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ASSOCIATION OF

FEDERAL COMMUNICATIONS CONSULTING ENGINEERS

WASHINGTON, D.C.

July 30, 1999

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OFFICE OF THE SECRETARY

Magalie Roman Salas, Secretary
Office of the Secretary, TW-A306
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

RE: MM Docket 99-25

Dear Ms. Salas,

Transmitted herewith for filing with the FCC are the original and four copies of the comments of AFCCE in the above-referenced matter. Also enclosed is an additional "return copy" that should be returned with our messenger.

If any questions arise in this matter, please contact the undersigned.

Sincerely,

Joseph M. Davis
AFCCE President

c/o Cavell, Mertz & Davis, Inc.
10300 Eaton Place, Suite 200
Fairfax, VA 22030
703-591-0110

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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 Low Power Radio Service	)	

COMMENTS OF THE ASSOCIATION OF FEDERAL COMMUNICATIONS CONSULTING ENGINEERS ON NOTICE OF PROPOSED RULEMAKING

INTRODUCTION

The Association of Federal Communications Consulting Engineers (AFCCE), celebrating over 50 years, is an organization that includes approximately 90 full members who are Registered Professional Engineers engaged in the practice of consulting engineering before the Federal Communications Commission.

AFCCE supports and commends the Commission for its efforts to create new and more widely based voices in the FM Broadcast service. We as consultants are frequently contacted by individuals and companies desiring to establish new radio stations. Like the Commission, we hear from the "have nots" as well as the "haves." We have no vested interest for or against the creation of a low power radio service.

However, we can only support the creation of the proposed new service based on sound technical arguments. A proposal as significant as the elimination of third and/or second adjacent channel protection must be supported by technical data showing why the protection is no longer needed. The burden of proof should be on those seeking to eliminate protection, not on those whose facilities were designed under the presumption of protection. The Commission has a responsibility to regulate all parties on a fair and common basis and not to become an advocate for either the proponents or the status quo.

The Commission has a long-standing policy of maximizing the availability of FM service to the public through full-service stations (see, for example, MM Docket No. 80-90). The Commission has also long recognized the spectrum efficiencies that result from higher power stations (see, for example, Docket No. 20735). In

Docket 20735 the Commission acted because the large number of limited-range Class D stations then operating were impeding licensing of more spectrum efficient Class B and C stations.

In MM Docket No. 99-25, the Commission now proposes to reverse these policies and to create ownership diversity at the expense of spectrum efficiency. While there is a larger question of whether the Commission is empowered to subvert by policy what the Congress has imposed by law, our comments only consider the technical issues of feasibility and leave the question of desirability to others.

Specifically, we address two questions (1) Do improvements in FM receivers justify decreasing or eliminating second and third adjacent protection, as claimed by some of the petitioners? (2) Would increasing the present emission mask reduce the potential for second-adjacent channel interference? We also offer some observations about the proposed rulemaking.

We do not address questions about the impact of the proposed rulemaking on IBOC digital audio, since this topic should be addressed by the expert proponents of those systems.

SUMMARY AND CONCLUSIONS

Second adjacent channel protection has already been increased from an undesired to desired ratio of 20 dB to the current 40 dB for commercial channels. For reserved channels, the Commission has recently proposed changing the protection requirement from 20 dB to 40 dB (MM Docket 98-83, *1998 Biennial Regulatory Review – Streamlining of Radio Technical Rules in Parts 73 and 74 of the Commission's Rules*). These changes are in agreement with a comparison of receiver measurements in the 1960s with receiver measurements over the last five years.

Comparable third adjacent channel protection measurements for the two time periods could not be located. No justification for a change could be developed based on improved receiver performance because of this lack of data. If third adjacent channel protection were to be decreased by 15 dB from the present undesired to desired ratio of 40 dB to a value of 55 dB, it would correspond for all classes except B and B1 to the 115 dB blanketing contour (47 C.F.R. 73.318). Going beyond the blanketing level of protection would be highly questionable, given the Commission's experiences with blanketing interference.

