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Federal Communications Commission
Office of Secretary

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

In the Matter of)
)
Amendment of the Amateur Service) WT Docket No. 97-12
Rules to Provide For Greater Use)
of Spread Spectrum Communication)
Technologies)

To: The Commission

REPLY COMMENTS OF THE
AMERICAN RADIO RELAY LEAGUE, INCORPORATED

The American Radio Relay
League, Incorporated

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June 5, 1997

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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 97-10, released March 3, 1997. The Notice proposes to amend the Amateur Service Rules, Part 97, to facilitate Spread Spectrum (SS) communications by means of additional spreading codes, and to cause the incorporation of automatic power limiting circuitry to limit power to that actually necessary to carry out the communications.

The Comments in this proceeding fall into five reasonably distinct categories: (1) those who support the Notice proposal to liberalize the regulation of SS spreading codes, and to impose automatic power limiting functions, but who offer minor additional regulatory modifications; (2) those who generally support the Notice proposal as far as it goes, but who would suggest significant additional deregulation of amateur SS emissions, including authorization of SS in additional frequency bands; (3) weak-signal experimenters, satellite enthusiasts, and other terrestrial users concerned about interference to sensitive receivers in weak-signal, Earth-moon-Earth, and satellite operations; (4) a single comment which suggests mandatory local coordination of "emitters" in mixed-emission mode bands, to minimize interaction between incompatible modes; and (5) those who object to more liberalized amateur SS operation because of concerns about interference to Part 15 devices in some of the same bands that amateurs would use for SS.

The League suggests, as it did in its comments in this proceeding, that the Commission has arrived at a balanced approach, carefully crafted to accommodate competing interests in this proceeding: greater flexibility for amateur spread spectrum operations, and avoidance of reduced flexibility in other narrowband amateur operations and certain kinds of unlicensed, Part 15 intentional radiators. The comments in this proceeding, variously asserting that lesser or greater regulation of amateur SS operation should be arrived at, itself reflects the Commission's success in having arrived at the proper balance of interests. The League suggests that the comments establish the propriety of the existing rules, and again urges the adoption of the Notice proposal without delay.

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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 of the Commission's Rules (47 C.F.R. §1.415) hereby respectfully submits its Reply Comments relative to the *Notice of Proposed Rule Making* (the Notice), FCC 97-10, released March 3, 1997. The Notice proposes to amend the Amateur Service Rules, Part 97, to facilitate Spread Spectrum (SS) communications by means of additional spreading codes, and to cause the incorporation of automatic power limiting circuitry to limit power to that actually necessary to carry out the communications. In response to the several comments filed in response to the Notice, the League states as follows:

I. Overview

1. The Comments in this proceeding, of which the League was able to locate 14, including those filed by the League, fall into five reasonably distinct categories. The first are

those who support the Notice proposal to liberalize the regulation of SS spreading codes, and to impose automatic power limiting functions, but who offer minor additional regulatory modifications, so as to address what they perceive as overregulation of amateur SS operation. The second group are those who generally support the Notice proposal as far as it goes, but who would suggest significant additional deregulation of amateur SS emissions, including authorization of SS in additional frequency bands. The third group consists of weak-signal experimenters, satellite enthusiasts, and other terrestrial users concerned about interference to sensitive receivers in weak-signal, Earth-moon-Earth communications, and satellite operations. The fourth, consisting of only one comment, suggests mandatory local coordination of "emitters" in mixed-emission mode bands, to minimize interaction between incompatible modes. Finally, the fifth group objects to more liberalized amateur SS operation because of concerns about interference to Part 15 devices in some of the same bands that amateurs would use for SS.

2. The League suggests, as it did in its comments in this proceeding, that the Commission has arrived at a balanced approach, carefully crafted to accommodate competing interests in this proceeding: the goal of greater flexibility for amateur spread spectrum operations, and avoidance of reduced flexibility in other narrowband amateur operations and certain kinds of unlicensed, Part 15 intentional radiators. The comments in this proceeding, variously asserting that lesser or greater regulation of amateur SS operation should be arrived at, themselves reflect the Commission's success in having arrived at the proper balance of interests. The League suggests that the comments establish the propriety of the proposed rules, and again urges the adoption of the Notice proposal without delay. Each of the comments filed, regardless of position, indicates support for amateur SS experimentation and disclaims any intention to frustrate such. Therefore,

the only issue for consideration is how to structure the final rules to permit such, without arriving at unintended adverse consequences. A reading of the comments leads inescapably to two conclusions: 1) that more liberal deregulation of SS emissions is undesirable at this time, until more experience is gained with different types of SS operation; and 2) on the other hand, the present level of Commission regulation of amateur SS emissions is unnecessary for interference avoidance and has choked off SS experimentation in an inherently experimental service. The modest deregulatory proposal in the Notice is entirely proper and should be adopted verbatim.

