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October 12, 1999

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th Street, S.W., TW-A306
Washington, D.C. 20554

Re: Reply Comments of the North Carolina Association of Broadcasters and the Virginia Association of Broadcasters, MM Docket No. 99-25

Dear Ms. Salas:

Transmitted herewith on behalf of the North Carolina Association of Broadcasters and the Virginia Association of Broadcasters are an original and four (4) copies of Reply Comments for filing in the above-captioned proceeding.

If any questions should arise during the course of your consideration of this matter, it is respectfully requested that you communicate with this office.

Sincerely,

BROOKS, PIERCE, McLENDON,
HUMPHREY & LEONARD, L.L.P.

Wade H. Hargrove

Enclosures

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

In the Matter of	)	MM Docket No. 99-25
	)	
Creation of a	)	RM-9208
Low Power Radio Service	)	RM-9242

To: The Commission

REPLY COMMENTS OF THE NORTH CAROLINA ASSOCIATION OF BROADCASTERS AND THE VIRGINIA ASSOCIATION OF BROADCASTERS

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October 12, 1999

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Summary

The substantive record evidence in this proceeding demonstrates unequivocally that not only is LPFM not in the public interest but that implementation of the Commission's LPFM proposals will affirmatively *harm* the public interest. The stark reality of the FM spectrum simply provides no room for LPFM. A comprehensive cost/benefit analysis reveals the following *costs*:

(1) LPFM will result in a documented loss of existing service outside stations' protected contours. Customized Arbitron data establish that, on average, more than 4600 actual surveyed listeners reside outside the protected contours of small Class A stations. Nationwide, across all classes of full power FM stations, it is conservatively estimated that at least 35 million listeners could be cut off from their community broadcasters were LPFM implemented.

(2) More than $600 million in federal and state taxpayer investments in public radio infrastructure will be jeopardized by the Commission's LPFM proposals. In addition, service to the more than 9 million individuals who receive a public radio signal exclusively through a translator could be adversely affected by LPFM.

(3) Receiver studies demonstrate that any implementation of LPFM will necessarily create new, objectionable interference to existing service, and, unequivocally, that neither the second nor the third adjacent channel interference protection standards can be reduced or eliminated. Nearly all receivers save automobile receivers—hundreds of millions of existing receivers—will suffer degraded performance from the increase in interference, and some large number, in the millions, in absolute terms, will actually fail to pick up any usable signal at all. The need to purchase new, more expensive receivers merely to continue to enjoy one's currently existing favorite radio stations is a regressive cost to the poor. In addition, the CEMA Receiver Study showed that LPFM and IBOC DAB systems are mutually exclusive.

(4) It is conservatively estimated that at least 3 million Americans who are blind or print-handicapped will lose existing radio reading services because of LPFM.

(5) The Commission should not direct minorities, or *appear* to direct minorities, to what, by definition, will be a second-class service. The creation of a second-class service in which minority broadcasters may become "ghettoized" is, by itself, too high a price to pay for a superficial increase in diversity, notwithstanding the *additional* cost of LPFM occasioned by the loss of *existing* service already provided by minority broadcasters.

(6) Community-oriented, small market radio may see its demise. Small market stations will be forced to cut staff, turn to satellite programming, sell out to group owners, or go off the air altogether. Moreover, economic analysis shows that the economic effects of LPFM will also be felt by consumers who will ultimately receive lower quality or less local programming.

(7) Both USA Digital Radio and Lucent Digital Radio make it clear that elimination of third and second adjacent channel interference protection standards could jeopardize the implementation of IBOC DAB. Both essentially implore the Commission not to put the LPFM cart before the IBOC DAB horse. LPFM jeopardizes a decade of research and investment in the radio industry's conversion to digital radio.

(8) The Commission will face tremendous budgetary, staffing, and administrative difficulties, and it will be impossible to police LPFM efficiently or effectively. The Commission will simply not be able to police out-of-band emissions, excessive power, or the use of non-certified equipment. Nor will the Commission be able to keep up with the necessary ongoing administrative oversight of thousands of new LPFM stations seeking facility modifications, requests for Special Temporary Authority, changes in ownership, and the like.