The proposed LP1000 service is ill advised. The proposal fails to achieve its intended purpose while adding to the interference to existing stations. According to the Commission's analysis, in the larger cities only about four LP1000 stations could be assigned on the average, even with no second or third adjacent protection to existing stations, while in New York, Chicago, San Francisco, Baltimore, and Washington, DC no LP1000 stations could be assigned.

The creation of so few new LP1000 stations would do little to satisfy the desire of multitudinous special interest groups for their own station. On the other hand, significant interference could be created. For example, based on present criteria, 12,000 to 18,000 people or more could receive third adjacent interference to existing stations from each new LP1000 station in a metropolitan area.

Congress has concentrated existing stations into the hands of the few by changing the multiple ownership rules. The Commission cannot, even by eliminating second and third adjacent protection to existing stations from the new LP1000 service, reopen broadcasting at the 1,000 watt level to a vast number of new owners, however deserving they may be.

The proposed LP100 service, with some modification, is technically viable. Maximum facilities of 100 watts ERP at 30 m HAAT appear reasonable, but the minimum ERP should be reduced to 10 watts from the proposed 50 watts. We agree with the Commission that the proposed LP100 service should be secondary service and should not displace translators; moreover, we believe that no translators or boosters should be allowed with LP100 stations. Prohibiting LP100 translators and boosters will maintain the local nature of the service. Similarly, LP100 stations should not be used as translators or boosters. No SCA service should be allowed using a LP100 station.

Although some form of LPFM service may be technically feasible, we believe that the proposed microradio service is a very bad idea. A microradio service would be impossible to regulate. The Commission has been down this road with Citizens Band radio and we cannot imagine any justification for committing such mayhem on the FM Broadcast band.

In the absence of sufficient resources to regulate a microradio service, we believe that more unlicensed transmitters would rapidly come into existence. These unlicensed transmitters,

whether certified or not, would have a high probability of being improperly operated. Existing stations and new LP100 stations would be severely impacted by the proliferation of these unlicensed, improperly operated microtransmitters. The resulting decrease in the value of the FM Broadcast spectrum would ultimately impact the present license fee and auction potential of the present service and the proposed LP100 service. The combination of increased interference, unregulated service, and decreased revenues would not be in the public interest.

ADJACENT CHANNEL PROTECTION REQUIREMENTS

It is clear that the proposed new LP1000 and LP100 classes of service succeed or fail based on the Commission's ability to find spectrum room for them. The Commission should not accept at face value the argument by some of the proponents that existing stations enjoy excessive adjacent channel protection and that this excess protection can be reduced to create spectrum for additional stations. It is incumbent on the Commission to address on an independent basis the question of harmful effects to existing stations and listeners.

In order to eliminate protection to existing second and/or third adjacent channel stations, the Commission should require that the technical basis on which the protection is founded is no longer valid. The technical support for this restriction is a matter of record going back over more than forty years.

The argument by proponents for LPFM, such as the Skinner Petition at 34, which refers to "vast improvements in receiver technology since the restrictions were created decades ago..." is unsubstantiated by any facts in the Notice of Proposed Rule Making. Before the Commission accepts this argument, it should compare the performance specifications of the receivers used as the basis for the present protection requirements for co- and adjacent channels with the performance specifications of modern receivers.

Modern radios are lighter, more reliable, consume less power, and are less expensive to build than the radios of thirty-five years ago. Electronic tuning has largely replaced mechanical tuning. We would agree with the notion that the success of mass market radio is at least partly due to the widespread availability and low cost of modern radio receivers.

However, the designers of solid state radios have struggled to achieve the levels of RF performance achieved by tube radios. In addition, the parameters which tend to suffer the most in the design of electronically-tuned receivers compared with mechanically-tuned receivers are intermodulation and image rejection, sensitivity, and ultimate selectivity. The small size and lack of shielding in some modern receivers may increase their susceptibility to strong and/or adjacent signals.

MEASUREMENTS LEADING TO THE PRESENT PROTECTION RATIOS

In 1945 the FCC issued Rules and Regulations governing the FM Broadcast service in the 88 to 108 MHZ band. Class A stations had an effective rated power of 1 kW and an antenna height of 76 m (very close to the proposed LP1000). Class B stations from New England to the Mid-Atlantic states were licensed at 10 kW minimum to 20 kW maximum effective rated power with an antenna height of 91 m minimum to 152 m maximum. Outside of this area the Class B minimum effective rated power was decreased to 2 kW. The co-channel undesired to desired signal value was -20 dB and the first adjacent channel undesired to desired signal value was -6 dB. Second adjacent channel stations were expected to operate in the same coverage area without objectionable mutual interference.