II. Supporting Comments

3. The Comments of the Manager, National Communications System (NCS), for the Secretary of Defense, support the Notice proposal. NCS has regularly participated in amateur radio rulemaking proceedings in support of the functions of NCS in carrying out its National Security/Emergency Preparedness (NS/EP) functions. NCS "fully supports" the Notice proposal. However, NCS also suggests some additional, relatively minor SS deregulation that might further unburden experimenters. Specifically, NCS asks that the Commission eliminate the narrowband identification requirement for SS emissions [§97.119(b)(5)], as it precludes the use of any commercially available SS equipment, and fulfills no useful purpose. Second, NCS asks that the station recordkeeping requirements [§97.311(e)] be eliminated, as they are not imposed on other types of amateur emissions. Third, NCS asks that the Commission's stated authority to restrict or cause the cessation of amateur SS emissions, or require recordkeeping, [§97.311(f)] is redundant of other amateur regulations and the Commission's authority generally, and need not

be repeated in the SS rules specifically. While the League is somewhat sympathetic to these additional suggestions of NCS, it is suggested that no further deregulation of SS regulations beyond that proposed in the Notice be implemented at this time. It is apparent from the comments that there is a lack of comfort among narrowband users about increased instances of mixing of SS and narrowband modes; there has been a significant absence of SS experiments over the past 10 years since SS was initially authorized in the Amateur Service; there is an inherent lack of "monitorability" of amateur SS emissions; and therefore, it would be prudent to continue the narrowband station identification requirement and station recordkeeping for SS emissions for the near term.

4. The well-stated comments of Lyle V. Johnson, WA7GXD (Johnson), a co-founder of Tucson Amateur Packet Radio (TAPR) and an accomplished amateur satellite and digital communications experimenter, generally support the deregulatory portion of the Notice proposal, but also object to the continuation of the narrowband SS emission identification requirement. Johnson notes that the entire objective of the use of SS is for such communications to relieve narrowband channel congestion, but the identification requirement adds to it. He also notes that SS operators will disseminate information about transmission format and frequencies anyway, so that others can communicate with them. He also suggests that, because all other authorized amateur emissions allow in-mode station identification, the same should be allowed for SS. As does NCS, Johnson also objects to the recordkeeping requirements as inconsistent with other amateur emission modes, and asks that the requirements be eliminated or at least liberalized, limited to a one-year retention period.

5. Finally, Johnson objects to the automatic power limitation requirement proposed in the Notice. He notes that this technology is used currently in CDMA cellular telephones connected to a central cell site using DSSS modulation techniques, because it is necessary in that configuration. However, he claims that amateur operation is different, because the station intercommunication characteristics (such as point-to-multipoint operation, e.g., roundtable-type on-air discussions and spacecraft downlink telemetry) are different. The result, he claims, is that automatic power control circuitry will limit the applications and utility of amateur SS communications. He asserts that Section 97.313(a) of the Rules already requires that Amateur stations use the minimum power necessary for the intended communication for all emissions, and that is a sufficient constraint.

6. The automatic power limiting circuitry requirement is useful both in mixed-mode situations where SS emissions are being added to bands in which narrowband emissions are already established and ongoing, and generally with respect to intra-mode interference avoidance. Amateur SS emission types are in the experimental phase, and until sharing protocols are developed sufficiently to avoid inter-mode interference, automatic power limitation circuitry is desirable. To the extent that this would limit point-to-multipoint amateur communications, that is a matter that should be resolved by technical innovation, not Commission regulation. The wideband characteristics of SS emissions make automatic power limitation highly desirable as a *quid pro quo* for the authority to use widely varied spreading codes.

