ORIGINAL

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules to	)	ET Docket No. 96-102/FCC 96-193
Provide for Unlicensed NII/SUPERNet	)	RM-8648
Operations in the 5 GHz Frequency Range	)	RM-8653

To: Mr. William F. Caton
Acting Secretary
Federal Communications Commission
Washington D.C. 20554

Reply Comments of

The San Bernardino Microwave Society

In Response to FCC ET Docket No. 96-102/FCC 96-193

From: Larry Johnston,
Corresponding Secretary
San Bernardino Microwave Society
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August 13, 1996

Reply Comments of

The San Bernardino Microwave Society

In Response to FCC ET Docket No. 96-102/FCC 96-193

By the Membership:

In Review

1. In comments filed to the above referenced Notice of Proposed Rule Making, the San Bernardino Microwave Society summarized its opposition to a proposed amendment of the Federal Communications Commission rules, specifically changes to part 15, which would allow a new unlicensed radio service to share spectrum with the Amateur service in the 5 GHz range. We stated that we are opposed to these proposed rule changes for the following reasons:

a) Proposed rule changes would eliminate long established protection of incumbent Amateur users of affected portions of the 5 GHz Amateur band.

b) Over time, the proposed rules would render a substantial portion of the Amateur 5 GHz band unusable in most geographic areas.

c) There are no alternative avenues presented as to how incumbent Amateur users of the affected 5 GHz band will be protected from interference caused by the proposed new service.

d) The proposed new rule section 15.409 (a) appears to be in conflict with the universally recognized interference protection of current rule section 15.5 (b).

Introduction

2. In its comments to the above referenced Notice of Proposed Rule Making, the San Bernardino Microwave Society (SBMS or the Society) made technical arguments in opposition to the proposed rule changes affecting portions of the Amateur 5 cm band. We believe that the technical arguments we have presented accurately and realistically forecast the situation that will be created if the proposed rules are codified.

3. We note that there were approximately 50 sets of comments received by the Federal Communications Commission (FCC or the Commission) representing both those in favor and in opposition to the creation of the proposed new service. We take this opportunity to reply only to the comments of a few organizations who we feel are central to both sides of this issue[1].

Reply Comments

4. We first wish to reply to the comments made by The American Radio Relay League[2] (the League). We feel that the League, through its comments filed to the original petition as well as this NPRM, has thoroughly covered the legal issues associated with this proposed new service.

5. Of specific interest, at paragraph 2 in its comments filed to this NPRM, the League states:

> "The Apple petition, when filed, was woefully incomplete in terms of technical specifications and sharing studies relative to incumbent users" ... "The petition is rife with glowing predictions of universal access by the public for whatever communications purposes are desired, but it contains no real information about the possibility of coordination of use between and among inter-service users".

We whole-heartedly agree with this statement. Not only was the Apple petition void of any supporting technical documentation, it also made no attempt to resolve the issue of how the proposed new service would protect or impact incumbent Amateur uses.

6. While we concur with and support the legal arguments put forth by the League, we must, however, take exception to the conclusion reached by the League at 17:

> "Should the Commission decide nonetheless to permit NII/SUPERNet devices in the upper segment as well as the lower, the League suggests that the Commission's proposed technical operational rules and interference avoidance criteria, only if taken together (and if strictly enforced), might be sufficient to avoid widespread interference to Amateur communications".

As we pointed out in our comments at 9:

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[1] Being non-commercial in nature, we lack the professional and monetary resources that are available to virtually all of the other commercial and educational commenters. We, therefore, can not respond to the comments made by most of the organizations who filed in this issue simply because we can not afford to obtain copies of their filings.

[2] 225 Main Street, Newington, CT 06111

"(And) in Appendix A at section 15.409, the Commission proposes to add the following rule revision: *(a) NII/SUPERNet devices will not be deemed to cause harmful interference to licensed services provided the devices operate in accordance with the output power, out-of-band emissions limits and spectrum etiquette requirement of this subpart and provided the devices are located indoors or employ an outdoor antenna that is mounted no more that 15 meters above ground."*

If this rule section is codified as it appears above, the opportunity for enforcement for what would presently be a violation of part 15 rules suddenly becomes moot[3]. Under these proposed rules, licensed Amateur stations (or part 15 stations for that matter) operating in the vicinity of a NII/SUPERNet network must accept any and all interference if the network devices (transmitters) are operated in accordance with the proposed rules. If a NII/SUPERNet device is suspected of being operated outside of its codified parameters, the burden of proof in support of a claim of harmful interference is borne by the Amateur. For this reason, we must respectfully disagree with the conclusion reached by the League that proposed rules "might be sufficient to avoid widespread interference"[4]. If an Amateur station receives interference under the proposed rules, the Amateur station has no choice but to tolerate the interference or vacate the affected band segment.

7. We are not the only Amateur organization that feels this way. In its comments towards the petitions, SCRRBA concludes[5] on page 10:

"The petition has merits and flaws. We believe we [SCRRBA] have pointed out many of the flaws. The basic concept is of sufficient merit that further consideration should occur. We believe that the request for spectrum for the "NII Band" can be satisfied without destroying the Amateur usage of the 5.6 GHz band. We believe that a completely unregulated unlicensed "freeband" is NOT in the public interest. An unlicensed digital radio service may well

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[3] We remind the reader that the Commission is the last resort for the Amateur to request enforcement help or action in an interference matter. Amateurs universally exercise every resource available to them prior to requesting help from the Commission field offices or the Washington, D. C. headquarters.

[4] Just one example of a potential situation under which an Amateur might need to invoke the present part 15 rules would be if a part 15 device interferes with the long-established weak signal band segment around 5.760 GHz. As we have stated previously, the no-fault interference protection concept, proposed to be incorporated into the part 15 rules to protect the proposed NII/SUPERNet devices from claims of interference effectively lowers the standing of the Amateur Service to secondary to part 15 in the affected band segment.