(9) Radio pirates will thrive as a consequence of LPFM. Many pirates are anarchists who reject outright the Commission's authority to regulate the airwaves. FM broadcasting cannot withstand the onslaught of hundreds of pirate stations, whose chances of successfully evading Commission enforcement action will exponentially increase, camouflaged amidst the introduction of thousands of new LPFM stations, many operating outside technical compliance parameters and perhaps without regard to current second and third adjacent channel interference protections.

In contrast to these enormous costs, the purported "*benefits*" of LPFM amount to these:

(a) An unquantified and indeterminate number of new "voices."

(b) "Pie-in-the-sky" optimism for relieving entrenched societal problems.

(c) An increase in consumer spending to buy new, more expensive radio receivers to replace those made unlistenable by the introduction of LPFM.

(d) The creation of jobs for lawyers, engineers, factory workers in China, advertisers, salesmen, and FCC staffers.

The cost/benefit calculus is simple. NCAB and VAB respectfully request that the Commission terminate this proceeding.

* * *

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

In the Matter of	)	MM Docket No. 99-25
	)	
Creation of a	)	RM-9208
Low Power Radio Service	)	RM-9242

To: The Commission

REPLY COMMENTS OF THE NORTH CAROLINA ASSOCIATION OF BROADCASTERS AND THE VIRGINIA ASSOCIATION OF BROADCASTERS

The North Carolina Association of Broadcasters ("NCAB") and the Virginia Association of Broadcasters ("VAB"), by their attorneys, hereby file the following reply comments in response to the *Notice of Proposed Rule Making* ("*Notice*"), FCC 99-6, released February 3, 1999, in the above-captioned proceeding. The *Notice* seeks comment on a wide variety of issues related to whether the Commission should establish three new classes of low power radio or microradio service in the FM band.

Any Rational Cost/Benefit Analysis Demonstrates That the LPFM Concept Must Be Abandoned

Cervantes' Don Quixote. Voltaire's Dr. Pangloss. Dickens' Mr. Micawber. In reading the comments filed by various proponents of LPFM, one cannot but help recall these famous literary characters, each an improvident *naïf* whose blind optimism is confounded by the stark realities of the real world. One can sense in the LPFM proponents' comments their fervid desire that the world be as they *wish* it to be, a world in which thousands of new LPFM stations, each bringing a unique voice to the airwaves, will prosper and co-exist harmoniously with the more than 11,000 licensed

FM facilities that already exist in the FM spectrum.

But the Commission is not the Make A Wish Foundation and the task at hand is not literary analysis. Instead, the Commission's duty is to safeguard and manage the radio spectrum in the public interest, and fulfilling this duty requires an honest, fact-based cost/benefit analysis. The fact of the matter is that the substantive record evidence in this proceeding demonstrates unequivocally that implementation of the Commission's LPFM proposals would affirmatively *harm* the public interest. The stark reality of the FM spectrum, of the laws of physics, and of the existing universe of both imbedded FM transmission facilities and the public's receiving equipment simply provides no room for LPFM.

In undertaking the necessary cost/benefit analysis, NCAB and VAB do agree that the Commission should employ what one LPFM proponent, David Earl Honig, on behalf of the Minority Media and Telecommunications Council and various other organizations, termed the "Rule of Nonreversibility":

> [A]n agency should avoid decisions that cannot be changed later without upsetting the legitimate expectations of those who invested time, money and effort in good faith.[1]

Applying the principle contained in the "Rule" to LPFM will, perforce, mean that the Commission should avoid implementing LPFM, as the following analysis demonstrates.

I. The Demonstrated Costs of LPFM Would Be Enormous

1. LPFM Would Result in a Documented Loss of Existing Service Outside Stations' Protected Contours

As numerous commenters observed, the effective and actual service area of a full power FM

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[1] Comments of Civil Rights Organizations at 18.

station extends far beyond its nominally-protected contour.[2] Indeed, NCAB and VAB empirically documented, based on customized data provided by Arbitron, that for small Class A stations, on average, more than 34.5% of a station's surveyed radio listeners actually are located outside the station's protected 60 dBu contour.[3] In the case of some stations, such as WCZI(FM), Washington, North Carolina, nearly 9 out of every 10 actual listeners live, commute, and work outside of the protected contour of one of their favorite radio stations.[4] Nearly all stations have actual listeners all the way out to the stations' 34 dBu contours. These results for North Carolina and Virginia stations are fully consonant with those for stations in other parts of the country.[5]