III. Proponents of Further Deregulation

7. The next group of comments included those of Robert A. Buaas, K6KGS (Buaas), Philip R. Karn, Jr., KA9Q (Karn), and TAPR. Buaas is perhaps the most prolific of the amateur SS experimenters, and has held Commission Special Temporary Authority (STA) for experiments with SS emissions. The results of his work contributed to the conclusions which led to the League's petition in this proceeding. Buaas, while acknowledging that the intent of the proceeding was to simplify SS regulation and encourage its use, feels that the result is the opposite. Buaas asks for authority to conduct SS operation in any amateur band above 50 Mhz without restriction; to use any coding and/or modulation technology; that in-mode identification be permitted; and to eliminate other restrictions on SS operation. He notes the absence of any complaints of interference from narrowband modes from co-channel SS operation, and offers an analysis of the compatibility between narrowband and SS modes that is largely based on time domain sharing. He concludes that "properly designed SS systems" have "minimum likelihood of causing interference". Buaas is critical of repeater operators and narrowband weak-signal experimenters who are opposed to liberalization of SS rules, having conducted few experiments themselves, and therefore lack an empirical basis for their interference fears.

8. The League is most respectful of the extensive experiments of Buaas, and has assisted his efforts to obtain and extend his STAs for the same. The League is comfortable that increased use of SS emissions as an overlay on established narrowband operation can be done without significant interference potential, but to do so requires informal band planning and informal spectrum management techniques such as amateurs routinely employ. It is not reasonable at this time to completely deregulate SS emissions as Buaas suggests, because to do so without

affording the amateur community the opportunity to develop its own protocols for band sharing invites a clash between incompatible modes, rather than the hoped-for assimilation of both narrowband and wideband emissions. Furthermore, as to the suggestion made by Buaas to permit SS emissions on all bands above 50 MHz, the current narrowband occupancy of those bands is sufficiently high that development of SS systems in bands currently authorized for SS operation is prudent. The amateur bands at 50, 144 and 222 MHz are among the most popular bands for numerous narrowband communications, and the higher bands are best suited for additional SS experimentation using varied spreading codes, due to substantially larger bandwidths (and concomitantly decreased power densities), available.

9. The comments of Karn note the distinct benefits of deregulation of SS emissions in the Amateur Service,¹ and the almost complete lack of development of SS technology by amateurs to date. Karn, like Buaas, has extensive experience with SS emissions, and laments that Part 15 regulation of SS emission, often in the same bands in which SS is authorized for amateur use, is far less restrictive than the current amateur rules, and that, because power levels up to one watt are permitted for Part 15 devices, far more amateurs are conducting experiments under the Part 15 rules than they do in the Amateur Service. He contends, and the League agrees, that the current rules offer a significant disincentive to amateurs to experiment or communicate with SS, and that the Notice proposal is a reasonable first step.

¹ Karn notes the following benefits of SS as a communications technology: improved resistance to multipath propagation, especially in urban environments; increased resistance to interference; reduced average transmitter power requirements, when combined with error control coding and automatic transmitter power control; increased spectrum capacity, especially when carrying intermittent traffic; and other special features, such as accurate ranging.

10. Karn, however, before announcing certain modifications he would offer to the Notice proposal, admits that it is impossible to say that under no circumstances could SS operations interfere with traditional narrowband operations. He thus concedes that there should be some continued regulatory limitations on its use. On the other hand, he insists that it is wholly inappropriate to demand a guarantee of non-interference in the first place, or to design rules with that expectation. The Amateur Service is, after all, an experimental radio service, albeit with emergency communications and public safety characteristics. All frequencies are shared, and there is no channelization. The flexibility to experiment and develop mixed-mode protocols in the same bands is a necessary characteristic of the Amateur Service. There have never been non-interference guarantees among radio amateurs in the use of shared bands, using differing emission modes. While the goal of the regulations on SS emissions is to minimize interaction on a broad scale, inter-mode interference avoidance largely is dependent on action by the users themselves. In any event, the deregulation of spreading codes and imposition of automatic power control interposes no additional interference concerns or Commission regulatory intervention.

11. Karn reverses his prior position relative to automatic power control. Though he suggests that it is useful as a means of minimizing interference potential, he no longer suggests such as a regulatory requirement. He also asks for elimination of the present 100-watt power limit for SS EME operation, as it is an impediment to SS EME experimentation, and because, he states, the antenna elevations above the horizon necessary for EME operation make the power limit unnecessary for interference prevention. This position is not well-taken, because when the moon is at or near the horizon, there is no significant antenna elevation, and thus that factor cannot serve as a sufficient interference avoidance technique. There are, in fact, certain

advantages to EME operation when the moon is at or near the horizon, due to the ground reflection gain derived in that configuration.