[5] The Southern California Repeater and Remote Base Association, PO Box 5967, Pasadena, CA 91117, the frequency coordinator for the southern California VHF, UHF and SHF bands (excluding the 2 M and 1.75 M bands), and in particular the 5 cm band. SCRRBA performs frequency coordination in accord with band plans drawn up by the Amateur community utilizing each band. It is this band plan which southern California Amateurs follow while operating within the 5 cm Amateur band. We have enclosed a copy of their comments to the original petition for the readers reference. Please note that the SCRRBA comments have a copy of the current southern California 5 cm band plan attached which shows the incumbent uses of the affected spectrum.

> be in the public interest, but it should not be allowed without sufficient safeguards to protect the existing spectrum users, the adjacent spectrum users and the end purchaser of the equipment. We believe this can be accomplished without undue regulation. We note that when the end user is unlicensed, such user does not take on any of the technical burden of responsible use of the spectrum. This burden is shifted to the equipment manufacturers. Commission oversight is required to insure that this burden is properly supported, and that the manufactured equipment is a responsible user of the spectrum. This oversight is usually in the form of technical regulations and may take the form of requiring type acceptance. We feel that the type acceptance process is likely to be the proper method of insuring that the regulations designed to protect the "public good" are actually being observed".

Just as we fully supported the League's legal arguments above, we also stand behind SCRRBA's technical comments and conclusion.

8. Additionally, we would like to respond to several statements made by Apple Computer Inc. (Apple) in their comments towards this NPRM. On page 16, Apple states:

> "The Commission must satisfy the legitimate concerns among other present and authorized users of the frequencies proposed for NII/SUPERNet applications, to insure their continued, unimpaired operation. For any solution to be acceptable, it has to be conservative, straightforward, rational and recognize the higher rights of licensees to use the band. Now that the commission has identified the frequencies for the NII/SUPERNet band and suggested some technical characteristics of the technologies that will be permitted to use the band, the Commission can weigh sharing and interference potentials generally, without waiting for exhaustive evidence proving compatibility or incompatibility among types of old and new users."

And at page 22:

> "In addition to the recognized value of Amateur service allocations in general, an overall trend of Amateur service operations is to explore and use even higher frequencies such as the 5 cm band. Apple's proposal involves only low-power devices in only part of the Amateur band, which already is available for very similar (or, in some cases, more intrusive) technologies."

The former statement only goes to support the League's contention that Apple has not supplied data relative to or conducted any studies of compatibility between the proposed new service and the incumbent uses/users of the Amateur 5 cm allocation. We have supplied technical arguments showing that there are serious compatibility issues. We are

not asking for "exhaustive evidence" to be presented, we are simply asking for Apple to support its claims of compatibility with technical facts. Additionally, Apple does not address the specific issue of how to share with incumbent uses such as the internationally recognized Amateur weak-signal band surrounding 5.760 GHz.

9. Apple states that a "conservative" sharing approach, coupled with "low- power" devices will equal compatibility with existing Amateur users. In its summary at the second page 2, and repeated again at page 8, Apple states:

> "Apple, however, believes that the Commission took an overly conservative approach on the maximum power level permitted for all NII/SUPERNet devices. Apple recommends a transmitter power of .1 watt (+20 dBm) and .316 watts (+25 dBm) for personal/portable and fixed equipment, respectively, with, of course, the proviso that the antenna gain not be restricted for point-to-point, fixed outdoor links."

We must ask Apple, with our tongues in cheek, which side of conservative is the Amateur service on? On a more serious note, Radio Amateurs operating in the microwave bands have communicated for world record distances with power levels significantly lower than those proposed by Apple.

10. Finally, we wish to respond to the almost universal statement from supporters that the proposed NII/SUPERNet band will be of some universal benefit to the American people[6]. We do not wish to argue whether or not the proposed new service has public benefit, the proponents certainly have argued heavily that such benefit might exist. What we do wish to reply to here is whether the proposed new service should be given a preferred status and standing within the Amateur 5 cm allocation, and that this preferred status represents a better "value" to the American People than the opportunities provided by Amateur radio[7]. To this end, we present the following:

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[6] Comments filed by WINFORUM and Apple Computer summarized in the NPRM at (2).

[7] As an example, Apple Computer Inc, one of the original petitioners, alludes to the creation of jobs, economic stimulus and worldwide competition (NPRM at 2). We find their claim (as paraphrased in the NPRM) to be rather optimistic when viewed in light of the current economic status of Apple. The San Francisco Chronicle reports that Apple is currently in the process of laying off about 16% of its workforce because of lagging sales and poor profit margins, actions that are ongoing since their petition was filed over one year ago. It would appear that Apple is asking the Commission to take their word that this proposed new service will be profitable for America and Americans while Apple Computer is laying off these same American workers. Has Apple demonstrated to the Commission that they have sufficiently explored production and marketing of applicable new products? Our hope is that they are prepared to bring them to market in a timely manner and are not just speculating on spectrum like the United Parcel Service request for portions of the Amateur 220 MHz band almost a decade ago.

* * * * *

What is the Value of Amateur Radio to the American People?

Recently, radio spectrum allocated to the Amateur Radio Service for many years has become desirable for other communications services. This spectrum, mainly confined to the microwave bands, was once considered to be commercially unviable for communications use by American business, industry, education or the general public. This paper identifies the value of Amateur Radio and clarifies the public benefit issue from the perspective of Amateur Radio.

11. It is proper to start at the beginning. Just after the close of World War II, Radio Amateurs were given frequency band allocations in what is loosely called the microwave bands. Following the creation of these bands, a number of Amateur groups and individual Amateurs around the United States went to work developing practical microwave communications systems. These Amateur microwave pioneers used the technology and materials available to them at each stage of hardware development. Over the next fifty years, Radio Amateurs have fulfilled their obligation to the Amateur Radio Service by populating the allocated microwave bands and sharing what they have learned with others, both inside and outside of the Amateur Service.

