cannot use for its own wireless loop purposes. As stated in Southwestern Bell's comments, at 5:

The two other frequency bands which are the subject of this proceeding, 2390-2400 MHz and 2402-2417 MHz, have appropriate propagation characteristics for use with WLL technology. The existing use, however, of the 2402-2417 MHz band for industrial, scientific and medical (ISM) applications make use of this band for WLL problematic. The most prevalent use of this spectrum is for microwave ovens, which would likely cause unacceptable interference with residential WLL service. In addition, the WLL system could cause unacceptable interference with other ISM applications operating in this band. Thus, the 2402-2417 MHz band would also appear to be inappropriate for use with WLL technology.

One wonders upon reading this whether Southwestern Bell has any idea what the amateur uses of the 2300-2310 MHz band and the 2390-

wireless local loop service would completely preclude amateur use of the 2390-2400 MHz segment, and the 2300-2310 MHz segment. Notwithstanding the existing allocation for interactive video data service (IVDS) at 216-219 MHz, Leaco Rural Telephone Cooperative asks that the entire 50 MHz, including the 2.4 GHz segments, be reallocated for interactive video, voice and data services in sparsely populated areas. There is no indication in those comments why existing IVDS allocations in the 216-219 MHz band, wireline service, and/or other existing common carrier, MDS, or MMDS allocations could not be used for the same purpose proposed by Leaco instead of a preclusive allocation for interactive video and IVDS.

12. The comments of the Association of American Railroads suffer the same myopic analysis. AAR merely argues, as it has done in numerous other cases where private land mobile spectrum may be available, that more private land mobile allocations are a priori, useful. There is no indication why yet more private land mobile spectrum should be allocated, no indication that there is any shortfall in existing allocations, and no indication that existing private land mobile allocations are being used economically. In

2400 MHz band are. If the segment above 2402 MHz is not sufficient for wireless local loop service, on what basis is it sufficient to accommodate amateur uses? In fact, Southwestern Bell's Comments, at 7, indicate that the only accommodation Southwestern Bell thinks amateurs need is for satellite downlinks. While it is true that amateurs can make significant use of 2400-2450 MHz, and ask that this segment be allocated on a primary basis for the Amateur Service, it is not, alone, sufficient to accommodate the weak-signal, fixed-link, and other uses increasingly necessary for amateur operation.

fact, all available evidence is to the contrary.⁸ The League has argued to the Commission repeatedly that additional allocations to the private land mobile radio services are a self-fulfilling prophecy; they insure that there will not be any use of new land mobile technologies to increase efficiency in existing bands. Indeed, in this proceeding, the Commission's Notice specifically discounted any private land mobile allocation for these bands, because "private users can receive service from commercial service providers and can compete in obtaining spectrum on the same basis as commercial providers."⁹ In fact, the Notice already rejected the most preclusive of the specific allocations suggested earlier in comments on the Notice of Inquiry in this proceeding, which are repeated in comments on the Notice now:

In response to the NOI, we received several other suggestions for use of the 2390-2400 MHz band. These uses include interactive video in rural areas, low power communications, mobile-satellite service (MSS) and advanced private communications. We believe, however, that most of these uses are already adequately accommodated in other bands, could be accommodated under our general allocation proposal for these bands, or may not be suitable for the 2390-2400 MHz band. Parties supporting alternative proposals for this band should address the compatibility of the proposed service with the Amateur and other services... We also note that, while we have not specifically identified spectrum for advanced private communications as requested by the Coalition of Private Users of Emerging Multimedia Technologies (COPE),

⁸ The Commission cannot, in good faith, create additional land mobile allocations without first resolving the refarming proceeding for land mobile spectrum, and the channelization plans for more efficient use of the existing land mobile bands. See, e.g. Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Services and Modify the Policies Governing Them, PR Docket 92-235, 7 FCC Rcd. 8105 (1992).

