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

In the Matter of	)	
	)	
Creation of a Low	)	MM Docket No. 99-25
Power Radio Service	)	
	)	

To: The Commission

Comments of the Society of Broadcast Engineers, Inc.

The Society of Broadcast Engineers, Incorporated (SBE), the national association of broadcast engineers and technical communications professionals, with more than 5,000 members in the United States, hereby respectfully submits its comments in the above-captioned Notice of Proposed Rulemaking relating to the creation of a low power radio service ("LPFM").

I. SBE Desires a Thorough and Thoughtful Technical Analysis of the LPFM Proposal

1. In his April 20, 1999, remarks at the Chairman's Breakfast at the NAB Convention in Las Vegas, Chairman William Kennard stated that the Commission is committed to the digital future of radio. He went on to imply that the Commission's LPFM proposal is technically sound and would therefore not be at odds with this goal. Finally, in response to a question from the audience, he stated that he hoped that LPFM critics would wait until all Comments are in before rejecting that proposal.

2. SBE could not agree more with the Chairman's wish for forbearance in this important and potentially precedent-setting matter. However, with all due respect to Chairman Kennard, he is not an engineer. SBE suggests that he should himself await input from the engineering community outside the Commission before he sits down with his fellow Commissioners to vote.

3. SBE shares Chairman Kennard's desire for fairness. SBE feels that the realities of the laws of physics, the current state-of-the-art of FM receivers, the present uncertainties regarding three different in-band, on-channel ("IBOC") digital radio systems, and the future economics of providing properly engineered LPFM transmission systems must all enter in to

the fair and thoughtful vote that the Commission will take. When the wishes of man conflict with the laws of physics, physics always prevails.

II. Where will LPFM Transmitters Be Located?

4. It is SBE's understanding that the LPFM proposal will make it possible for new segments within the diverse fabric of our communities to have direct and self-determined access to the airwaves. Churches and community groups are two examples cited. SBE certainly agrees with the premise that such groups have never had an easy path to Part 73 access. SBE will let others debate the policy and political considerations of increased access to broadcast spectrum, and will limit its comments primarily to the technical merits of this particular proposal.

5. SBE agrees that such groups by definition are not only community-based, but often have limited real estate resources outside of their immediate neighborhoods. This leads to the important issue of where potential LPFM licensees will want to locate, or must locate, their transmitter sites. SBE feels that many potential licensees will seek to locate antennas on their own roofs or church spires.

6. LPFM licensees will presumably not be exempted from the same RF mitigation rules current Part 73 licensees must observe. Around every FM antenna exists a roughly circular area where the radiated field can make radio and TV reception difficult, if not impossible. Remedying interference to other services within the presumed "blanketing area" has traditionally been the financial if not the moral responsibility of new licensees. Using the formula provided in Section 73.318 of the FCC Rules, which defines the blanketing contour for FM stations as the 115 dBu (562 mV/m) contour, and provides the formula D (in kilometers) = 0.394 times the square root of the station's effective radiated power in kilowatts, blanketing contour distances of 12 meters, 39 meters, 125 meters, and 394 meters can be derived for LPFM stations with ERPs of 1, 10, 100, and 1,000 watts. Clearly, if located in a residential area, even a 12-meter blanketing contour is a potential problem, and certainly 125-meter or 394-meter blanketing contours would result in serious neighborhood disharmony. The Commission must take into account that a blanketing area will exist around all LPFM transmitter sites, and that many, if not most, such sites will be in residential areas. The Commission must therefore be mindful of the blanketing area problem from a potentially large number of LPFM staions when performing its public interest calculus.

III. Products, Images and Capture Ratios

7. Because FM receivers exhibit a "capture" effect, listeners experiencing interference often encounter a binary, almost digital reception phenomenon. They either get the station they desire to tune in, or they get the interfering station. Even at the proposed LPFM power levels, there will be an adverse impact when measured against "pre-LPFM" reception conditions. This sort of "collateral damage" is directly related to the design of a given FM receiver. Lower cost receivers are often more prone to all types of interference, and in turn present greater difficulties when mitigation is attempted.

8. Another well-documented aspect of the properties of FM receivers is often referred to as "mixing" or receiver-induced third-order intermodulation effect ("RITOIE"). When RF signals meet in the right (or wrong) environment, they produce new signals that are mathematically related as the sums and differences of the elements of the "mix." A key premise of spectrum management is that radio channels should not be allocated without calculating and taking into account potential mixing problems. Even low LPFM power levels can create mixing problems.

IV. What will be the Impact of LPFM on Part 74?

9. All current Part 73 FM licensees are eligible for Part 74 licenses for Remote Pickup ("RPU") as well as Studio to Transmitter Links ("STL"). SBE has made numerous representations before the Commission on the current congestion in many markets in the 450-451 and 455-456 MHz Remote Pickup bands as well as in the 950 MHz Aural STL band. Should LPFM licensees be granted Part 74 rights as new Part 73 licensees? On the one hand, barring LPFM from these services would prevent them from field operations common to many formats as well as from the financial benefits of the one time cost of microwave STL links. Purchasing such services on a monthly basis from third parties would add significantly to LPFM costs.

10. From the point of view of existing RPU and STL users in many urban areas, these bands are congested more seriously than the Part 73 bands. The Commission must take the potential negative impact on existing Part 74 licensees as a very serious issue in this proceeding. Forcing another form of "collateral damage" on existing licensees would not be fair. In the event that this rulemaking results in the adoption of Class LP1000 LPFM stations, SBE urges that only this highest power class of LPFM stations be granted eligibility for Part 74 frequencies.