12. Finally, Karn discusses non-regulatory means for limiting the interference potential of SS emissions, all of which are worthy of further testing and evaluation. It is precisely because of that relative absence of compatibility testing, however, between narrowband and SS modes that more substantial deregulation of SS emissions is premature. Safeguards such as automatic power control are necessary, as discussed above. It may be that higher power for SS EME operation is justifiable, but it is not necessary to allow such at the present time. The idea of the League's petition for rule making, and of the instant Notice as well, is to permit sufficient deregulation to permit greater SS experimentation, and a determination on a reasonable scale of the aggregate interference potential to narrowband modes. Mr. Karn's interference-limiting concepts are exactly the type of technical development that must occur before complete deregulation of SS emissions is subject to reasonable discussion.

13. The comments of TAPR make essentially the same points as do those of Buaas. TAPR supports the Notice proposal. TAPR, like Karn, abandons its support for the automatic power control requirement, noting that it would be difficult to utilize SS emissions with APC circuits in the point-to-multipoint packet radio networks. TAPR also asks for elimination of the 100-watt power limit, due to the preclusion of some of the more interesting applications in the Amateur Service, such as EME operation. TAPR also asks for elimination of the narrowband station identification requirement and the recordkeeping requirement, and asks that SS emissions be permitted on all amateur bands above 50 MHz.

14. The time may come when each of these regulations may be eliminated without concern for compatibility with narrowband modes already existing in the bands where SS is authorized. That concern exists now, however, because of the relative absence of SS experimentation and operation in those bands, and the comments in favor of further deregulation do not make much of a case for the necessity of additional deregulation. The difficulties in application of the APC requirement to point-to-multipoint operation, for example, are hardly a justification for elimination of APC as an interference limiting device generally. The adverse effects of the 100-watt power limit on EME operation have not been shown to be a reason why amateurs have not experimented with SS emissions to date, and no technical justification for the contention is offered. Similarly, the narrowband identification requirement and the station recordkeeping requirement are minimal intrusions indeed, and are designed to permit self-regulation and compatibility determinations involving a mode that is difficult to monitor.

IV. Repeater Compatibility Issues and Local Coordination

15. There were a number of comments filed in response to the League's petition for rule making, RM-8737, by groups of repeater users and local coordinators, expressing concern over what they perceived as a potential for interference from SS emissions to amateur repeaters. Surprisingly, there was but one comment in this category filed in response to the Notice, that being from the 220 MHz Spectrum Management Association of Southern California (220 SMA). The 220 SMA comments carefully identify that organization as a "spectrum management coordinator" rather than a "repeater coordinator", but note that its functions include coordination of digital linking at 219 MHz and repeater coordination at 222-225 MHz. The 220 SMA fears

interference from SS operation at "developed communication sites." As the result, the 220 SMA argues in favor of regulatory language that would place the burden of interference resolution as between SS and narrowband modes on the "uncoordinated emitter", thus to establish a *de facto* local coordination requirement on SS operations.

16. There are several problems with this concept. It is based on the premise that the Notice proposal envisions SS operation to be a "subordinate" emission mode, which is already established as a regulatory matter by virtue of Section 97.311(b), which is unaffected by the Notice proposal. It reads, in relevant part, as follows: "Stations transmitting SS emission must not cause harmful interference to stations employing other authorized emissions, and must accept all interference caused by stations employing other authorized emissions." This rule is sufficient to establish the priority of interference resolution as between a station transmitting SS emissions and one transmitting another narrowband mode. The implicit suggestion of 220 SMA, however, is more than simply to establish a hierarchy of interference resolution obligations; it would in addition place amateur SS experimentation under the watchful jurisdiction of local repeater coordinators, whose membership consists essentially of repeater owners, and whose interest is in repeater and remote base operation and not in SS or other types of amateur operation. It might be presumed under that configuration that interference involving repeaters would be resolved in favor of the repeater, because it is "coordinated", over other types of amateur emission modes. In any case, the formal coordination requirement that is suggested by 220 SMA is unnecessary, and undesirable in the proposed configuration, because the Commission has established the priority of emissions relative to amateur SS.

17. While the League would agree with the 220 SMA that Commission restrictions on SS operation should be reduced, and that the amateur community should be permitted to do its own spectrum management, it is not desirable to mandate any particular frequency coordination mechanism for SS operation at the local level, any more than it is desirable to mandate local coordination of other emission modes. Therefore, the League strongly opposes the proposal for a "formal emitter coordination process when elected by the local/regional body of Amateurs."