⁹ See, the Notice, at paragraph 16.

private users can receive service from commercial service providers and can compete in obtaining spectrum on the same basis as commercial providers. Additionally, we will continue to consider COPE's request for spectrum as we determine uses for additional spectrum being reallocated from Federal Government use under the Reconciliation Act.

Notice, at paragraph 16.

13. The comments of Loral/Qualcomm Partnership L.P. (LQP) are in the same category. LQP suggests that the Commission should allocate all of the initial 50 MHz for use by MSS, for non-geostationary systems. It asks for the 2300-2310 MHz band as well for non-GSO MSS systems. Not a word is included in these comments as to the effect on existing users, and once again, the Commission could only conclude that there is no compatibility between existing amateur uses and MSS operation in the same bands. The proposal of LQP is thus defective, and not responsive to the Commission's Notice requirements. The Commission could not implement the LQP proposal consistent with the requirements of the Budget Reconciliation Act. It is suggested that LQP consider other spectrum reallocated under the Budget Reconciliation Act requirements for MSS, which is not already in use by the Amateur Service. The same suggestion applies to each of the preclusive specific proposals previously rejected by the Commission in the Notice, and which are incompatible with continued amateur operation in the reallocated segments at 2 GHz.

14. Not all commenters ignored the Amateur Service in formulating specific proposals for use of 2390-2400 MHz. In-Flight Phone Corp. has attempted to establish that there is some significant compatibility between its proposal for one-way audio

and video transmissions to aircraft from a limited number of ground stations¹⁰ might be compatible with continued amateur operation in that segment. In-Flight Phone stated as follows:

First, AAVS, unlike any other service discussed favorably by the Commission, can co-exist with co-channel operations in the Amateur Service. (footnote omitted). As shown in an engineering statement attached...it appears that AAVS and the Amateur Service can co-exist subject to two simple conditions. In order to protect amateur receivers from interference by AAVS base stations, amateurs would need to locate their receiving antennas beyond the line of sight of a co-channel AAVS transmitting antenna. This would be a relatively insignificant restriction on amateur operations since (1) no amateur receiver will be within the line of sight of more than one AAVS base station; (2) each AAVS base station will operate on only one-sixth of the AAVS licensee's assigned bandwidth (footnote omitted); and (3) individual amateur systems usually require less than 800 kHz of bandwidth and often require less than 50 kHz (footnote omitted). Second, in order to protect AAVS receivers from harmful interference by co-channel amateur systems, the Commission would need to ensure that

¹⁰ The engineering exhibit attached to the In-Flight comments was prepared by Jules Cohen & Associates. It indicates that AAVS antennas would be approximately 390 kilometers apart, and involves cellular-like channel re-use. The antennas would be at 25-meter transmitting height AGL, as the intent is to transmit to aircraft flying at between 5,500 meters and 12,000 meters altitude, within a 225-kilometer radius of the AAVS site. As to the interference area, the exhibit states:

The distance to the radio horizon for a transmitting antenna mounted 25 meters AGL is 20.6 kilometers. While the amateur receiving antennas could be installed at elevations greater than 25 meters AGL thereby increasing the distance to the radio horizon, reception may be precluded only on the portion of the 2390-2400 MHz band used for AAVS transmission in that vicinity. An amateur receiving antenna atop a 1,500 meter (5,000 foot) mountain would have the potential of seeing only one AAVS transmitter, as the AAVS transmitters will be located almost 400 kilometers apart. Thus, a major portion of the 2390-2400 MHz band would remain free for amateurs operating from high mountaintop sites.

In-Fight Engineering Exhibit, at 3.

amateurs (1) use antennas having gain and bandwidth characteristics similar to those used today, and (2) operate their transmitters at power levels no higher than power levels at which they operate today (footnote omitted).

In-Flight Phone Corporation further notes that other services under consideration by the Commission (it cites wireless local loop service and unlicensed PCS as examples) are not compatible with co-channel amateur operation.