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[2] *See, e.g.*, Comments of the Corporation for Public Broadcasting at 7; Comments of National Public Radio, Inc. at 18; Comments of the Public Radio Regional Organizations at 8-9; Comments of the Station Resource Group at 15; Comments of Noncommercial Educational Radio Members of the North Carolina Association of Broadcasters and the Virginia Association of Broadcasters at 3; Comments of Z-Spanish Media Corporation at 2; Comments of Minority Members of the North Carolina Association of Broadcasters at 2-3; Comments of the National Association of Broadcasters ("NAB") at 41-43; Comments of the New Mexico Broadcasters Association at 28; Comments of Emmis Communications Corporation at 2; Comments of Cox Radio, Inc. at 10; Comments of Greater Media, Inc. at 7 n.1; Comments of Bott Broadcasting Company *et al.* at 24; Comments of Heartland Broadcasting Corporation at 5.

[3] *See* Comments of the NCAB and VAB at 25-29 and Exhibits 4-6. The median surveyed audience located outside the studied stations' protected 60 dBu contours was 20.9%. *See id.* at 26.

[4] The zip code/contour map of WCZI, showing the location of WCZI's surveyed listeners, is attached as Exhibit A for convenience. Also attached in Exhibit A is a zip code/contour map of WZXI(FM), Buffalo Gap, Virginia. Approximately two-thirds of WZXI's surveyed listeners reside outside the station's protected contour, and this in a mountainous area hampered by terrain. These maps were previously provided in Exhibit 5 of the Comments of the NCAB and VAB.

[5] The Public Radio Regional Organizations showed that large percentages of listeners of certain public radio stations reside outside the stations' protected contours:

(continued...)

These results demonstrate that real, actual service—and not merely theoretical service—will be jeopardized by implementation of the Commission's LPFM proposals. Indeed, at jeopardy are more than 32,500 actual surveyed listeners outside the protected contours of just *seven* small Class A FM stations in North Carolina and Virginia, i.e., an average of more than 4600 listeners each for Class A stations that do not even broadcast at the maximum 6000 watts permitted for their class. Because the secondary service areas of more powerful stations are significantly larger and contain, correspondingly, significantly more listeners, an average of 4600 listeners losing existing service per station is a *very* conservative estimate. Therefore, nationwide, across the 7779 currently licensed commercial and NCE FM stations (excluding translators and boosters),[6] at least *35,000,000* listeners could be cut off from their existing community broadcasters were LPFM implemented.

The Commission previously acknowledged the merit in avoiding, through the process of repeatedly eating away at an existing station's service by authorizing second or third adjacent channel interference, the creation of "a sort of 'Swiss cheese' coverage pattern for the original station, [i.e.,] a large service area with numerous 'holes' caused by this type of interference around

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[5](...continued)

Station	Listenership Outside Protected Contour
KXPR/KXJZ Sacramento, California	54%
WRVO(FM) Oswego, New York	67%
WBJB-FM Lincroft, New Jersey	32%
WOI-FM Ames, Iowa	22%

See Comments of Public Radio Regional Organizations at 8-9.

[6] *See Broadcast Station Totals As of June 30, 1999* (released July 19, 1999).

the transmitters of the interfering stations" and the concomitant "deterioration of service, through the assignment of a number of stations the total impact of which upon an existing station is substantial."[7] The Commission's current LPFM proposals would create just such a "Swiss cheese" coverage pattern for existing broadcasters on a massive scale. Were LPFM stations maximally packed in, existing full power stations could lose more than one third of their existing, surveyed listeners. This actual loss of proven service cannot be in the public interest.[8] Indeed, it is one of the Commission's fundamental principles that the listening "public has a legitimate expectation that existing service will continue"[9]—without regard to protected contours.[10] Application of the "Rule of Nonreversibility" would mandate that LPFM not be implemented.

2. Substantial Taxpayer Investments in Non-Commercial Public Radio Will Be Jeopardized

Several commenters demonstrate convincingly that LPFM could destroy public radio as it has come to exist over the past 30 years. Both federal and state governments have invested substantial sums in constructing and supporting a vast network of public broadcast facilities to "extend delivery of public telecommunications services to as many citizens of the United States as

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[7] *Revision of FM Broadcast Rules*, Notice of Inquiry, Notice of Proposed Rule Making, and Memorandum Opinion and Order, FCC 61-833, 21 Rad. Reg. (P& F) 1655 (1961), at ¶ 45.