V. Interference Concerns of Weak-Signal and Satellite Operators

18. There were several comments from amateur weak-signal and satellite enthusiasts, who were concerned about interference to those types of operation from amateur SS. The Radio Amateur Satellite Corporation (AMSAT) supports liberalization of the Commission's Rules governing SS in the Amateur Service, but is concerned that increased noise levels of up to 20 dB at distances up to 20 km from the SS emitter could result, and that the situation, it claims, is worse in the aggregate. AMSAT therefore asks that SS operation be excluded from the Amateur-Satellite Service bands below 2410 MHz.

19. The comments of Robert J. Carpenter, W3OTC, express a similar concern. He asks that the power level of SS emissions be limited to one watt, and proposes that the APC requirement in the Notice not be adopted. APC, he argues, would increase power of an SS transmitter in response to moderate signals from other modes within the spreading frequency range of the SS transmitter. Mr. Carpenter also suggests that a form of narrowband SS, not more than 10 kHz, be permitted on bands above 50 MHz.

20. The Comments of the Central States VHF Society (CSVS), a substantial group of sophisticated weak-signal VHF, UHF and microwave enthusiasts, notes that weak-signal operation in those bands, and especially EME operation, requires low noise levels. CSVS also suggests that the rules differentiate between "wideband" and "narrowband" SS operation, similar to the comments of Carpenter. CSVS proposes exclusion of "broadband" (i.e. greater than 10 kHz) SS emissions on any segments between 50 MHz and 10.4 GHz that are used for regular weak-signal amateur operation, so as to avoid interference potential that may exist.

21. The comments of William A. Tynan, W3XO, Raphael Soifer, W2RS, and Robert Brown, N7STU, are similar to CSVS and others in this category. The League's response to these individuals, who are properly concerned about interference to their mode of operation, is the same as that offered in response to arguments made in comments on the League's Petition for Rule Making: *The Notice does not propose to either increase power for SS emissions, nor expand the frequencies on which SS transmissions may be conducted.* Instead, it merely proposes to permit additional spreading codes, so that SS experimenters can have additional flexibility to determine, among many other things, which spreading codes have the least interference potential to narrowband amateur modes. The frequencies on which SS emissions may be transmitted is not at issue in this proceeding, as no change is proposed over existing rules. There are no instances of interference identified in any of the comments, and there is thus no justification for imposition of additional restrictions on SS emissions. The only other change proposed is to *limit* power by use of APC, for those SS transmissions over one watt. The League is sympathetic to the desirability of limiting interference between SS and narrowband emissions, and the need to avoid interference to satellite and weak-signal communications. However, band planning to

accomplish that is best done in this context informally, by amateurs and amateur groups themselves, rather than by Commission regulation which significantly and unnecessarily limits SS experimentation. Cooperation in the use of shared bands, in the standard self-regulatory traditions of the Amateur Service, should be adequate to prevent or resolve unintentional amateur-to-amateur inter-mode interference.² Commission regulation is not needed in this case, and none of the Comments offer sufficient justification for increased regulation of SS emissions, or continuation of the current limitations on spreading codes.

² The League is impressed by the arguments of Karn in this respect. Karn's comments note, in part:

A highly effective interference mitigation technique is to simply announce one's intentions to the local amateur community. There are now many ways that local amateurs can communicate on a regular basis, ranging from traditional meetings and newsletters to packet bulletin boards and Internet newsgroups and web pages.

If it were customary to give notice of spread spectrum operations, including transmitter location, modulation type, bandwidth, power levels, antenna patterns, etc. to the local amateur community, then anyone experiencing interference from an unidentified source would know who to ask.

This is perhaps the simplest solution to SS interference avoidance, though Karn notes numerous others.

VI. Comments of Part 15 Manufacturers

22. The remaining category of comments included those of the Part 15 Coalition and Metricom, Inc., an association of manufacturers and a manufacturer, respectively, of Part 15 SS devices, which operate at sufferance in certain bands allocated to the Amateur Service. The Part 15 Coalition is concerned about the deregulation of SS spreading codes which may be used by amateurs, to the extent that the proposed deregulation would permit amateurs to use and adapt commercial Part 15 devices for amateur use.³ Metricom states that it has no objection to the deregulation of spreading codes, provided that amateur SS emissions be limited to the power levels of Part 15 devices. Metricom and the Coalition are concerned about the possible addition, by amateurs, of power amplifiers to the devices.