The FCC's Laboratory Division performed a series of measurements on FM Broadcast receivers starting in the late 1940s. Under Project No. 22231 interference rejection ratios were measured on eleven commercially available receivers.

Data was taken at three desired carrier signal levels, 3,500 μV, 350 μV, and 35 to 70 μV depending upon the sensitivity of the receiver being measured. The input impedance was 300 ohms, so the input levels were -43.9 dBm, -63.9 dBm, and -83.9 to -77.9 dBm.

The desired carrier was modulated at 30 percent at 400 Hz and an audio output reference level established. The modulation on the desired carrier was then removed and an undesired carrier signal modulated at 100 percent at 400 Hz was added to the input. The level of undesired carrier signal needed to generate an audio output of 20, 30, and 50 dB below the audio output reference level was measured. These three audio rejection ratios were believed to represent annoying, discernible, and barely discernible audio interference. The ratio of undesired to desired carriers was then calculated for each of these audio rejection ratios.

The results were presented graphically. We have read the median ratio values from the graphs and show them in the table below, along with the corresponding values in dB, rounded to the nearest dB. In general, significantly different values were measured above and below the desired carrier frequency. We have averaged the two ratio values at each offset. The spread in measurements from the maximum to the minimum values in each median was also quite significant, representing variations in different receivers.

1947 FCC RECEIVER MEASUREMENTS ON 11 RECEIVERS: MEDIAN U/D in RATIO and (DB)				
D (μV)	CO-CHANNEL	FIRST ADJ	SECOND ADJ	THIRD ADJ
For 20 dB audio rejection				
3,500	.43 (-7)	3.1 (+10)	19 (+26)	83 (+38)
350	.55 (-5)	2.3 (+7)	48 (+34)	315 (+50)
35-70	.45 (-7)	1.9 (+5)	38 (+31)	335 (+51)
For 30 dB audio rejection				
3,500	.22 (-13)	1.7 (+4)	19 (+26)	64 (+36)
350	.32 (-10)	1.4 (+3)	31 (+30)	150 (+43)
35-70	.29 (-11)	1.2 (+1)	25 (+28)	370 (+51)
For 50 dB audio rejection				
3,500	.043 (-27)	.42 (-8)	4.8 (+14)	8.2 (+18)
350	.08 (-22)	.41 (-8)	13 (+22)	53 (+34)
35-70	.17 (-15)	.63 (-4)	9.3 (+19)	130 (+42)

The Joint Technical Advisory Committee of the IRE and EIA presented its report entitled "Allocation Standards for VHF Television and FM Broadcasting" to the FCC Engineering Conference on that subject (Docket 9175) in December 1948. This report recommended signal strengths and co-channel and adjacent-channel protection ratios for urban and rural service; these recommendations were also influential in the rules later adopted by the FCC.

According to the Notice of Inquiry for Docket No. 14185, the docket referenced in the present NPRM, the Commission adopted the present interference criteria in August 1958 (see 5, FCC 61-833, issued July 5, 1961). The undesired to desired ratio was set at -20 dB for co-channel stations, -6 dB for first adjacent stations, 20 dB for second adjacent stations, and 40 dB for third adjacent stations. At that time the interference criteria were used to assign stations based on signal strength criteria.

DEVELOPMENTS AFTER THE PRESENT RATIOS WERE ESTABLISHED

In 1960, similar measurements to the measurements made under Project 22231 were made by the FCC's Laboratory Division. The methodology was the same, except that 35 μV was consistently used instead of the variable 35-70 μV input. Five receivers were measured under project 2223-6, although only two of the five receivers had sufficient quieting to obtain 50 dB audio rejection ratios. The Laboratory concluded that, while measurements of only five receivers was a small sample, comparison of the results with the 1947 measurements indicated "... that there is no evidence that the interference ratios specified for FM broadcasting... should be relaxed, if it is true that [Project 22231] was the principal basis for establishing the original limits. If anything, the Rejection Ratio curves for the contemporary receivers might indicate that greater protection may be needed."