V. LPFM IBOC Issues Should Not Be Decided Before the Fact

11. The National Radio Standards Committee ("NRSC") has a current deadline of December 15, 1999, to receive final reports from the three IBOC digital radio proponents. No one knows which system will be recommended, or what bandwidths or emission masks might be needed to better ensure the success of the digital transition for both Part 73 AM and FM stations. Certainly the FCC needs to consider an IBOC NPRM co-incident with this instant rulemaking. SBE feels that the LPFM issue must not be settled prior to whatever actions stem from the expected NRSC final report on IBOC. SBE also wonders at this point how LPFM licensees will be assured a place on the coming digital FM dial that they will assuredly demand once a digital radio service is established.

VI. The Economics of Good Engineering Practice

12. SBE wishes to point out that the proposed Low Power FM service must not in any way release potential licensees from the standards of good engineering practice. Low Power FM may not necessarily be low cost FM in all aspects of its operation. SBE notes that although the Commission eliminated its Type Acceptance and Notification procedures for broadcast transmitters as of October 8, 1998, in ET Docket 97-94, it now proposes to establish a "certification" process to ensure that LPFM transmitters are capable of meeting frequency stability and out-of-band emission limitations. SBE supports this proposal. SBE also urges that LPFM transmitters have tamper resistant, encapsulated or "potted" circuitry that will hard-limit the transmitter's deviation to whatever value comes out of this rulemaking.

13. In the event that the only way that the creation of LPFM can be technically justified is to limit the frequency deviation allowed for LPFM stations (*e.g.*, 50 kHz instead of 75 kHz), a stricter spectral mask, or both, SBE questions how the Commission will ensure that the licensees of such stations, some of whom will be former radio "pirates" who have already demonstrated their lack of respect of the Commission's authority, don't alter their transmitters to increase deviation or simply remove any emission mask filters. Indeed, SBE questions how the Commission will ensure that some LPFM operators won't operate 1-watt ERP LPFM stations at 10-watts, or 10-watt ERP LPFM stations at 100 watts, or even 1,000 watts. At these power levels order-of-magnitude power increases are both physically and economically feasible, and will represent a potentially serious enforcement challenge. SBE notes that is one thing to shut down a "pirate" FM station with no authority to operate, but it is a much greater enforcement challenge to shut down an LPFM that has obtained FCC authority (but only on the basis of a 1-watt ERP and reduced deviation) but is being operated

at 10, 100, or even 1,000-watts ERP and with full deviation. A 10-watt or 100-watt power amplifier could easily be concealed in the attic of a LPFM licensee's house, with a remotely-controlled pair of coaxial bypass relays, so that before an FCC inspector has even finished knocking on the station's front door the power has been reduced. Yes, field strength measurements could detect such an order of magnitude change, but SBE questions whether the Compliance and Information Bureau ("CIB") of the FCC has the capability to take on such a task.

14. The requirement to measure the technical parameters of a large number of LPFM stations may simply now be beyond the Commission's capability, given the wholesale reduction in CIB staff and field offices that occurred circa 1993. Most of the CIB regions have mothballed or dismantled the Engineering Measurement Unit ("EMU") monitoring vehicles necessary to make occupied bandwidth, peak deviation, stereo pilot subcarrier, and subsidiary communications subcarrier ("SCS") injection measurements. SBE notes that in a statistical analysis of all FCC violation notices for 1988 versus 1997 conducted by Mr. Harold Hallikainen of Hallikainen and Friends, based on information obtained under the Freedom of Information Act ("FOIA"), in 1988 there were 18 violations for improper FM modulation, but only one in 1997. In 1988 there were nine violations for improper stereo pilot injection but none in 1997. SBE believes that this reflects the lack of FCC monitoring and enforcement rather than improved operation by FM broadcast stations.

15. The Commission must also take into account other aspects of Part 73 that have to do with technical operations. These include, but are not limited to, the Emergency Alert System ("EAS"), Chief Operator requirements, unattended operation, and radio frequency radiation ("RFR") exposure levels. Even the simple requirement that the FCC and the public have a working telephone number to reach all studios must be addressed and should be required if this service is created.

VII. Other Outlets: Direct Satellite Broadcasting, IBOC and the Internet?

16. SBE wonders, as part of its technical analysis of this issue, if the FCC has considered that there may be new opportunities on the horizon for community organizations and churches to achieve their desired access goals. The result may even be achieved at a lower cost and burden. IBOC digital FM will likely permit more subsidiary services on existing FM stations. The potential may even exist on AM for subsidiary communications in the digital future. What of Internet "broadcasting," or the hundreds of channels possible with the direct broadcast satellite ("DBS") radio service already authorized?

VII. Summary

17. SBE has focused on technical issues in its comments. Improper or inadequate resolution of these issues will certainly result in collateral damage to both the audience and existing licensees. Islands of urban FM interference will almost certainly be created. The SBE does not wish to see technically naïve potential LPFM licensees get trapped in technical issues that sometimes challenge the best financed existing licensees. Competition for Part 74 resources will not endear LPFM licensees to existing full-service licensees who now need more RPU and STL spectrum. Creating rules that promote more competition may be good, but when the competition created is for resources that are not there, it is simply not healthy or smart. It is in no way a model for proper government technical regulation.

Respectfully submitted,

Society of Broadcast Engineers, Inc.

By _____
Edward Miller, CPBE
President

By _____
Dane E. Ericksen, P.E., CSRTE
Chairman, SBE FCC Liaison Committee

By _____
Christopher D. Imlay, Its Counsel

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Booth, Freret, Imlay & Tepper
5101 Wisconsin Avenue, NW, Suite 307
Washington, D.C. 20016
202/686-9600