15. The League recognizes that In-Flight Phone has taken serious consideration, almost alone among the commenters proposing specific additional uses of the reallocated spectrum, of compatibility with continued amateur operation at 2390-2400 MHz. Subject to review of an engineering proposal with a comprehensive analysis of interference parameters, given proposed power levels and noise levels beyond line-of-sight transmission paths, the League would not oppose a co-primary allocation arrangement with AAVS systems at 2390-2400 MHz. Such concurrence would be conditioned upon coupling this with a primary amateur allocation at 2300-2310 MHz and 2400-2417 MHz. A further condition would be that technical rules for operation of AAVS at 2390-2400 MHz must include a prior coordination requirement between amateurs and AAVS licensees relative to site selection, channel selection, and power and antenna configurations of AAVS systems to protect existing and future amateur fixed links at 2390-2400 MHz.

16. An additional utility and benefit of a shared, co-primary allocation for Amateurs and AAVS at 2390-2400 MHz, vice any other additional user, is that it provides separation between the

sensitive amateur operation now centered at 2304 MHz, for weak-signal uses, including propagation research, and fixed links operating in other portions of the 2300-2310 MHz segment. The proposals for pairing 2300-2310 MHz with 2390-2400 MHz for any additional uses would severely disrupt existing amateur fixed control and auxiliary links now operating in both segments, but also 2390-2400 MHz high-rate data, packet data, FM repeaters, AM television operation (centered at 2390-2396 MHz). Such pairing would also completely preclude any amateur narrowband operation at 2300-2310 MHz. That result would be completely at odds with Congressional intent, and the Commission has already concluded as much.¹¹ The same conclusions were drawn by NABER and the Forestry Conservation Communications Association in comments filed with NTIA in response to the NTIA's Preliminary Spectrum Reallocation Report.¹²

¹¹ See the "Report From The Federal Communications Commission To Ronald H. Brown, Secretary, U.S. Department Of Commerce, Regarding The Preliminary Spectrum Allocation Report", FCC 940213, released August 9, 1994. The Commission stated, with respect to both the 2300-2310 MHz and 2390-2400 MHz segments:

The largest factor affecting use of these bands is their existing availability for use by the Amateur Service (footnote omitted). Congress specifically sought to avoid disruption of existing use of Federal Government frequencies by amateur radio licensees (footnote omitted). We agree with commenters that there is a substantial likelihood that reallocation of the 2300-2310 MHz or the 2390-2400 MHz bands to commercial or local government use could cause serious disruption to Amateur service use of these bands.

¹² NABER stated that existing uses of the 2390-2400 MHz band will make "commercial sharing with the amateur service ... difficult." The comments of the Forestry Conservation Communications Association stated that the spectrum in the 2.4 GHz

17. Apple Computer is another commenter which has attempted to take into account the needs and interests of the Amateur Service in formulating its proposed use of the band. It has also considered secondary implications of additional uses of the 2390-2400 MHz segment on the 2300-2310 MHz and 2402-2417 MHz segments as well. Apple, in urging that new Data-PCS services be permitted at 2390-2400 MHz, shared only with the Amateur Service, states as follows:

As discussed above, the 2390-2400 MHz band is currently allocated only for the amateur service, a status that the Commission is calling into question in the NPRM. Similarly, the next increment of spectrum to be turned over for the private sector by January 1, 1996 is expected to include the 2300-23[1]0 MHz amateur-only band. Both of these bands, as well as the 2400-2450 MHz bands, are considered parts of the "13 cm" bands.

Each of these bands, and others in the amateur service, are essential components of a set of band segments extending through much of the radio spectrum. Each amateur band has certain characteristic attributes, in permitted signaling, in available bandwidth and in propagation, that allow hams to experiment, develop and use it appropriately for those band-specific attributes. Any change in status of one band can affect other amateur bands. In the past, the Commission has made allocation decisions affecting a single amateur band without addressing these secondary effects, resulting in an overall pattern of diminishing the spectrum available for the amateur service.