Measurements were again made by the FCC's Laboratory Division in 1961 on six more FM receivers under Project No. 2223-7. The methodology was the same, except that the 50 dB audio rejection ratio measurements were omitted and two of the six receivers did not have adequate quieting for the 35 μV measurements. The Laboratory concluded that "Comparison of the rejection ratios obtained in these tests with the values reported in the previous Lab projects show no apparent change in performance as regards to selectivity. The median values still display a rather broad selectivity characteristic which would seem to preclude any relaxation of interference standards for allocation purposes."

In 1962, also under Project No. 2223-7 (Part II), the FCC's Laboratory Division conducted subjective listening tests of FM interference using two standardized receivers to try to establish protection ratios based on listening tests of various types of programs in place of interpolation from the previous fixed audio rejection ratios of 20, 30, and 50 dB. The Commission concluded that modulation percentages strongly influenced interference

magnitudes. While some of the subjective measurements indicated that the protection ratios were insufficient for adjacent channels, others indicated that the ratios were sufficient, except for the first adjacent channel.

In Docket No. 14185 the Commission used the same interference criteria to develop spacing tables for allocation purposes. In paragraph 15 of the First Report and Order under Docket No. 14185, 40 FCC 662, 719 (1962), the Commission noted that most of the commenting parties favored maintenance of the ratios in the absence of persuasive data to the contrary. Those changes suggested were generally in the direction of higher ratios (more protection). Zenith and RCA submitted data based on measurements of their receivers' performance. Unfortunately, the data was not quoted in the R&O.

In 1975 the Commission's engineering staff reaffirmed the use of the existing protection criteria. In a study of the potential for increasing the efficient use of the FM band, the staff used the present protection criteria, noting that these criteria had the weight of international agreement and were taken or derived from CCIR documents of 1970 and 1974 (see FM Broadcast Channel Frequency Spacing, FCC/OCE RS 75-08, December 1975, page 2).

In 1980 a study at the Institute for Telecommunication Sciences proposed that "modern good-quality FM broadcast receivers can maintain a 30 dB audio signal-to-interference ratio even when second-adjacent (i.e. alternate) channel interference is 50 dB or more above the desired signal." (Haakinson and Adams, "Coverage and Interference for Second-Adjacent Channel FM Broadcast Stations," IEEE Transactions on Broadcasting, Vol. BC-26, No. 4, December 1980, page 133)

The source referenced by Haakinson and Adams for this numerical data was Quadracast Systems Inc., "Comments to the FCC Further Notice of Inquiry on Quadraphonic Broadcasting," FCC Docket 21310, 1979. No independent data by impartial parties was presented to support this decrease in second-adjacent protection from the present 20 dB to the postulated 50 dB.

Haakinson and Adams performed an analysis based on the signal levels calculated for grandfathered short-spaced stations. The predicted interference based on a 50 dB criteria agreed more closely with the results reported by the station managers the authors interviewed than did the predicted interference based on a 20 dB criteria. The authors concluded that "current FCC second-

adjacent-channel separation requirements for FM broadcast stations are overly protective..." but recommended that "...measurements be made on a wide variety of FM receivers to substantiate suitable receiver interference thresholds."

PRESENT DAY RECEIVER PERFORMANCE

The adjacent channel performance of an FM receiver is partially determined by the desired audio quality. For example, the $6,000 Magnum Dynalab MD108, a high-end hybrid analog tuner, has a second adjacent channel attenuation of 46 dB in the "wide" position, 60 dB in the "narrow" position, and 80 dB in the "super narrow" position. Audio quality decreases as the bandwidth is decreased.

Car radios also take advantage of the listening environment. For example, the newest Blaupunkt line of car radios has an alternate channel specified response of -80 dB.

Consumers Union (CU) tests the sensitivity and selectivity of FM tuners in the lower priced consumer market as part of their review and rating service. Consumers Union has provided the following laboratory test data as a professional courtesy and the providing of this data should not be construed to indicate any position by CU regarding this docket. The exact test methods are not known and may include some subjectivity.