12. What is the obligation of the Amateur operator to the American People? It is probably best spelled out by the Communication's rules under which the Amateur service is sanctioned. Appropriate rule sections are reviewed below:

97.1 Basis and purpose.

The rules and regulations in this part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:

(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary non-commercial communications service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

(c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communications and technical phases of the art.

(d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians and electronics experts.

(e) Continuation and extension of the amateur's unique ability to enhance international goodwill.

97.3 Definitions

(4) *Amateur service.* A radio communication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

13. We state here that it is clear from these rules and definitions that Radio Amateurs in the United States have and are upholding the responsibility entrusted to them through the Amateur Service.

14. During the quiet times between emergencies or major disasters, Radio Amateurs simply become "Ham operators" who go about the activities associated with this radio service. Everybody knows a "Ham"; He or she may be a friend or relative, or that person who lives up the street with the B-I-G antenna in his yard. Unfortunately, the electronic and print media rarely cover this part of Amateur radio, leaving word-of-mouth and Amateur-specific periodicals[8] as the only ways of sharing day-to-day Amateur Radio activities with the American public.

15. In times of emergency, however, Amateur Radio is frequently featured in the electronic media. No matter what the emergency or disaster is, Amateur reports pertaining to the severity of the situation and how human life has been impacted are routinely shown or quoted. For those affected by the disaster, services provided by Amateur operators can protect lives and property or provide peace of mind to loved ones far away. For the distant observer, the role of the Amateur may only appear as a flash of video or sound-bite in a news story covering the event. Other than technical accounts of how Amateur Radio was used during a disaster published in Amateur periodicals, the Amateur operator rarely receives (or desires to receive) any significant public recognition of his or her efforts.

16. The public perception of Amateur Radio typically is that it is just a hobby. We contend that it is a personal choice of each individual Amateur as to whether he or she treats the Amateur service as hobby or avocation. It should be noted that the word hobby does not appear anywhere in the rules that create and govern the Amateur Radio Service[9]. In its codified definition of "Amateur Service" the FCC refers to Amateurs as "duly

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[8] These accounts of Amateur activity, and specifically activities of public benefit, can be found in abundance within the pages of the Amateur periodicals like QST Magazine, CQ Magazine, 73 Magazine, Etc. The newsletters of Amateur Radio clubs and organizations from around the country and around the world are filled with similar and more detailed information.

[9] The first definition of "amateur" in Webster's dictionary is "devotee and admirer", from the Latin word *amator* meaning "lover". From our experience, Amateur radio has many *lovers* and people who have *devoted* their lives to this radio service. Amateur radio also includes those who fit the Webster's second definition: "one who engages in a pursuit, study, science or sport as a pastime rather than a profession".

authorized persons interested in radio technique". As you have read in the rule sections above, the Amateur service is directed by the FCC to be comprised of all levels of operational and technical competence. Yes, there are *amateurs* at radio communications within its ranks, but there are also highly dedicated journeymen who fulfill roles within the Amateur Service as experienced teachers and leaders. We prefer to view Amateur radio as a pool of *reserve communications operators and technicians*, a purpose that is clearly spelled out in the Amateur Service rules

17. What sets Amateur Radio apart from the *commercial services* is the fact that Radio Amateurs must not profit from or charge for the services that they provide. In order for an Amateur to prepare him or herself to responsibly respond to any public crisis, they *must* do the following:

> 1. Have a desire to learn about communications and communications technique.
>
> 2. Pass exams that demonstrate an understanding of the FCC rules as well as the technical requirements associated with effective communications. This is a prerequisite to the mandatory authorization (license) required before transmitting within the bands assigned to the Amateur Service.
>
> 3. Assemble, optimize and operate an Amateur Radio station or stations so as to become technically and operationally proficient at radio communications and techniques.
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> 4. Continuously practice using and mastering technical and operational skills through drills and general operating activities so as to be prepared and available when called upon to serve.
>
> 5. Respond to the needs of the general public when communications services are needed.
>
> 6. Share their acquired knowledge, skills and time so that others will have the opportunity to learn and master communications techniques.

18. As indicated in the FCC rules above, ***the Radio Amateur must do all of these things with his or her own resources, specifically monetary resources, and may not charge the American public for these services.*** In fact, Radio Amateurs are forbidden to recover the cost for services supplied to the American Public. This is a very important point[10].

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[10] We estimate that it typically costs the Amateur in excess of $1,000 to license, assemble and operate his or her first station. The highly complex equipment required to take advantage of the Amateur microwave bands is a substantially greater investment in time and money primarily because there is precious little equipment manufactured for the Amateur microwave bands. Most of the Amateur microwave equipment

19. Recent proposals for new radio services to share the Amateur microwave bands or to entirely displace Amateurs from some bands all are commercial in nature. Compared to the services provided for free by Radio Amateurs, the American people will have to pay for the proposed new services as follows:

a. The American public will have to buy the hardware necessary to participate in the proposed new service, a fact that is supported by proponents stated claims that new communications services will mean new jobs and economic stimulation[11]. Costs for such equipment and systems may be born either directly by the American public or indirectly through the Federal, state or local tax structure, or through higher costs for public services which are to benefit through the use of the proposed new service.

b. As above, the American public may be required to pay access charges associated with the proposed new services or ancillary services[12].

c. As above, the American public will be required to pay maintenance charges associated with the ongoing maintenance of the proposed new equipment.

d. Finally, the American public will be required to pay for the cost of educating Americans in the use, operation and maintenance of the proposed new systems[13].

20. Amateurs have been active on the microwave bands for fifty years now, contributing to the development of current microwave technologies; The same

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in use today is either entirely home built or converted from equipment operating in adjacent commercial bands.