[8] *See, e.g., Hall v. FCC*, 237 F.2d 567, 572 (D.C. Cir. 1956) (stating that it is "axiomatic" that "curtailment of service is not in the public interest").

[9] *Amendment of the Commission's Rules Regarding Modification of FM and TV Authorizations to Specify a New Community of License*, Memorandum Opinion and Order, 5 FCC Rcd 7094, 68 Rad. Reg. 2d (P & F) 644 (1990), at ¶ 19.

[10] *See* Comments of the New Mexico Broadcasters Association at 30-31.

possible by the most efficient and economical means."[11] National Public Radio shows that Congress has appropriated more than $5 billion to support the basic operations of public broadcasting facilities and to foster the production of programming and has invested $600 million for infrastructure alone.[12]

Significantly, the existing public radio infrastructure was engineered and funded based on the settled expectations of spectrum protection contained in the Commission's current rules. As the Public Radio Regional Organizations explain:

> [T]he existing public radio infrastructure depends heavily on service that exists outside [protected] contours and on FM translators to extend service. In fact, most public radio regional and statewide networks['] transmission sites were selected to maximize service that might be obtained beyond the protected contour and to minimize the number of transmitters necessary—it would not have been cost-efficient or feasible to design statewide or regional coverage so that protected contours overlapped sufficiently to create seamless "protected" service. *The "theoretical gaps" that exist between these stations do not exist in reality.*[13]

LPFM jeopardizes substantial taxpayer investments in public radio both by destroying existing service outside the stations' protected contours and by failing to protect the existing, extensive translator network. More than 9 million individuals receive a public radio signal exclusively through a translator.[14] Interference caused by LPFM stations is likely to knock out entire chains of translators or satellite/repeaters. For example, if an LPFM station operating on an adjacent

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[11] 47 U.S.C. § 390.

[12] *See* Comments of National Public Radio, Inc. at 5 and Appendixes A & B. *See also* Comments of the State of Oregon at 14 (discussing public radio infrastructure expenditures of state and local governments).

[13] Comments of the Public Radio Regional Organizations at 10 (emphasis in original).

[14] *See id.* at 5; Comments of National Public Radio, Inc. at 23; Comments of the Corporation for Public Broadcasting at 21.

channel to KUER-FM's Delta, Utah, translator knocked out reception of its input signal, service from seven other translators in the chain would be crippled.[15] As the State of Oregon cogently illustrates:

> [T]ranslators have proven to be not only the most cost-effective but, often, the *only* feasible means of bringing public radio to small communities located great distances from populated areas. Translators have proven to be a wise government investment, an investment which will be lost if not protected from LPFM interference.[16]

The State of Oregon further argues that the Commission's LPFM proposals demonstrate "a shocking lack of understanding . . . of the policies, practices, and history of state and federal government commitment to public broadcasting for the past 40 years."[17] LPFM is not—and cannot be—a substitute for public radio systems.

The costs of LPFM, from the point of view of public radio, are at least twofold: A loss of existing service to the public and the loss of public monies, time, and effort, made in good faith, to create the public radio system. Clearly the "Rule of Nonreversibility" would mandate that LPFM not be implemented.

3. Hundreds of Millions of Consumer Radios Could Be Rendered Worthless

There are 710 million FM receivers in use in the United States.[18] Based on annual sales categories, including factory-installed automobile receivers, these 710 million FM receivers can be

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[15] *See* Comments of the Public Radio Regional Organizations at 7 n.4 and Attachment A.

[16] Comments of the State of Oregon at 16 (emphasis in original).

[17] *Id.* at 15.

[18] *See* Comments of the Consumer Electronics Manufacturers Association ("CEMA") at 9.

broken down into the following five category types[19]:

Table (principally clock)	15%
Personal (portable, Walkman-type)	22%
Portable (boombox)	19%
Component	14%
Automobile	31%

Based on listening environment data, it is estimated that 44.1% of all daily radio listening occurs on automobile receivers and 55.9% of daily radio listening occurs on the other four types of receivers.[20]

Four substantial receiver studies have been conducted for the purposes of this docket: (1) Moffet, Larson & Johnson, Inc. ("MLJ") determined the standard of service and selected the test receivers, Carl T. Jones Corporation conducted the actual tests, and MLJ analyzed the test results, all on behalf of the NAB ("NAB Receiver Study")[21]; (2) CEMA conducted tests under the auspices of itself and National Public Radio and the Corporation for Public Broadcasting ("CEMA Receiver Study")[22]; (3) Broadcast Signal Lab evaluated receivers on behalf of the National Lawyers Guild Committee on Democratic Communications and several others ("NLG Receiver Study")[23]; and (4) the Commission's Technical Research Branch, Laboratory Division, Office of Engineering and

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[19] *See id.* at 10.