CU tested component FM receivers in 1995 and again in 1998. The test data includes adjacent (first adjacent) channel rejection, alternate (second adjacent) channel rejection, capture ratio, and image rejection. The following table gives the data from CU.

We believe CU data should compare favorably with manufacturer's claims. For example, on page 28 of the February 1996 issue of Consumers Reports, the Yamaha RX-V490 receiver, at $375, is evaluated as having a better than average tuner. "Excellent selectivity makes the Yamaha a good choice for those who live in an area crowded with stations." While CU would not provide individual receiver test data, we speculate that the Yamaha would be at or near the top of the 1995 test data in the table.

CONSUMERS UNION COMPONENT RECEIVER TEST DATA				
PARAMETER	1995		1998	
	RANGE (DB)	AVERAGE (DB)	RANGE (DB)	AVERAGE (DB)
Adjacent Channel Rejection	0 - 16	8	0 - 16	9
Alternate Channel Rejection	45 - 78	66	53 - 80	70
Capture Ratio	1.5 - 4.3	3	NA	NA
Image Rejection	32 - 49	42	30 - 60	45

The manufacturer's specifications for the RX-V490 give the alternate channel selectivity as 85 dB. This is reasonably close to the maximum value of 78 dB measured by CU.

CONCLUSIONS

In summary, available receiver performance data does suggest a general improvement in second adjacent channel rejection. One could argue with some justification that alternate channel selectivity has improved at least 20 dB for comparable receivers. Accordingly, the relaxation of the second adjacent channel protection ratio to 40 dB (and currently proposed relaxation to 40 dB for reserved-band channels) might therefore be justified on the basis of improved receiver performance.

No current third adjacent data could be located. An argument could be used that the 20 dB change in the second adjacent criteria could also be applied to the third adjacent criteria on the grounds that better filters are the primary source of the improvement. This would ignore the potential for front-end overload of electronically-tuned receivers and would overlook the next level of protection in the current rules which is the blanketing contour at 115 dBu.

Additional data on receivers, including "boom boxes" and earphone receivers, would be necessary before using receiver performance as a justification for changing or eliminating the

third adjacent channel protection requirements for existing services.

Any changes in protection criteria should apply to all classes of service, not just the proposed new classes of service. If receiver improvements are the justification for changing protection levels, there is no basis for having the changes apply to one class of service any more than another.

EMISSION MASK CHANGES

In paragraphs 52 - 54 the Commission proposes increasing the present emission mask over the second adjacent channel to reduce the potential for second-adjacent channel interference. The question is posed as to whether 10 or 20 dB of additional attenuation over the presently required 35 dBc would be adequate.

Measurements are made on existing FM stations routinely as part of required performance measurements under 47 C.F.R. 73.317. 47 C.F.R. 73.317 requires that spurious sidebands must be at least -25 dBc between 120 kHz and 240 kHz from the carrier frequency and at least -35 dBc between 240 kHz and 600 kHz. Beyond 600 kHz emissions must be at least 43 + 10 Log (Power in watts) dB below the carrier, or 80 dB, whichever is less.

A review of these measurements for six existing stations with various formats showed that the present 35 dBc emission limit at 240 kHz is quite loose. Five of the six had emissions at 240 kHz which were 30 dB or more below the present emission mask. The sixth station had emissions at 240 kHz that were only 26 dB below the present emission mask, but that station exceeded the mask at several other points and undertook repairs immediately.

This data indicates that requiring 10 or 20 dB additional attenuation over the presently required 35 dBc would have no impact on the present level of second adjacent channel interference. Such a requirement, therefore, would be a technically invalid method to provide additional protection to second adjacent channel stations.

THE LP1000 PROPOSAL

The primary argument for finding room for the proposed LP1000 service is the reduction or elimination of second and third adjacent channel protection. In addition, for the proposed LP1000

service, the Commission proposes that, if the LP1000 proponents' position regarding third adjacent protection is wrong, the error will be insignificant. In paragraph 43 of the Docket, the Commission hypothesizes that:

> Areas of potential interference would be very small and occur only in the immediate vicinity of the low power transmission facility. An LP1000 station operating with maximum facilities would be predicted, under the current protection ratios, to cause 3rd-adjacent channel interference to a distance of 1.4 kilometers (0.9 miles) from its antenna, and even this very small predicted interference zone could possibly pose a potential problem to other stations only if the LP1000 station were located at, or very near, the outer edge of the protected station's service contour.