[11] We find such a statement quite concerning. In all probability this equipment will be manufactured off-shore and marketed through existing wholesale/retail outlets as accessories to computer systems. This is supported in Apple Computer's comments at page 9 "degree of complexity (from blister-packed complete system to individual networks)". Since this marketing infrastructure currently exists, where will all of the new jobs be? The only people who will profit financially are those who wholesale or retail this proposed new equipment, or entrepreneurs who might construct advanced networks operated on a for-profit basis.

[12] We are unaware of any commitment made by the petitioners that this proposed new service would be operated without charge to the American public. Operators of each network may need to charge access fees to recover costs of operation. The opportunity for an entrepreneur to construct and operate for-profit the backbone of such networks exists. In any case, the end user/subscriber will be burdened with these costs whether the costs is included with the price of the hardware itself or for access/subscriber fees associated with each network.

[13] The reader is cautioned not to misinterpret this discussion as being critical of the public benefits of any of the proposed new services. Any responsible Amateur must help to promote the state-of-the-art wherever advances occur. We are compelled, though, to ask who will ultimately pay the costs associated with the construction and operation of the proposed new systems? The answer is obvious. These thoughts are supported by the Apple comments at page 26.

technologies which now make commercial uses of microwave bands feasible. Until recent advances in manufacturing and technology, there was no interest in the microwave bands from a commercial perspective.

21. The question here is; *How to fairly and responsibly balance the needs of the American people between a new and unproved commercial service and an existing non-commercial service with a long proud history.* None of the supporters of the proposed new services have stated the following: In time of emergency, they will respond to the needs of the American public and set up and operate dynamic communications networks with trained/experienced operators, all totally without charge. Yet in all cases, they are asking for amendments to the FCC rules that will immediately or within a short period of time seriously limit the effectiveness of Radio Amateurs to perform these exact tasks!

22. From the perspective of spectrum planning and usage, Radio Amateurs are in a very difficult position. We can not justify our spectral needs on a commercial basis, though we are expected to fulfill our obligations as Amateurs with an ever-increasing demand placed upon our spectrum resources; Demands from an expanding Amateur population and the subsequent spectrum usage coupled with an outside demand for spectrum for commercial uses. How can Amateur Radio can plan for its own future when its frequency bands, microwave bands in this case, can not be depended upon to be available over the long-term? Given the state of band crowding that exists on virtually all of the HF, VHF and UHF bands, the microwave bands are a necessary resource to the Radio Amateur. The microwave bands are being used today in a number of important ways; Linking of urban areas for voice, data, etc; Satellite/Space communications; Weak signal, Earth-moon-Earth; Data; Video; Experimentation and education. Their most important use is, however, the relief of crowding in the lower bands[14].

23. When an outside need alters the status-quo of an Amateur band, it places an economic burden on all users of the band, both existing and those preparing for implementation of new systems. Even though the Amateur service is a non-commercial service by design, it is asked to absorb totally the costs of relocating or altogether discontinuing operation in a threatened band. No potential new user has ever made an offer of economic reimbursement for cost associated with relocation of existing Amateur equipment[15].

24. Though we are not the only service to have suffered with band re-alignment, Amateur Radio has recently become a prime target for such activity[16]. Since Amateur

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[14] The reader is again referred to the comment to the original petition by SCRRBA, attached.

[15] Though the Commission has required reimbursement of displaced users in a number of bands where a new commercial service was created in a band previously occupied by incompatible incumbent (non-Amateur) users/uses.

[16] What makes this problem worse is that the band segments eyed by proposed new outside commercial uses are the center of long-time existing Amateur uses. This is true for both the Amateur 5 cm and 13 cm bands, where in each case the long-established worldwide weak-signal band segments are threatened by

Radio can not be commercial in nature, we lack the ability to effectively fight within the political arena. We are handicapped by the very rules from which we draw our existence. All Radio Amateurs depend heavily on the FCC to protect their interests by "Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communications and technical phases of the art". The erosion of any amateur band is contrary to the future growth of Amateur radio, the current Amateur's ability to respond to the needs of the American people and the morale of the devoted Amateur.

25. From the perspective of the Radio Amateur, a greater benefit exists to the American public through Amateur Radio. This benefit comes in two forms, one of which is the availability of a trained team of prepared communications experts to respond to emergencies and the other is the lack of dependence upon the tax base to support it.

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either re-allocation or re-alignment of band usage priorities. In both cases, other long-established Amateur uses are affected as well.

Conclusion

26. As stated in our original comments, we are disheartened by the thought of any additional unlicensed transmitters operating within the Amateur 5 cm band. The proposed part 15 rule amendments to support the NII/SUPERNet, specifically the no-fault interference clause, is most alarming. The Commission's rules clearly protect the Amateur 5 cm allocation from interference caused by currently authorized part 15 devices operating within the band segment of 5.725 to 5.875 GHz. The proposed no-fault section to be added to part 15 rules completely removes Amateur protection from these devices.

27. Also as stated previously, the Society is unaware of any instance where the part 15 rules have been formally invoked to resolve an interference issue with any properly operating part 15 device. Radio Amateurs as a fraternity would prefer to exhaust all alternative solutions to such a problem before exercising the protections guaranteed in 15.5 (b). This protection is extremely important to Amateur radio operators because it clearly establishes priorities of communications within the Amateur allocations shared by part 15 devices.

28. The new proposed rule section 15.409 (a) quoted at (6) above removes such protection from the Amateur service. If and when this new NII/SUPERNet service is created under the existing part 15 rules, it will only be a matter of time before these devices begin to be utilized. **For this reason we must respectfully state that we are strongly opposed to section 15.409 (a) of the instant docket, or any derivative thereof, that will degrade the usefulness of the Amateur allocation at 5 cm.**

29. Again, as stated previously, the proposal of limiting transmitter power to 0.1 Watts appears tolerable when coupled with the existing part 15 rules. Under the proposed no-fault interference rules, any useful power level will be harmful to Amateur operations. An omni-directional antenna meeting the proposed 15 meter rule with a gain of 10 or more dB produces an ERP of 1 or more Watts. There is no conceivable way that these stations will not cause harmful interference to existing Amateur operations, and the no-fault interference rule leaves Amateurs no choice but to either tolerate the interference or vacate the affected spectrum.