[20] *See id.* Note that a simple typographical error appearing in the original has been corrected in the above text.

[21] *Standard of Service for FM Receiver Tests* (July 21, 1999), *appearing in* Comments of the NAB, Volume 2, Exhibit A; *FM Receiver Interference Test Results Report* (July 1999), *appearing in* Comments of the NAB, Volume 2, Exhibit B; *Selection of Receivers for FM Receiver Testing and Analysis of Test Results* (July 21, 1999), *appearing in* Comments of the NAB, Volume 2, Exhibit C.

[22] Thomas B. Keller and Robert W. McCutcheon, *FM Receiver Interference Tests, Laboratory Test Report* (July 27, 1999), *appearing in* Comments of CEMA, Exhibit A.

[23] *Receiver Evaluation Project* (June 30, 1999), *appearing in* Comments of National Lawyers Guild, Committee on Democratic Communications, Exhibit B.

Technology also conducted a study ("FCC Receiver Study").[24] The following is only a brief summary of the results.

The NAB Receiver Study evaluated the performance of 28 FM receivers: 5 clock, 5 personal, 5 portable, 5 component, and 8 automobile (OEM and after-market). These test receivers thus approximate the relative percentage of each category in the total universe of FM receivers. The median receiver performance by category for a desired signal level of -65 dBm, which corresponds to a field strength of approximately 60 dBu at a 1.5 meter receive antenna height, is as follows:

Median Receiver Performance, -65 dBm Received Power
NAB Receiver Study[25]

	Second Adjacent Channel Interference	Third Adjacent Channel Interference
Clock	-17.2	-30.1
Personal	-32.3	-42.3
Portable	-22.8	-36.5
Component	-39.1	-38.3
Automobile	-41.9	-42.9

The D/U ratio required to produce third adjacent channel interference in the median receiver is -39.7 dB.[26] This value is essentially equal to the current third adjacent channel protection ratio of -40 dB (provided, of course, that the third adjacent interfering station is located *outside* of the desired station's protected contour). Clearly, then, the current third adjacent channel interference

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[24] William H. Inglis and David L. Means, *Second and Third Adjacent Channel Interference Study of FM Broadcast Receivers*, Interim Report, FCC/OET TRB-99-1 (July 19, 1999).

[25] *See* NAB Receiver Study, Exhibit B, Tables 6 & 7.

[26] *See id.*, Exhibit B, page 26.

protection standard cannot be reduced or eliminated, as the Commission has proposed.[27] In fact, these results indicate that more than a third of the extant universe of FM receivers (i.e., clock and portable receivers) do not perform well even under the current standard.

The situation with respect to second adjacent channel interference is noticeably worse. The D/U ratio required to produce second adjacent channel interference in the median receiver is -30.5 dB.[28] This value is 9.5 dB greater than the current second adjacent channel protection ratio of -40 dB in the non-reserved band. As many as 56% of existing FM receivers (i.e., clock, personal, and portable) do not give satisfactory performance under the existing standard, and the results for even component and automobile receivers show that the standard cannot be reduced further or eliminated, as the Commission is contemplating.[29]

The test results are worse for stronger signals within a station's protected contour. As MLJ concluded:

> The interference ratios measured in the NAB's receiver test program show that the interference susceptibility of contemporary receivers has generally not improved since the rules were adopted in the 1940s. This is true for the second and third adjacent channel cases where the Commission is considering ignoring potential interference caused by proposed LPFM stations. In addition, the measurements show that receiver interference rejection performance tends to decline for strong FM signals. Consequently, if LPFM stations were allowed to operate within a station's service contour, they would cause much more interference than predicted by the use of a constant interference ratio

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[27] *See Notice* at ¶ 43.