This hypothesis is unsupported by the technical facts. An area with a radius of 1.4 kilometers is about 6.2 square kilometers. Examination of census data for urban areas, both towns and cities, shows population densities of 2,000 to 3,000 people per square kilometer or more. This means that 12,000 to 18,000 people or more could receive third adjacent channel interference in such a setting. Further, if the LPFM transmitter site is in the close vicinity of a busy highway interchange (such as those employed by cellular and PCS providers), interference to vast numbers of mobile receivers could occur as they pass through the area.

The Commission protects TV Channel 6 stations from interference populations of more than 3,000 people, one-fourth to one-sixth the interference population that would be created by each new LP1000 station in an urban area. It would be difficult to justify subjecting existing FM stations to such a high level of interference as compared with TV Channel 6 stations.

Interference would be compounded by the fact that many full power stations are located outside of population areas in order to avoid blanketing interference or to find acceptable locations for towers. LPFM stations, on the other hand, would need to be located within the population area in order to maximize the audience in their small coverage area. We speculate that LPFM stations would have greater success than larger stations at locating within population areas because of the LPFMs small size. The result would be exactly what the Commission predicts in the last sentence quoted above: The LP station will be at the outer edge of the full power station's service contour where the likelihood of interference is

the greatest. The cumulative impact of several LP1000 stations on a single full power station could affect even more people than a single interferor.

The LP1000 proposal fails to achieve its intended purpose. In a first-order spectrum availability analysis (Appendix D) the Commission calculates that, with full interference protection, about 17 new LP1000 stations could be assigned. With no second or third adjacent channel protection to existing stations at all, about 165 new LP1000 stations could be assigned. In the larger cities only about four LP1000 stations could be assigned on the average with no second or third adjacent protection to existing stations, while in New York, Chicago, San Francisco, Baltimore, and Washington, DC no LP1000 stations could be assigned.

In paragraph 11 of the docket, the Commission states that they received over 13,000 inquiries in the last year alone from individuals and groups wishing to operate a LPFM station. Clearly the proposed LP1000 class would contribute little toward satisfying this demand.

THE LP100 PROPOSAL

The proposed LP100 service maximum facilities of 100 watts ERP at 30 m HAAT appear reasonable. The minimum ERP should be reduced to 10 watts from the proposed 50 watts to allow exciters with outputs in the 20 to 30 watt range that are available on the new and used equipment market to be used as LP100 transmitters with single bay antennas.

The proposed LP100 service should be secondary service. Protection to existing translators should be provided. LP100 stations should not be used as translators or boosters, which will maintain the proposed local nature of the service. Nor should they be allowed to utilize subcarriers beyond the stereophonic baseband, in order to minimize their emission bandwidth and associated potential for interference to other stations. With the addition of the spacing requirements for LP100 stations, the present rules form the basis for a good compromise between flexibility of allocation and service to the public.

In the noncommercial educational portion of the FM band, the minimum Class A primary station under current rules is 100 watts ERP at 30 m HAAT. Moreover, these stations are licensed using a signal strength contour methodology that is less restrictive than

the spacing requirements proposed for LP100 stations. Directional antennas are also allowed for NCE stations under current rules.

We anticipate that most educational LP100 stations with the potential for 100 watts ERP with second and third adjacent channel protection will seek to be licensed as primary Class A stations rather than as secondary LP100 stations. In most urban areas, there is little, if any, potential for additional protected stations in the reserved portion of the band under the present second and third adjacent protection requirements, even for minimal Class A stations. In these areas, the secondary LP100 station will be the only new service available in the reserved portion of the FM band.