30. The Commissions additional consideration of allowing 1 Watt output power transmitters operating into omni-directional antennas spread throughout American cities will certainly end Amateur operations in the affected sub-band. **We again must respectfully state that we are opposed to this higher output power level as it will further degrade the usefulness of the Amateur allocation at 5 cm beyond what will occur at the currently proposed power level of 0.1 Watt.**

31. Finally, we must object to proposed section 15.409 (a), the "no-fault" interference rule, because it is in direct conflict with long established part 15 rules. This conflict presents the Amateur community with a two-headed dilemma:

> (I) The proposed new rule section eliminates a long-established hierarchy under which the manufacturers and users of part 15 devices had a clear understanding of the responsibilities associated with owning and operating these devices. This gave Amateur operators a clear path towards resolution of an interference problem in the unlikely event that an affected Amateur stations might need outside help (from the Commission and only as a last resort) in resolving an interference problem.
>
> (II) The proposed new rule section may be perceived as a signal to manufacturers and users of part 15 devices, specifically those authorized in the Amateur 33 and 13 cm allocations, that the Commission may also be willing to relax the part 15 rules for these bands. The application of this same philosophy to other part 15 allocations that share spectrum with the Amateur Service will have the same disastrous effect. In time, it will render those bands, where the no-fault interference rules are applied, to be utterly useless to the Amateur service.

32. We therefore urge the Commission to vacate the no-fault interference protection of proposed rule section 15.409 (a) as it erodes section 97.1:

> (c) *"Encouragement and improvement of the amateur service through rules which provide for advancing skills* [such as microwave skills] *in both the communications and technical phases of the art".*

33. The Society wishes to thank the Federal Communications Commission and staff for allowing us this opportunity to present reply comments to this issue. The Amateur community depends heavily on the Commission to protect our interests in this matter. We therefore ask the Commission to help protect, maintain and insure the usefulness of the Amateur 5 cm allocation for current and future Amateurs alike.

For the membership,
Frank Kelly, President
San Bernardino Microwave Society

Attachment: SCRRBA Filing to the Original Petitions
SCRRBA Southern California Band Plan

Certificate of Service

The SBMS certifies that copies of its comments have been forwarded by first-class mail to the organizations listed below:

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Copies of our reply comments were served via first class mail to these organizations by:

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SCRRBA

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In the Matter Of:

Allocation of Spectrum in the 5GHz Band to Establish a Wireless Component of the National Information Infrastructure

RM-8653

Re: Comments of the Southern California Repeater and Remote Base Association on the Petition for Rulemaking by Apple Computers to re-allocate portions of the 5.7GHz band to a new "Part 16" unlicensed radio service.

July 08, 1995

The Southern California Repeater and Remote Base Association (SCRRBA) is a voluntary association of owners and operators of Amateur Radio Service fixed and mobile relay stations operating primarily on the UHF and Microwave Frequency amateur bands. SCRRBA has provided frequency coordination for these activities since 1970. SCRRBA has actively participated in numerous Federal Communications Commission rule making proceedings pertinent to our activities.

SCRRBA currently maintains over 2,100 frequency coordination records. These data represent the activities of approximately 600 relay type amateur radio systems in Southern California. All of these systems operate on the UHF (420 MHz) and higher amateur frequency bands. These systems each have an average membership of about 60 amateurs. The largest of these systems has a membership exceeding 1,400.

SCRRBA is an active participant (usually the sponsor) in the amateur band planning process. We represent the fixed and mobile relay interests in regional band planning meetings. These meetings occur when the existing plans do not cover a desired activity, or when they need to be upgraded to match new or increased activities. These meetings are attended by representatives of ALL the amateur uses of the band. These band plans are adopted by unanimous consent of these representatives. These band plans cover activity in the Southern California region. In 1992, we met and developed a new set of band plans for the 5.6 GHz and other microwave amateur bands. Whenever we adopt a new band plan for our region, we submit it to the American Radio Relay League, Inc. (ARRL) to be included in national band planning efforts.

The members of SCRRBA are clubs and individual amateurs who construct and operate mobile and fixed relay amateur systems. These systems generally are available for normal operation 24 hours a day. Their fixed relay equipment is generally constructed and operated to provide a communications (and data) link between fixed points. The points of communication for these fixed relay stations do not change in the normal course of system operation. The typical systems are constructed with equipment manufactured for the commercial communications industry. This equipment is then modified for operation in the amateur band, and generally improved with devices developed experimentally. Our members use tools and equipment developed from a variety of sources. The experimenter amateurs (see San Bernardino Microwave Society) often develop techniques and devices that can be adapted for use on our mobile relay and fixed relay systems. These modifications result in system performance far above that of the original equipment.

Systems developed by our members are generally used for continuous on-going daily communications rather than the intermittent or random nature of HF communications more often associated with Amateur Radio operations. Various types of communications and control data are sent over these systems. The members of most systems are "control" operators who are able to configure their

system to meet any particular operational need. The control systems built to do this are all of amateur design and manufacture. There are no commercial equivalents that could be adapted to our needs. These systems can become quite sophisticated and complex. The experience we gain building and operating these systems allow us to have communications tools far superior to and far more flexible than any commercial system could ever be. We have the communications equipment in place. From long experience we know how to make our systems reliable. We have these systems running continuously which also allows us to develop communications skills. These systems, and the tools and skills residing within our membership provide a huge resource of communications capability. This resource is regularly tapped to provide many different types of public service communications. This resource is of tremendous value in an emergency[1]. These Amateur Radio systems often have a service area that extends throughout the Southern California area and into neighboring states. This capability allows us to provide public service communications into and out of a disaster area when the commercial systems are not functioning[2]. These systems communicate into and out of the region on fixed point-to-point links.