[28] *See* NAB Receiver Study, Exhibit B, page 28.

[29] *See Notice* at ¶ 46.

> that is pertinent at a station's protected contour. For the median receiver, the assumption of constant receiver interference performance regardless of desired field strength is inappropriate.[30]

Based on the NAB Receiver Study alone, were second and third adjacent interference protection standards reduced or eliminated, at least 400 million FM receivers in the homes of Americans would be adversely affected. In fact, the NAB Receiver Study further showed that, should LPFM stations be permitted at all, quality reception actually requires co-channel spacing based upon a ratio of 34 dB, rather than the current 20 dB ratio used for existing full power stations.[31]

The CEMA Receiver Study evaluated the performance of 16 receivers: 1 personal, 5 portable, 5 component, and 5 automobile. This sample represents fairly well the relative percentage of automobile receivers and personal/portable receivers (considered together) in the total FM receiver universe, greatly overstates the relative percentage of component receivers, and ignores the existence of table/clock radios. Despite the bias towards more expensive receivers that ought to perform well, the results of the CEMA Receiver Study are fully consonant with those of the NAB Receiver Study. Indeed, it worth noting at the outset CEMA's observation that

> [r]eceivers are designed with intentional design and cost tradeoffs that are made by manufacturers to meet market needs. For example, many high-end component Hi Fi receivers optimize their sensitivity to receive weak signals and produce high-quality sound reproduction. This performance, however, comes at the expense of lower adjacent-channel, intermodulation and IF interference rejection. Conversely, automobile receivers are designed to optimize mobile reception by greater selectivity to improve their immunity to adjacent-channel and other interference, but at the expense of their ability to receive weak signals. Rarely does one find a receiver that optimizes all these

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[30] *See* NAB Receiver Study, Exhibit C, pages 16-17.

[31] *See id.*, Exhibit C, page 15.

features simultaneously since such receivers will appeal to a small minority of owners.[32]

The CEMA Receiver Study used two test scenarios. In the first scenario, the D/U ratio was determined at a target signal-to-noise ratio (weighted, quasi-peak) of 45 dB, a ratio previously established as a *minimum* for quality broadcasting.[33] The second scenario measured the audio S/N ratio at a fixed D/U ratio. The results of the first scenario, for second adjacent channel interference only, are summarized in the following table:

Mean Receiver Performance, -50 dBm, 45 dB S/N WQP Target
CEMA Receiver Study[34]

	Second Adjacent Channel Interference
Personal/Portable	-11.3
Component	-29.3
Automobile	-41.0

The average D/U ratio across all 16 receivers at the 45 dB S/N target was -26 dB.[35] This value is 14 dB greater than the current second adjacent channel protection ratio of -40 dB in the non-reserved band. Under this study, only automobile receivers give satisfactory performance under the existing

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[32] Comments of CEMA at 17.

[33] In fact, as the Prometheus Radio Project, one LPFM proponent, correctly observes, the "standard level of signal to noise ratio today is 60 dB—with digital broadcasting, it may be 90 dB." Comments of the Prometheus Radio Project at 11. Therefore, a target S/N ratio of 45 dB represents a very low standard, but a standard that cannot be lowered any further without a considerable loss in quality reception of lightly processed content such as classical music and jazz. *It is worth noting that were a higher S/N ratio target chosen, such as 60 dB, the results for the receivers tested in the various studies would be significantly worse.*

[34] *See* CEMA Receiver Study, Appendix B, Test B3.3.

[35] *See id.*, Summary of Test B, page 3.

standard, and, thus, more than two thirds of existing FM receivers do not give satisfactory performance under the existing standard. These results show that the standard cannot be reduced or eliminated to fit in LPFM stations, as the Commission is contemplating.

Under the second scenario, the CEMA Receiver Study reported that, with respect to second adjacent channel interference, with a fixed D/U ratio of -20 dB, the average S/N ratio was 45 dB, and with a fixed D/U ratio of -40 dB, the average S/N ratio was only 28 dB. Moreover, in the latter instance, 4 of the 16 receivers failed.[36] Thus the current second adjacent channel interference protection standard in the reserved band is just appropriate to provide the minimum for quality broadcasting whereas the current second adjacent channel interference protection standard in the non-reserved band results in a degraded listening environment.