As noted above, the demand for new LP100 stations will far exceed the supply. Since the potential for new LP100 stations is greater in the commercial portion of the band than in the reserved portion of the band, both commercial and noncommercial LP100 stations should be allowed in the commercial portion of the band, whether assignments are made by lottery, auction, or on a first-come, first-served basis. Prior to issuing new LP100 assignments, existing Class D stations should be upgraded to LP100 stations wherever possible.

The proposed LP100 service should be required to meet the same technical standards as existing Class A stations, since these standards are based on power ratios and not absolute power levels. Protection of second and third adjacent channel primary stations should be required.

A minimum distance from the LP100 station's transmitting antenna to any inhabitable/general population locations should be specified regarding human exposure to radiofrequency electromagnetic field. We note that a six meter clearance is required for 100 Watts ERP (circularly polarized) if no other radiators are in the vicinity. The standard OET Bulletin 65 analysis or the worksheet in the FCC Form 301 are also possibile guidelines to ensure safety of the general public.

As a secondary service, LP100 stations should be allowed to accept interference from second and third adjacent channel primary service stations. Since this is a proposed new service, LP100 stations can be deprived of second and third adjacent channel protection from both primary service stations and from other LP100 stations without violating any presumption of protection.

The use of spacing rather than contour protection for the initial allocation of LP100 stations will ease the application burden and allow applicants to determine potential locations for stations without undue, but not negligible, expense.

THE MICRORADIO PROPOSAL

The microradio service would be impossible to regulate. The similarities with the present Citizen Band radio service are not appealing. Existing stations and new LP100 stations would be severely impacted by the proliferation of unlicensed, poorly designed, improperly operated microtransmitters that would soon be emanating from every nook and cranny hiding a would-be broadcaster. The resulting decrease in the value of the 88-108 MHZ spectrum from a license fee and auction perspective should be a cause of concern for the Commission.

Should the Commission proceed with the microradio service, microradio transmitters could have a "sealed" frequency modulated oscillator with integral modulation limiting circuitry in the hope of preventing deliberate off-frequency adjustment or over-modulation. If the seal were broken, the unit would be considered to be in violation.

CERTIFICATION AND ENFORCEMENT

Transmitter certification, while desirable and necessary, is relatively unimportant for maintaining order in both the microradio and LP100 service. The assumption that a certified transmitter would not be modified in the field by someone desiring to sound louder or to cover more area is not valid. Volunteer inspections performed at the request of the station are subject to fraud.

Regular inspection and rule enforcement by Commission personnel are critical to the maintenance of order in both the commercial and educational portions of the FM band. The staff requirements for policing microradio would be impossible to achieve.

It is our impression that the rise in unlicensed operations in the FM band has already placed a strain on the thin resources of the FCC Field Offices. After being underfunded for many years and then reduced in size a few years ago, the remaining field personnel

spend a great deal of their time investigating unlicensed low power FM broadcast stations otherwise known as "pirate stations."

The field investigations involve tracking the stations using direction finding techniques, performing field strength measurements, inspecting the stations, and issuing warning letters. Those unlicensed operators who refuse to shut down voluntarily are referred to the local US Attorney's Office and further evidence gathering is required in these cases.

Based upon our information, the pirate stations organize their efforts through web sites on the Internet. They are fully familiar with FCC investigative techniques and one of their practices is to do their best to avoid FCC detection and prosecution.

The current pirate situation clearly indicates that demand for broadcast licenses far outweighs the supply. The LPFM proposals would allow some groups to broadcast legally, but many more would not be as fortunate. Those individuals who do not get a license form a pool of potential new as well as continuing pirate operations. Legal LPFM stations may actually increase the burden on the FCC by inspiring people who are unable to obtain a license to take to the airwaves. The attitude for some will be, "If those people across town can have an FM station, why can't I have a station?"

As a result, the FCC Field Offices will have to spend time not only inspecting the legal LPFM stations to ensure that they are operating within the scope of their licenses, but also may have even more pirate stations to investigate. If the Commission elects to adopt LPFM, it should be prepared to increase the resources of the Field Offices to handle this increase in enforcement activity.

Respectfully Submitted,

Joseph M. Davis
President
July 30, 1999

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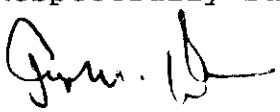

Joseph M. Davis, P.E.
President
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