During the early 1980's, the need for point-to-point operation in the microwave amateur bands became quite obvious as the frequencies allocated (by band plan) in the lower UHF bands became full to overloaded. The rapid increase of packet (digital) radio "backbone" (point-to-point or multipoint) operations placed a serious burden on this already overloaded spectrum. Amateur Television operators also began to build point-to-point relays for their activities. There is no usable spectrum in the 420-450 MHz amateur band for television relay[3]. TV and FM fixed relay operations in the 902-928 MHz band were begun, and then rapidly curtailed[4].

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[1]**Most commercial and public communications are disrupted or overloaded during most any type of emergency. When the emergency is as severe and widespread as the recent Los Angeles earthquake, Amateur radio is often the sole source of communications for officials and the public alike. Many of our members' systems were heavily used during the earthquake aftermath. Many operated nearly continuously.**

[2]**The telephone system was shut off to incoming calls from out of state for many days after the recent earthquake. The area shut off for the first day or two was nearly ten times that actually affected by the earthquake. This meant that relatives and officials in areas outside Southern California could not call in on the telephone to areas where there was no damage at all. Our members' systems handled hundreds of calls each from people all over the Southwest who could not call their relatives and friends in Southern California, an area of some 20 million people.**

[3] **Television relay describes fixed point-to-point use. Regular Amateur TV operations, while generally occurring from fixed home stations, are considered as "mobile" activity for the purpose of this submission.**

[4]**The 902-928 MHz band is essentially unusable due to the severe susceptibility to interference of Pacific Teletrac's "Automatic Vehicle Monitoring" system operating on the same frequencies. This system is a wideband pulse system that is not "spread" or otherwise enhanced. This means there are 8 MHz wide receivers on virtually every communications site in the region that cannot tolerate the presence of a carrier (or equivalent) of ANY discernible strength within its passband. The 902-928 MHz band is shared with numerous services, and the "AVM" licensees have a higher legal priority than does the Amateur**

The 1240-1300 MHz band is where the primary Amateur television "mobile relay" (repeater) activity takes place. All available TV frequencies in that band were occupied before the 902-928 MHz spectrum was even released to Amateur operations. The next higher bands available to the Amateur Service are the 2.3 and 3.3 GHz bands. These bands are too narrow to accommodate high density duplex operations.

The 2.3 GHz band has become quite fragmented by Commission actions over the last two decades. The 2.390-2.400 GHz segment has very recently become the new home for a smaller version of the "Part 16" [5] type of activity proposed in the instant petition. The amateur community is preparing itself to share this spectrum with a huge influx of these unlicensed operations. There are, as of this writing, no specific technical data available on the equipment proposed by Apple Inc., or other manufacturers for use in the 2.390-2.450 GHz band. The 2.300-2.310 GHz segment of this band is still under threat of loss to the amateur service. This future status of this very important segment will determine the final usability of the 2.3 GHz amateur band. The amateur community needs to retain long term full use of the presently allocated segments of the 2.3 GHz band. These segments will support the many present activities as well as expanded Amateur television relay and low to medium bandwidth medium to long haul point to point services. There is no space for high density relay operations in this band.

The 3.3 GHz band is used extensively by Government as the primary user in the band. The recent studies by the NTIA[6] showed that the 3.3 GHz band has the highest (economic) concentration of government use of any of the bands studied. The recent substantially increased pressure on the government to free lightly used spectrum for non-government uses can only result in an increase in the usage in the remaining government spectrum. The Amateur Radio Service has been successfully and courteously sharing Government VHF, UHF, and Microwave spectrum for nearly 50 years.[7] Much of the government spectrum usage is located away from populated areas which minimizes the interference potential. The amateur community cannot expect to make expanded use of this already densely populated band without significant risk of interference to government operations. This interference will result in the termination of the amateur operations, and the potential loss of the cooperative respect we have earned sharing government spectrum. The 3.3 GHz band is much too small for wideband duplex operations.

Radio Service. This renders that band virtually unusable for TV as well as virtually all mobile or fixed relay systems.

[5]See FCC NPRM 94-0272 and First Report and Order 95-47

[6]See NTIA Preliminary Report

[7] NTIA Preliminary Report Section 3 page 3-6 paragraph 1 and associated footnote 20

The next amateur band is the 5.6 GHz band[8]. This is the first microwave band with enough space for high and medium density duplex fixed relay operations, space to earth and earth to space satellite operations, and weak signal activities. The performance characteristics of this band allows the reliable operation of moderately long distance point-to-point paths (to and beyond 100Km). Immediately adjacent to this band is the 5.925-6.425 GHz Earth to Space domestic public fixed (satellite) uplink band and the private fixed microwave band. This puts the 5.850-5.925 GHz portion of the 5.6 GHz amateur band at risk from reallocation to the uplink band. This presumes the likely event that the government studies of the bands above 5.0 GHz continue to support such reallocation. This segment is also allocated for amateur earth-to-space and telecommand operations. The segment from 5.830 to 5.850 is already allocated for amateur space-to-earth operations. It is clear that fixed relay operations in 5.830-5.850 GHz segment, while possible on case-by-case coordination, are generally not desirable. The segment from 5.759-5.761 GHz is where the weak signal communications activities occur. The amateur stations operating in this segment operate with very high power and very high gain antennas and very sensative receivers. These stations often have sufficient performance to produce transmitted signals well above +60DBW ERP. These stations must have their operating frequencies totally free of interfering signals in order to receive the extremely weak signals encountered in this type of activity. These stations often point their antennas at the horizion in order to utilize tropospheric scatter or ducting modes. The band plans utilized by amateurs all around the country successfully provide protection to and from these weak signal activities.[9][10]

DISCUSSION OF PETITION

Throughout this petition the petitioner uses lots of heavily loaded phrases and "buzz" words to describe who might make use of this new band and how this "NII Band" might serve portions of the proposed "National Information Infrastructure". This new "public" band requires equipment sold by the petitioner (at a profit). There are pages and pages of words about Schools, Libraries, Community Networks, Equal Access, Native Americans, Information Superhighways, Etc. Very little of the petition is technically specific. The petitioner indicates that all the technical details can be worked out by the manufacturers and the Commission need not "worry" about rules or licensing for this band -- as long as users of this band are required to conform to the not yet specified protocol these manufacturers invent.