Also under the second scenario, the CEMA Receiver Study reported that, with respect to third adjacent channel interference, with a fixed D/U ratio of -40 dB, the average S/N ratio was 34 dB and 2 of the 16 receivers failed.[37] This result shows that the current third adjacent channel interference protection standard is not adequate to its task and that the current listening environment is degraded.

CEMA itself concludes from this data that neither the second nor the third adjacent channel interference protection requirement can be reduced or eliminated without resulting in the "creation of extensive, new objectionable interference to existing services."[38] In fact, in order to maintain a high-quality primary service, CEMA actually recommends that the Commission establish a -20 dB

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[36] *See id.*, Summary of Test B, page 4.

[37] *See id.*, Summary of Test B, page 6.

[38] Comments of CEMA at 13.

protection requirement for second adjacent channels and a -30 dB protection requirement for third adjacent channels.[39]

Perhaps even more significant are the results of the CEMA Receiver Study with respect to co-channel and first adjacent channel interference. To attain a target 45 dB S/N ratio requires an average D/U protection ratio for co-channel stations of 42 dB, an increase of 22 dB from the current standard of 20 dB. Based on this result, CEMA concludes that there will be a "significant increase in interference to existing services" if *any* new LPFM stations are authorized, even respecting the current 20 dB D/U protection ratio.[40] In addition, because in-band on-channel ("IBOC") digital audio broadcasting ("DAB") designs generally place the digital energy in the first adjacent channel spectrum, the test results for first adjacent channel interference led CEMA to conclude that, if protection of IBOC DAB systems is to be considered, a first adjacent channel protection ratio of 35 dB is needed, an increase of 29 dB from the current standard of 6 dB. Because it is "difficult to find existing full-service FM spectrum meeting that protection requirement[] and LPFM would clearly exacerbate that situation, . . . *CEMA believes that LPFM and IBOC DA[B] systems are mutually exclusive.*"[41]

Taken together, the NAB and CEMA receiver studies demonstrate that any implementation of LPFM will necessarily create new, objectionable interference to existing service, and, unequivocally, that neither the second nor the third adjacent channel interference protection standards can be reduced or eliminated. Nearly all receivers save automobile receivers—hundreds

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[39] *See id.*

[40] *Id.* at 11.

[41] *Id.* at 12 (emphasis added).

of millions of existing receivers—will suffer degraded performance from the increase in interference, and some large number, in the millions, in absolute terms, will actually fail to pick up any usable signal at all.

Despite the incorrect interpretation of its data by the National Lawyers Guild, the results of the NLG Receiver Study do not contradict those of the NAB and CEMA studies and, when fairly and broadly considered, actually support those results. The NLG Receiver Study evaluated the performance of 11 receivers: 1 table/clock, 1 personal, 3 portable, 4 component, and 2 automobile. This sample underrepresents the relative percentage of table/clock, personal, and automobile receivers in the total FM receiver universe, somewhat overstates the relative percentage of portable receivers, and grossly overstates the relative percentage of component receivers. Despite the bias towards more expensive receivers that ought to perform well, the results of the NLG Receiver Study do not differ significantly from those of the CEMA Receiver Study.

Part of the NLG Receiver Study methodology is very similar to the second test scenario of the CEMA Receiver Study. The following table summarizes the results, for stereo tone on interferer, of the average S/N ratio at the FCC limit (i.e., -20 dB D/U ratio for second adjacent channel interference, reserved band; -40 dB D/U ratio for second adjacent channel interference, non-reserved band; and -40 dB D/U ratio for third adjacent channel interference).

Mean Receiver Performance, Average S/N @ FCC Limit
NLG Receiver Study[42]

	Second Adjacent Channel Interference, Reserved Band	Second Adjacent Channel Interference, Non-Reserved Band	Third Adjacent Channel Interference
Clock	60.5	45.8	36.4
Personal	27	n/a	n/a
Portable	43.6	20	26.2
Component	61.9	47.9	50.7
Automobile	57	57.2	54.3

The NLG Receiver Study may be seen as reporting that, with respect to second adjacent channel interference at the FCC limit in the reserved band, the average S/N ratio was 52.7 dB, and at the FCC limit in the non-reserved band, the average S/N ratio was 41.1 dB. Moreover, in the latter instance, 1 of the 11 receivers failed. Considering a S/N ratio of 45 dB as the minimum level for acceptable quality broadcasting, as the CEMA study did, the current second adjacent channel interference protection standard in the reserved band is appropriate to provide the minimum for quality broadcasting whereas the current second adjacent channel interference protection standard in the non-reserved band results in a slightly degraded listening environment.