³ The Part 15 Coalition states, in part, as follows:

Although from a purely theoretical standpoint the expanded use of spread spectrum transmission technologies by amateur radio operators should not substantially increase the interference potential of these stations, the rule change could have downstream effects that, as a practical matter, could fundamentally alter the delicate balance between users of these shared bands.

For instance, by expanding the range of spread spectrum transmission modes that may be used by amateur radio stations, operators who have little or no technical knowledge will now be able simply to purchase and use Part 15 spread spectrum equipment that is widely available in the market.

(Part 15 Coalition, at 2).

This statement is absurd; the goal of Part 15 manufacturers is to sell consumer devices to the general public, the majority of whom have *absolutely* no technical knowledge whatsoever. Amateur licensees have passed examinations in radio theory and operation. They routinely adapt devices, and often refine, modify, and redesign them. If the use of the devices by amateurs reduces the utility of the devices for the general public, then the device has designed into it its own obsolescence.

23. This issue has been raised by Metricom and one other manufacturer earlier, and the Notice has already dealt with the arguments.⁴ The League has met recently with representatives of the Part 15 Coalition and Metricom, and it was agreed that the League and Metricom would conduct tests of Metricom's devices at the League's laboratory, with the goal of minimizing interaction between Metricom's devices and amateur SS station configurations.

24. It apparently bears reiteration, however, that Part 15 manufacturers generally have no standing to object to Amateur Service rules changes, because Part 15 devices have no allocation status in any Amateur bands. There can be no restrictions, nor any refusal to eliminate unnecessary regulatory barriers, on amateur radio experimentation based on unquantified fears of possible future interference to Part 15 devices. This is especially so where the fear of interference is based on projections of increased amateur band occupancy. The Commission has absolutely no basis for restricting any licensed radio service in the performance of its intended operations in authorized allocations, in order to protect Part 15 devices from anticipated interference. Those devices are allowed to operate only at sufferance.⁵

⁴ The Notice, at Paragraph 9, states:

We agree that the current rule prohibits amateur stations from using SS emission types that are routinely used in other communication services, and that such a prohibition is inconsistent with the experimental purpose of the amateur service. As requested by the ARRL and Part 15 equipment providers, we propose to require that automatic control circuitry which reduces the radiated power of an amateur station transmitting an SS emission to the minimum level necessary to conduct communications, be included in SS equipment. Additionally, we solicit comments, regarding other methods that are available to minimize any potential interference between amateur station operations and Part 15 devices.

⁵ Part 15 devices have no allocation status, internationally or domestically. They are permitted on an "at-sufferance" basis: they must not cause interference to licensed radio services, and they must tolerate interference received from licensed radio services in the same bands. The

25. Amateurs can currently operate, using narrowband emissions, at up to 1500 watts, and up to 100 watts PEP output using SS emissions, in the same bands that Metricom wishes to be limited to one watt for SS emissions. Yet, nothing in the Notice proposal increases the interference potential from amateur stations to Part 15 devices. The 100-watt power level for SS emissions has been authorized for twelve years, apparently without interference. The Notice now

Communications Act of 1934 is devoid of any authority to accord Part 15 type devices any allocation status, or interference protection from licensed services, at all; the only authority to permit unlicensed devices under the Act is with respect to radio control and citizen's radio service facilities, and, more recently, marine and aviation services. 47 U.S.C. §307(e). The only provision for Part 15 devices in the Communications Act is for the Commission to regulate the *interference potential* of such devices by "reasonable regulation". 47 U.S.C. §302. This the Commission has done by permitting operation of such devices in bands allocated, on a primary basis, to one or more licensed radio services, where the operation of the unlicensed devices have been determined to be unlikely to *cause* interference to the licensed radio services.

The benefits to the manufacturers of such non-licensed devices under the circumstances are several: their products need not be licensed before they can be used by the purchasers thereof; the equipment itself need only be authorized by the Commission by type, pursuant to Part 2 Equipment Authorization requirements; they can operate with some degree of frequency agility and bandwidth variability; and they can be used for an infinite number of purposes, without any eligibility determinations on the part of the user. The devices can be made less expensively, and operated without regulatory effort by the owner. These benefits are realized by manufacturers at the cost of an absence of any priority in the subject bands relative to licensed radio services.

