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July 12, 1996

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Office of the Secretary
Federal Communications Commission
Washington, DC 20554

RE: NPRM 96-102

Gentlemen:

Enclosed are an original and 9 copies of comments on the above referenced Petition for Rule Making. These comments are made on behalf of the Northern Amateur Relay Council of California, Inc., a voluntary association of over 250 owners of fixed and mobile relay stations in Northern and Central California

We appreciate your consideration of our position and concerns on this important matter

Yours, truly,

Carl Guastaferro
Director

CCG/cg

enclosures

Before the
Federal Communications Commission
Washington, DC 20554

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JUL 15 1996
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In the Matter of	)	
Allocation of Spectrum in the 5 GHz Band To Establish a Wireless Component of the National Information Infrastructure	)	NPRM 96-102

COMMENTS OF THE
NORTHERN AMATEUR RELAY COUNCIL OF CALIFORNIA, INC.

by

Its Spectrum Director

Carl Guastaferro

July 12, 1996

Before the
Federal Communications Commission
Washington, DC 20554

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National Information Infrastructure	)	

TO: The Commission

Comments

I. INTRODUCTION

1. The Northern Amateur Relay Council of California, Inc. (NARCC) is a voluntary association of over 250 owners of Amateur Radio Service fixed and mobile relay stations in Northern and Central California. NARCC grew out of the original California Amateur Relay Council. It was formed in the early 70's in response to the desires of repeater and remote base operators to mutually coordinate channel assignments.

2. NARCC is recognized as the official coordinator for all repeater sub-bands in our area for frequencies 28 MHz and above. Our Board of Directors hold monthly meetings, we publish a quarterly newsletter, our general membership meets semi-annually and we publish an annual directory of our repeater database. We along with our Southern California counterpart, SCRRBA, are active in the band planning process. Our database and current band plans are on file with the American Radio Relay League, Inc. (ARRL). Our comments presented here concern the NPRM for a new allocation in the 5725-5875 MHz Band. Currently, the Amateur Radio Service shares the 5.650-5.925 GHz Band with Government Radiolocation and Industrial, Scientific and Medical Equipment. **We are therefore concerned about the prospect of potential interference and possible elimination of the above referenced band segment from the Amateur Radio Service.**

II. BACKGROUND

3. This NPRM is the result of petitions by Apple Computer and WINforum for an unlicensed allocation in a band currently occupied by licensed entities and ISM devices. Comments have been exchanged and the Commission has made a determination to go forward with an NPRM.

Based on NARCC's evaluation of the comments and reply comments, there was more than sufficient concern and uncertainty about the proposals to dismiss them. However, there appears to be a strong incentive in government circles to pass some sort of positive ruling; so here we are.

4. The Omnibus Budget Reconciliation Act is in the process of transferring significant blocks of spectrum from Government to the Private Sector. The bidding process will generate considerable revenue. As stated in earlier comments, the proposals "fly in the face" of the ongoing reallocation process. No revenue will be gained by the proposed allocation and there is still considerable doubt that a new allocation is truly needed and will be in the public interest.

5. Nevertheless, there has been positive progress in that certain portions of the earlier proposals have been dropped from this NPRM and proposed technical standards have been offered for consideration.

III. DISCUSSION

6. We at NARCC have no doubt that a wireless component of the National Information Infrastructure will be a reality in the not-too-distant future. Our position is to make certain amateur operations are not impaired by the new traffic (if we must share frequency bands with it). We will confine our comments to those areas in the NPRM which impact our service and which we feel we can contribute to a further understanding thereof.

7. The fundamental question continues to be "<u>is the 5 GHz Band the proper place for the new NII service?</u>" The answer is no. Contrary to what proponents would have you believe, there is a great deal of available spectrum below 4 GHz. The propagation characteristics in the 2-4 GHz Band are more favorable for a wireless NII service and equipment cost is less there. The relatively short range of the proposed devices makes frequency re-use very practical. An example is with broadcast ENG equipment in the 2 GHz Band. There was talk about moving some of it to 4 GHz. That idea is likely to be scuttled for these very reasons: more expensive and less flexible. Proponents do not want to be forced to operate above 5 GHz but ask yourselves the question "why not move them down?"

8. As to the need for 350 MHz of spectrum, that is excessive at least in the beginning. Rules should be flexible enough to allow for future expansion but even if the channels are 25 or 50 MHz, frequency re-use will permit channel to be used over and over again in a small region. Start with a 100 MHz allocation and go from there.