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[8]See SCRRBA 5.650-5.925 GHz Band Plan attached

[9]The SCRRBA database shows 18 high density point to point terminals coordinated in this band. Most of these are located at high elevation mountaintop communications sites

[10]Amateur activity in the 5.6GHz amateur band cannot be determined from any one listing or database. As clearly stated by the ARRL in testimony to the NTIA and in discussions with Commission personnel, the ARRL Repeater Directory cannot be used for such information. The Directory is a listing suitable for use by "itinerant" mobiles to find a repeater to communicate through. Fixed relay devices such as commonly used on the 5.6GHz band are not suitable for itinerant mobile use and are not listed at all.

The petitioner states that the proposed operations can accommodate current and proposed users[11], and at the same time that the new "NII Band" service needs to operate in "a protected spectrum band."[12] It is clear that these statements are incompatible and we seriously doubt that the first is correct or even intended by the petitioner. It is quite clear that the petitioner actually wants spectrum devoid of ISM, Government and Amateur operations in which to sell its products. The petitioner describes at some length how all users of this "NII Band" must conform to the "packet-switched protocol without priority weighting." It would appear that the petitioner wants to simply "hook" a radio transmitter and receiver to a digital network "LAN" and make few considerations of the effect upon the operating and adjacent spectrum. It would appear that spread spectrum techniques would actually make this proposed operation somewhat tolerant of and compatible with other types of services in the same spectrum. A carrier (of moderate strength) on a specific frequency generally does not render a spread spectrum system inoperative, yet it would appear that the proposed equipment would be rendered inoperative by such a carrier. This conclusion is inferred from the petitioner's insistence on "protected spectrum" and that all users conform to a switched packet protocol. Spreading the transmission over even more bandwidth would make the proposed system even more impervious to interference and would result in much less interference to other services. The petitioner's insistence on using an interference susceptible transmission media indicates a concentration of effort on "handling bytes". More effort needs to be placed upon how to get those same bytes transmitted and received efficiently rather than just inexpensively. We are most concerned about the concept of industry driven regulations and protocol when the principal proponent shows so little regard for existing users and absolutely no consideration for adjacent users.

The petitioner admits that there are some types of communications which cannot conform to the proposed protocol and summarily relegates them to wired or fixed common carrier service[13]. These comments make it very clear that the petitioner does not consider that amateur service has any value or place occupying this spectrum. We seriously doubt that the petitioner has considered the effect of an amateur "weak signal" station transmitter on the "NII Band" equipment operating within the beam pattern of such a station. We are certain that the petitioner has not considered how the accumulated power of many "NII Band" stations will raise the noise floor at the amateurs' receiver at either a weak signal station or at a fixed relay station. It is our position that these effects must be considered carefully in any allocation action and that the amateur operations must be protected by effective regulatory means. Radioastronomy and NASA space network operators not only insist on absolutely NO other signals inside their spectrum, but they are extremely concerned about adjacent spectrum uses. We are being asked to tolerate an unlicensed country wide explosion of digital toys on our exact operating frequencies.

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[11] petition summary at 9 and petition section VI at 2 and at 13

[12] petition summary at 2, petition at 4,

[13] petition section V at 10

The amateur community must count on the Commission for regulatory and operational protection from commercial users. The amateur community cannot produce income or revenue from its activities and cannot "fight back" effectively against powerful economic interests such as the petitioner. The amateur service provides services for the "public good" and has done so for many more years than the petitioner has existed. We cannot justify having our spectrum effectively taken away for a commercial interest under the guise of "public good." In any spectrum sharing arrangement, the parties must operate on a "level playing field." Any commercial user will be easily able to economically overpower the amateur operators by simply deploying so much equipment that the amateur is driven off the band. In the proposed "community network" concept, the amateur will be pressured to cease operations by the very community in which the amateur lives and operates. There are many amateur stations located at schools or universities. These stations serve well as part of the educational opportunities at those schools. The use of this proposed "NII Band" at that same school would immediately result in the amateur station being forced to cease operations in the band. Even if the amateur allocation is primary to the "NII Band" unlicensed operations, the amateur will be forced to cease operations. Visualize explaining to the university president that the new million dollar wireless network providing computer network access around the campus and to the "National Information Superhighway" cannot operate when the university amateur radio station is conducting moonbounce or tropospheric scatter experiments or controlling the amateur station via a fixed relay. The amateur station will be summarily told to cease operations and may even be thrown off the campus depending upon how technically paranoid the university computer staff is. This is hardly an acceptable way of "meshing with.. most all existing or planned uses."[14]

Amateur operations are intrinsically neither more or less important than the proposed "millions of Americans" who might occupy the NII band using the petitioners' equipment. The amateur bands are already available to those same "millions of Americans" the petitioner is trying to reach through a very simple licensing process where the operator is licensed, not the equipment. These bands are already available for a non-commercial use -- the Amateur Radio Operator. This is the key to this petition. The petitioner apparently wants to obtain "free" spectrum for "free" and make large amounts of money selling equipment onto what can easily become a digital "CB" band[15]. The petitioner apparently wants to circumvent both the licensing process and the fee process whereby a commercial use pays some resemblance to both costs and value for the spectrum. The commercial venture

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[14]petition section VI at 2

[15]**The "CB" term refers to the 27 MHz "Citizens Band" allocated nearly 40 years ago for use by regular citizens for basic radio communications. The Commission made this allocation (out of an amateur band, interestingly enough) with the best of intentions. This spectrum was put to uses no one could have foreseen. The explosion of activity and rampant total disregard for the regulations have become legend. The Commission has formally given up on this band and does not even attempt to enforce the regulations. It is our hope and plea that a repeat of this disaster will not be allowed to occur.**

then has the vested interest to make sure that the operations on that spectrum are such that they are profitable and managed so that the profit can continue. This profit cannot continue of the system is improperly used or causes interference resulting in the loss of the license to operate the system. The petitioner apparently wants to circumvent this process and place the responsibility for effective radio system management in the hands of untrained and unlicensed operators.