The 2300-2310 and 2390-2400 MHz bands could be a case in point, but the Commission can and should act otherwise in conjunction with the present proceeding (footnote omitted).

Apple suggests, to provide for further amateur activities, and to "forestall repetition of the current process whereby many parties

range entails a "danger of RF interference..." which will "restrict the usefulness of the band" and that "(s)econdary amateur use may also be a problem because of the difficulty of identifying sources of interference."

contend for the amateur spectrum, the Commission should make a package of coordinated decisions now...". These include (1) retention of the entire 2390-2450 MHz band to the Amateur Service, affirming that no primary services will be licensed, auctioned or otherwise, in the 2400-2483.5 MHz band; (2) increasing that allocation to extend over the balance of the Part 15 band at 2450-2483.5 MHz, with the full understanding by all parties that the increased allocation is applicable only domestically and thus is not suited for the Amateur-Satellite Service; (3) allocate the 2390-2400 MHz band to the most compatible sharing partner with the Amateur Radio Service, which Apple claims is a low-power Part 15 Data-PCS service, secondary to the Amateur Service; and (4) Declare that the 2300-2310 MHz band will maintain an amateur-exclusive status and will not be considered for reallocation after the band is released by the Federal Government.

18. The League tentatively supports Apple's plan, which provides a reasonable proposal for additional use of the 2390-2400 MHz band, when coupled with the comprehensive plan for amateur exclusive use of 2300-2310 MHz and primary use of 2400-2450 MHz. It would appear, from Apple's description of the Part 15 Data-PCS service, that there is compatibility between the Part 15 Data-PCS use and continued amateur use of that segment.¹³ The League would

¹³ According to Apple, the "scales will be tipped" in favor of the amateur licensee. The rules adopted for asynchronous unlicensed Data-PCS would limit emissions to under a watt. According to §15.319(c), (d) and (e), peak transmit power is limited to 100 μ W multiplied by the square root of the emission bandwidth in hertz. For example, a 100 kHz data signal would be permitted 32 mW, a 1 MHz signal 100 mW, and a 10 MHz signal 316 mW output.

be interested in determining the interference potential of Data-PCS transmitters in the aggregate, rather than considering each transmitter as a point-source radiator (which of course they are not), especially in residential areas. Apple proposes a coordinated use of 2390-2400 MHz, however, and, as part of Apple's comprehensive allocation plan, the League suggests that coordinated operation may well be possible.

IV. The Comments Almost Unanimously Support The Status Quo at 2402-2417 MHz

19. Almost without exception, the comments suggest that no additional users should be allowed at 2402-2417 MHz. The comments of IBM are typical of Part 15 manufacturers and users' comments, and others, which indicate that there is no additional use to be made of the 2402-2417 MHz band, save for Amateur, Part 15 and Part 18 operation. Those comments, and others, focus on the 2400-2483.5 MHz segment for use by Part 15 devices, noting correctly that the Commission has led the Part 15 manufacturers to design and market products for that band especially. There is no indication in any of the comments that continued Amateur use of that band has been or is incompatible with Part 15 operation there. The comments of IEEE 802, the LAN MAN standards committee, note that it has developed a standard for computer data adhering to the Commission's Rules (47 C.F.R. §15.247), and that comparable rules for such operation exist in more than 40 other countries. The Committee selected the band for spread spectrum devices because of its ready availability throughout the world for non-licensed devices. Adding new users in

the band would jeopardize the world market for the devices, the IEEE standard, and the existing use of Part 15 devices now being marketed for use in that band. It would also damage the companies that have relied on the continued availability of the band since the Commission's rewrite of the Part 15 rules a scant 5 years ago.