9. More study is needed to address spectrum sharing between licensed and the proposed unlicensed service. This is the NTIA recommendation. Why not do it? So far, all we've seen is a list of proposed technical standards. A great deal of thought and effort was put into them. Let's carry it to the next logical step and do some actual testing. In that way, we'll be better prepared

to deal with interference problems. Why "put the cart before the horse" and go charging ahead with an allocation without sufficient research into the realities of spectrum sharing.

10. We are pleased that higher power than 0.1 watts is not a consideration at this time. In the future, we once again recommend additional studies and actual tests to determine the interference potentials if higher power is a consideration. By then, the usability of the band chosen should be a factor as to whether it is even feasible to contemplate higher power devices in the same band. Our experiences with 1 watt into even a modest antenna at 5 GHz will reach out well beyond 50 miles line-of-sight. Communication over such distances have historically required frequency coordination. Ask yourselves the question "how can unlicensed devices be coordinated?" The answer is they can't

11. Regulatory barriers are both good and bad. They limit unchecked expansion but they sometimes prevent worthwhile growth. We recommend the safe approach and let the current regulations stand. Like it or not, they serve as checks and balances.

12. The antenna gain issue is a complicated matter. You need enough gain to assure more than minimum received signal level but not so much that you overreach and interfere with other similar or dissimilar services. Add to that the gain vs. beamwidth issue and there are a lot of variables. We suggest caution and not authorize too high a gain antenna, at least at first. If this 5 GHz Band is chosen (and we still hope it is not), a 1 foot antenna with 21 dB gain and 14 degree beamwidth would be a good starting point. With 1 watt input, maximum ERP would therefore be +51 dBm. Quite healthy.

13. On the issue of interference potential, it once again points to the need for further study and actual testing. Potential interference will be both "A into B" and "B into A". Only having seen a description of the modulation scheme in Apple's proposed technical standards, not too much can be determined about the nature and severity of interference. Theory can be used but only to a point. It is well documented that digital modulation is more immune than analog to interference. A wideband signal as is proposed would look like broadband noise on a spectrum analyzer. Narrowband discrete signals in the region may coexist if the C to I ratio is 30 dB or more. However, some wider type signals such as conventional video, require more than 55 dB of C to I to coexist. There are just too many variables to come up with a rulemaking before more testing is done.

14. "Right on" as far as requiring long-range transmissions to be licensed. The reasons were covered in Paragraph 10, above. It is unlikely that higher power community networks could mesh with lower power local systems. More study is needed to determine the ability to coexist without harmful interference. We suggest that the high power community networks be fully licensed, preferably in another band segment.

15. You have requested comment on placement of NII devices along with height restrictions. Those suggested in the NPRM are good guidelines. However, logic should dictate a simple

means of modifying the rules if they prove unworkable Must it go the NPRM and R and O route? Forcing the NII devices to cease operation if they cause interference may be easier said than done. We like the identifier for each transmitter GPS location devices are getting downright cheap. Perhaps the master transmitter in a network could be equipped with a GPS receiver and that information could be part of the identifier data packet. Monitor devices that can process the identifier and look it up in a database (one that is up-to-date) would need to be cheap and readily available. Then comes the task of proving the device is interfering and forcing the user to turn it off. Who does that?

16. We firmly recommend licensing and competitive bidding be adopted for the longer range higher powered devices. As we said in comments to the earlier Apple petition, their request on the surface looked like an attempt to circumvent the established Omnibus Budget Act directive to re-allocate and auction off spectrum and thus derive some income. If unlicensed low power devices are allowed to escape that process, at least require the higher power devices which we feel must be licensed to "go by the rules"

17. Comment has been requested on what factors could increase spectrum efficiency. First and foremost, by requiring that higher power devices be licensed and preserving the concept of auctioning off the spectrum, the successful bidder should be prepared to offer his plan in terms of how much bandwidth he needs to carry 25 Mbps of data and of course how much he is prepared to pay for the spectrum As a minimum, a spectral efficiency of 2 bits per hertz should be adopted. Proponents of the new service might have you believe that this is too high. Perhaps a few years ago but not today Commercial microwave voice and data networks have been operating at more than 2 bits per hertz for many years The modulation methods are already designed and not expensive Thus a 25 MHz wide channel assignment should be capable of carrying 50 Mbps or more of data. This will have a very positive effect in that it will minimize the amount of spectrum the NII devices will need and thus limit potential interference to existing services.