There have been considerable undocumented "discussions" of this petition on the existing information "superhighway."[16] These discussions tout this proposal as a way to obtain "free long distance telephone service" and free access to many commercial services. These same discussions make the petitioners' position quite clear about amateur operations. Amateur operations are to be removed from the band as being "undesirable" uses. These same discussions make it quite clear that many perceive this petition as an opportunity for a digital "CB" with its attendant problems and benefits. The existing analog "CB"[17] has been abandoned by the Commission as totally uncontrollable. The petitioner indicates that the expected cost of the devices for this band will place them well within reach of individuals with even modest incomes[18]. The potential for these devices to be sold by the local computer superstore along with every computer as an inexpensive way to gain access to the digital network is a scary thought. We urge the Commission to act to prevent a reoccurrence of the "CB" horrid mess from happening to any new unlicensed allocation.

These undocumented "discussions" call into question the actual intent of the proposals by the petitioner for uses at 2.390-2.400 GHz. The petitioners' proposals there seem to be a successful approach to obtaining spectrum for unlicensed PCS while continuing reasonable access by amateur operators. The petitioners "undocumented" statement that the amateurs are undesirable and are to be removed causes us to be quite concerned that the petitioner does not intend to be a good neighbor. The petitioner has not put forth any technical specifications for the equipment in this band. We are extremely concerned that the petitioner is trying to obtain another much larger allocation at the expense of the amateur community. The proposed allocations at 5 GHz will allow much higher power levels and much larger areas of coverage, all still without any technical specifications. This is quite worrisome.

Even though the petitioner wants to take away a very important amateur band, the proposals have basic merit. We believe that with the proper analysis the Commission will be able to allocate spectrum for a form of unlicensed digital service

[16]These "discussions" are not formally recorded and distributed over the petitioners name so that proper analysis and comments can be made. We consider that these discussions by some of the individuals in support of the petition may more accurately reflect the true intents behind the petition than does the petition itself. As these discussions are not formal they must be taken for what they are - informal comments.

[17]See footnote 15 supra

[18]petition section VI at 23 footnote 25

without destroying the amateur band at 5.6 GHz. We urge that sufficient regulations be applied to prevent this allocation from becoming another "CB" band. We would suggest that if the petitioner demonstrated sufficient control of out of band radiation that operation closer to the very important radio astronomy band at 4.990-5.000 Ghz could be accomplished. The 5.150-5.300 GHz band should provide the principal requirements of the petitioner and allow the "Hyperlan" development in the United States. This band could be authorized for the power levels necessary to provide the longer distances the petitioner requests. Proper management and technical design might provide justification for additional allocations adjacent above and below this segment allowing better interference suppression and more efficient usage. We suggest that a compatible form of spread spectrum emission should be required in order to provide the end user protection from interference that the manufacturer might not otherwise choose to provide.

Portions of the 5.725-5.875 GHz band could also be utilized on a limited basis if adequate technical limits are imposed and if the amateur service obtains exclusive Primary Non-Government allocation status. Use of this band segment should be limited to spread spectrum class devices with similar power limitations as are applied to the new unlicensed PCS at 2.390-2.400 GHz. These devices should be required to occupy the entire band segment to minimize the accumulated noise floor. These devices should not be allowed long distance communication. We suggest 500M is a reasonable value. This should be more than adequate for a medium sized office complex or K-12 school where more distance is not needed. With separate allocations with separate capabilities, the manufacturers have the opportunity to provide a lower cost unit where only short distances are needed. Where an interference problem exists with amateur operations, equipment for the 5.150-5.300 GHz segment can be used. These lower power lower cost units should be manufactured so as to be able to change to the 5.150-5.300 GHz segment by switch selection or even automatically if they encounter interference. Higher power units must not be allowed access to the 5.725-5.875 GHz segment.

CONCLUSIONS

The petition has merits and flaws. We believe we have pointed out many of the flaws. The basic concept is of sufficient merit that further consideration should occur. We believe that the request for spectrum for the "NII Band" can be satisfied without destroying the Amateur usage of the 5.6 GHz band. We believe that a completely unregulated unlicensed "freeband" is NOT in the public interest. An unlicensed digital radio service may well be in the public interest, but it should not be allowed without sufficient safeguards to protect the existing spectrum users, the adjacent spectrum users and the end purchaser of the equipment. We believe this can be accomplished without undue regulation. We note that when the end user is unlicensed, such user does not take on any of the technical burden of responsible use of the spectrum. This burden is shifted to the equipment manufacturers. Commission oversight is required to insure that this burden is properly supported,

and that the manufactured equipment is a responsible user of the spectrum. This oversight is usually in the form of technical regulations and may take the form of requiring type acceptance. We feel that the type acceptance process is likely to be the proper method of insuring that the regulations designed to protect the "public good" are actually being observed.

We urge the Commission NOT to allow wide area and or high power uses within the 5.650-5.925 GHz amateur band. We urgently request that the Amateur Radio Service have the Primary Non-Government allocation status in the 5.650-5.925 GHz band and that any other service be Secondary to the Amateur Service.

Respectfully submitted
For the SCRRBA Board and Technical Committee
M. Robin Critchell Board Member

Attachment: 1: 5.6 GHz band plan for Southern California