With respect to third adjacent channel interference at the FCC limit, the average S/N ratio was 42.6 dB and 1 of the 11 receivers failed. This result shows that the current third adjacent channel interference protection standard is almost adequate to its task and that the current listening environment is slightly degraded.

These average results, however, are doubly skewed on the high side by the gross

[42] NLG Receiver Study, Appendix G.

overrepresentation of expensive component receivers (costing more than $150)[43] and by the fact that data were not obtained for the Walkman test receiver for commercial band second and third adjacent channel interference which would likely have lowered the averages.[44] For the majority of receivers in actual use (i.e., table/clock, personal, and portable), the NLG Receiver Study results demonstrate that neither the second nor the third adjacent channel interference protection standards can be reduced or eliminated without causing significant objectionable interference to existing service.

Although stated very generally, Broadcast Signal Lab's conclusions support this interpretation of the results. In summarizing the second adjacent channel test results, Broadcast Signal Lab stated:

> Most of the lower priced radios that were tested succumbed to lower levels of undesired signal, at or below the FCC ratio reference level. Second adjacent channel interference performance appears to be dependent on receiver design factors, including a possible relationship to receiver cost.[45]
>
> * * *
>
> Compared to other adjacencies, radio performance against second adjacent channel undesired signals exhibited the widest variation. The poorest performing radios were susceptible to second adjacent channel undesired signal levels that were as much as 50 dB lower than the levels that affected the best performers.[46]

With regard to third adjacent channel interference, Broadcast Signal Lab stated that "[h]igher priced

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[43] *See id.*, Tab 1, page 9 (dividing the receivers into three broad classifications, higher priced tuners and receivers, lower priced radios (less than $150), and car radios).

[44] *See id.*, Appendix G (showing partial results for Walkman test receiver which are below the target 45 dB S/N ratio).

[45] *Id.*, Tab 2, page 10.

[46] *Id.*, Tab 2, page 14.

radios and car radios tended to fare better than lower priced radios."[47] Since lower priced receivers predominate in the market (56%), it is clear from the NLG Receiver Study that the current interference protection standards cannot be reduced without negatively affecting the performance of hundreds of millions of receivers.[48]

Finally, the FCC Receiver Study was, by its own admission, a "rush job," and, unfortunately, is so skewed and inconclusive that its results are practically useless. The study itself acknowledges its extreme limitations:

> *Because of the need to get some objective data into the record as quickly as possible*, fairly narrow limits were imposed on the scope of the initial study effort, both in the size of the sample of receivers tested and in the range of tests performed.[49]

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[47] *Id.*

[48] Broadcast Signal Lab's conclusions and the data drawn directly from the NLG Receiver Study totally belie the spurious conclusions that NLG itself attempts to draw from the study. For example, while NLG admits that, for lower priced receivers, "performance was uniformly mediocre," Comments of the NLG, part XII.B.3.b, and further states that lower priced radios "had slightly more trouble discriminating between the desired and undesired signals as the signal strength went beyond the FCC interference ratio," *id.*, part XII.B, NLG nevertheless concludes that "*[t]hese results strongly indicate that, at least for Low Power FM stations of 100 watts ERP or less, regulation of second and third adjacencies should also be eliminated*," *id.* (emphasis in original). Obviously, these results suggest no such thing; in fact, they indicate precisely the opposite. NLG is evidently blinded by its view that LPFM should not be "held hostage to that small number of radio receivers with the worst selectivity that occupy the lowest end of the consumer electronics market." *Id.*, part XII.B.3.d. Of course, the 56% of the market that lower priced receivers occupy, representing some 400 million receivers in use, is not a "small number of radio receivers." And, quite significantly, NLG ignores the fact that the poorest Americans are those most likely to own those receivers occupying "the lowest end of the consumer electronics market." Apparently, NLG thinks even the poor should be required to purchase more expensive receivers so that such persons can continue to listen to their *currently existing* favorite radio stations.

[49] FCC Receiver Study at 4 (emphasis added). *See also id.* at 3 (acknowledging again the study's limitations "[b]ecause of the need to develop some information quickly").