The Commission recently released its *Report and Order* in ET Docket 94-32, (FCC 96-390, released October 18, 1996) in which it refused to elevate the regulatory status of Part 15 devices in the 2400-2483.5 MHz band, and reaffirmed the primary allocation status of the Amateur Service in the 2390-2400 MHz and 2402-2417 MHz bands. In so doing, at paragraph 34 thereof, the Commission stated:

Further, we note that unlicensed devices enjoy a certain flexibility with their unlicensed status and are being effectively used under existing rules. In this regard, we deny Motorola's proposal to establish an operating parameter under which Part 15 devices would be presumed not to cause interference. Accordingly, we will not grant unlicensed devices additional rights to the spectrum at this time; however, if problems develop, we will consider this issue at that time.

proposes to *limit* amateur power output for SS emissions by imposing automatic transmitter power control requirements, limiting the power to those levels necessary to maintain communications. That limitation fits conceptually within the general scheme of amateur regulation. The reduction of power to one watt on a blanket basis does not.

26. The practical result of the Metricom proposal to limit amateur SS power to one watt, ostensibly to protect Part 15 devices from interference (an argument which is totally devoid of technical support, and has not been proven to be necessary at all) would be to elevate the status of Part 15 devices to a protected status relative to licensed services in the subject bands. This would be tantamount to a change in the entire conceptual framework of regulation of Part 15 devices: they would be entitled to the benefits of a licensed radio service but without any of the obligations attendant to shared, licensed users in shared bands. This is inequitable under the circumstances, as well as unjustified and unprecedented.

VII. Conclusions

27. The League's review of the comments in this proceeding leads it to conclude that the Notice proposal constitutes a proper balance between relief of restrictions on an experimental mode of amateur communications, which will permit increased experimentation, and continued protection against any increase in interference potential. As the Notice states, the rule changes proposed "would increase spectrum efficiency and allow amateur operators to contribute to technological advances in communications systems and equipment. Experiments conducted by amateur operators have shown that stations transmitting SS emissions can co-exist with other amateur stations, and in many cases these spread spectrum emissions are undetectable by other

amateur stations...We agree that the current rule prohibits amateur stations from using SS emission types that are routinely used in other communication services, and that such a prohibition is inconsistent with the experimental purpose of the amateur service..." (*Notice, at ¶8*).

28. There are comments from amateurs that urge greater deregulation, including authorization for SS emissions in additional frequency bands. There are, on the other side, comments from amateurs that urge additional frequency restrictions. These issues largely go beyond the scope of this rulemaking proceeding, which is limited to authorization of additional spreading sequences and APC circuitry. There are those who urge deletion of the 100-watt power limitation, and those who urge greater power limitations for amateur SS emissions. The changes advocated have not been justified technically by any of the comments, however, and the APC requirement appears to be adequate to insure that SS transmissions are made at the minimum power necessary to conduct the SS communications generally. There are those who urge informal notification to narrowband users to further amateur self-regulation, and those who favor mandatory coordination. The League suggests that an informal notification process, such as that suggested by Karn, is desirable, but certainly not something that the Commission should mandate, in the Amateur Service.

29. Overall, it is apparent from the Comments that the Commission has arrived at the proper result in this proceeding and the proposed rules should be enacted *verbatim* at the earliest possible opportunity.

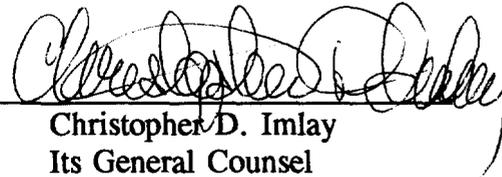
Therefore, the foregoing considered, the American Radio Relay League, Incorporated reiterates its support of the Notice proposal, and respectfully requests that the Commission move quickly to implement the rules contained in the Appendix B thereto.

Respectfully submitted,

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June 5, 1997

CERTIFICATE OF SERVICE

I, Margaret A. Ford, Office Manager of the law firm of Booth, Freret Imlay & Tepper, P.C., do certify that copies of the foregoing Reply Comments of the American Radio Relay League were mailed this 5th day of June, 1997, via U. S. Mail, postage prepaid, first class, to the offices of the following:

Paul R. Schwedler, Deputy General Counsel
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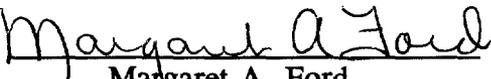
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