20. There is no comment which suggests that Amateurs should not have a continued allocation in the 2402-2417 MHz band. Rather, while attempting to create an allocation status for Part 15 devices, commenters suggest that sharing partners with Part 15 devices be made "co-primary" in the segment.¹⁴ Indeed, this is a de facto recognition of the fact that the Omnibus Budget Reconciliation Act plainly gives the Commission the authority to allocate the band to a service already operating there, rather than requiring the agency to allocate the band to a new use. Thus, 47 U.S.C. §923(a)(3) requires only that the Secretary of Commerce identify spectrum that "can feasibly be made available...for use under the 1934 Act." As Part 15 devices have no allocation status, the Amateur allocation should be made primary, and no other allocation should be made in that segment, due to incompatibility between commercial or private services on the one hand, and continued Amateur and Part 15 use of the band on the other.

21. The other use made of the segment 2400-2483.5 MHz is for ISM devices centered at 2450 MHz. The comments of Fusion Systems Corporation sound an appropriate caution with respect to any potential additional uses of the 2402-2417 MHz segment. Fusion

¹⁴ See, e.g. the comments of AT&T Corp., at 2.

makes industrial equipment using the entire 100 MHz centered at 2450 MHz. It states, in part:

"...any secondary usage in or around the 2450 MHz band must be able to withstand interference in-band, and must co-exist with ISM operations out of band. Because it is so difficult to predict the future environments and useful applications of ISM technologies, Fusion urges the Commission and the Department of Commerce to look elsewhere for new spectrum allocations for developing mobile and fixed service technologies.

Fusion urges the Commission to avoid allocating any of the 2450 MHz band to developing services that are not fully capable of co-existing on a secondary basis to ISM applications in both industrial and residential environments. Proposals, mentioned in the Notice, to use the 2402-2417 MHz band for such technologies as mobile satellite, wide area networking and even in-building voice and data would appear to be incompatible with widespread ISM applications. In addition, private radio proposals risk the real possibility of suffering unacceptable levels of interference from ISM equipment...For these reasons, Fusion believes the better approach is for the Commission to leave the ISM band allocations as they exist and utilize other spectrum from the Federal Government for use by emerging technologies.

Fusion comments, at 1,4 (emphasis in original)

The League notes that radio amateurs can successfully make use of the ISM allocation, given the flexibility that is an attribute of the Service. It is not an attribute which is shared with commercial or private radio services. The commenters thus agree with the Commission that any additional allocation of the 2402-2417 MHz band is a bad idea, and that any additional uses "could jeopardize significant private sector investments already made in this band and could result in a loss of benefits to the public and the Federal Government."¹⁵

¹⁵ See the Notice, at pp. 23, 31.

22. The comments of the Radio Amateur Satellite Corporation (AMSAT) note the increasing importance of the 2400-2450 MHz band for amateur satellite operation. Indeed, use of directional antennas for satellite reception minimizes noise from terrestrial sources, and facilitates amateur compatibility with Part 15 and 18 devices in the band. The comments of AMSAT specifically note the technical incompatibility between commercial and private radio users on the one hand and Part 15 and 18 users on the other.

V. The Highest and Best Use of the 2300-2310 MHz and 2390-2400 MHz Segments is for Amateur Use on a Primary Basis

23. The comments of Motorola, which urged the use of 2300-2310 MHz and 2390-2400 MHz for private mobile systems on a paired basis, nonetheless admit that the noise splatter from the 2400-2483.5 MHz ISM band (caused primarily by microwave ovens, high-efficiency lighting devices, and industrial heaters) could increase the noise floor in the 2390-2400 MHz band by 6 dB or more. Thus, the area covered by mobile wireless systems would be decreased by a factor of 2. Clearly, Motorola notes, other bands would be preferable for mobile systems, such as the 380-400 MHz and 1710-1760 MHz bands. Motorola does, however, grudgingly indicate that it would accept use of the 2300-2310 and 2390-2400 MHz segments for private land mobile use. However, in Motorola's comments filed in response to the Notice of Inquiry in this proceeding, Motorola stated that the 2390-2417 MHz segments do not offer any spectrum that would provide immediate benefits to the traditional land mobile user community. Nothing has occurred in the interim to validate Motorola's half-