18. We at NARCC wholeheartedly support the Commission's current position on the lack of sufficient grounds to establish a new "Part 16" of the Rules The FCC has correctly seen this as an attempt by the NII device proponents to gain additional rights which they do not need. The current Part 15 is certainly sufficient to govern the new service and protect it as it does for existing services.

19. Comment has been requested on the status of the proposed new service. Fellow members associated with the Amateur Radio service have argued that establishment of an NII wireless service by means of this NPRM and subsequent Report and Order are not in accordance with the current "Rules of the Game" Evidently, the Commission feels the proposal has sufficient merit to consider it. Logical evolution of a new service is to give it a secondary level until and unless it can be shown that it deserves a higher (primary) allocation

20. Once again, NARCC agrees with the FCC's position on not changing emission restrictions for ISM devices. They have been able to coexist with existing licensed services for many years. To place additional restrictions on ISM devices would be an unfair burden.

IV. COMMENT ON THE IRFA

21. This is not the first time (nor will it be the last) that a decision is made on whether small entities will be discriminated against if there is an auction to the highest bidder. However, we must ask the question " In this case, for this type of service, are small companies likely to develop the best radio at the lowest price?" If the answer is "Yes", then the auction process should not be used. In my "other life", I work for a microwave radio manufacturer. Over a 30 year span, I have not seen many new manufacturers of RF transmitters and receivers. Those who come on the scene use new features they believe will distance them from the established competition. They come to market with the proverbial "low price" and are under intense pressure to survive and then to prosper. Often, the new features have no corresponding benefit. It is likely that only established major players in the microwave radio world will have the talent and financial resources to bring the proposed NII wireless devices to market in a timely manner. Therefore, we feel that affording small companies preferential treatment will not produce anything significant in the way of a lower cost, more innovative product.

V. 5.8 GHZ OPERATIONS IN NORTHERN CALIFORNIA

22. This information was presented in our earlier comments but bears repeating:
A group of several amateurs in the Northern California area have been active in the 5.8 GHz region for nearly 25 years. The activity spans most of the north half of the state as well as mobile and portable usage in the remainder of the state. The activity consists of more than 15 full duplex point-to-point microwave systems operating in continuous duty and 3 mobile/portable point-to-point systems operating as required. The fixed systems connect several traditional amateur facilities together for repeater linking, as well as full-motion television and multiplexed telephone line delivery. Many of the FM systems in our area have phone patch capability only because the 5.8 GHz links deliver it to them.

23. The television and telephone circuits were heavily used during the Oakland Hills fire in 1991. The California Office of Emergency Services (OES) has been a main beneficiary of the mobile and portable portions of the network. These systems have been deployed in numerous exercises and drills at the state and local level. They are listed as available communications resources which can be deployed anywhere in the state.

24. Although NARCC does not have the specifics, it is our understanding that a similar system not only exists in Southern California but is in the process of a major expansion, thanks to an

infusion of a large number of 6.5 GHz FDM microwave links acquired from a government agency. These can be and are being re-tuned to the 5 8 GHz Band. They will be of great benefit by providing a much needed "backbone system" for relaying voice, data and control channels. That traffic is currently contributing to the tremendous congestion in the UHF Bands.

25. These are but 2 examples of our ongoing evolution of consolidation and migration to the higher bands. Our future is there.

26. Earlier this summer there was a significant amount of "weak signal" activity in California on the 5.8 GHz Band. Thanks to good propagation conditions and the lack of "background noise", many long distant contacts and experiments took place. The deployment of NII wireless devices in great numbers will effectively elevate the background noise an limit our activities.

VI. CONCLUSIONS AND RECOMMENDATIONS

27. We at NARCC respect the Commission's desire to go forward with a rulemaking and possibly creating a wireless component of the NII. We would like to be allowed to continue and develop new uses for our portion of the 5 GHz spectrum. Taken to extreme, unchecked use of the band by commercial entities will ultimately drive us out. We would ask that the Commission in its Report and Order establish adequate safeguards and to provide for a workable way of dealing with interference problems to existing services such as ours if and when they occur. **The Amateur Radio Service is a national resource.** Our survival as such depends on having frequency spectrum to operate in and to expand into. We are dedicated to looking at ways to utilize what we have in an efficient manner. In recent years, there have been attempts (some of which successful) to take away some of our frequencies. This will no doubt continue and we must try our best to protect our interests. Please do not forget "without frequencies to operate in, there is no Amateur Radio Service".

Respectfully submitted,

Carl Guastaferro
Spectrum Director
Northern Amateur Relay Council of California Inc.