

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

MM Docket No. 86-144

In the Matter of

Review of Technical Parameters
for FM Allocation Rules of Part 73,
Subpart B, FM Broadcast Stations

SECOND REPORT AND ORDER

Adopted: September 10, 1987; Released: September 25, 1987

By the Commission:

INTRODUCTION

1. The Commission herein amends Part 73 of its rules to promote efficiency in the allocation, licensing, and use of the FM broadcast spectrum. The amendments include a specific method for classifying FM stations according to their effective transmitting power and antenna height, and increased accuracy in the required procedures for predicting FM station coverage and calculating distances between FM stations. Additionally, we amend Section 73.213 of our Rules, which allows routine technical modifications to certain short-spaced FM stations, to permit only modifications that do not increase the potential for interference.

BACKGROUND

2. The Commission now authorizes six classes of commercial FM broadcast stations: A, B1, B, C2, C1, and C. Three of these classes, B1, C2, and C1, were created in BC Docket 80-90¹. The six classes of stations are intended to provide different ranges of service, and stations in each class are allowed appropriate facilities and required to be separated from other stations by various distances in order to meet this goal. Class A stations operate with modest transmitting power and effective antenna height, and are intended to provide local service. Class B and C stations are afforded much greater power and effective antenna height, and are intended to serve much larger areas. The new classes are intermediate sizes that provide more range than Class A facilities, but less than Class B or C.

3. In Docket 80-90, we focused on the issue of expanding FM service to the public by increasing the number of station classes, thereby providing new opportunities for additional stations and upgrading of existing stations. At that time, we amended certain existing rules merely to accommodate the new classes.² We indicated that we could adjust these affected rules later based on a record addressing them in greater detail.

4. Although it was intended that the new station classes created in Docket 80-90 and the existing classes, together, would provide a continuous range of permissible FM facilities, it soon became apparent that many feasible com-

binations of power and antenna height do not fall within the limits for any of the six classes. This occurs because the minimum power requirements adopted in Docket 80-90 do not make allowance for existing or proposed stations that have relatively large effective antenna heights. Such stations can operate below the minimum power for their class, yet have a range greater than the maximum that could be obtained by a station in the next lower class.³ This results in gaps in the range of allowable facilities. Consequently, our procedures for station classification by power and antenna height need some revision.

5. The Commission initiated this proceeding by adopting a *Notice of Proposed Rule Making (Notice)*⁴ proposing to amend rules that were affected by Docket No. 80-90, but were not given detailed consideration in that proceeding. We also proposed a new method for classifying stations which would allow a continuous range of permissible FM facilities. Finally, we proposed to review certain technical rules which need updating.

6. More than 400 parties filed comments or reply comments in response to the *Notice*.⁵ Earlier this year we adopted a *First Report and Order*⁶ resolving two of the matters we considered⁷ in the *Notice*. The Commission amended the rules to permit any class of station to be allotted on 20 channels which were previously restricted to Class A operation. Also, the Commission declined to remove a rule section which provides for the classification of stations by zone based on transmitter location rather than the location of the community of license. This *Second Report and Order* addresses the remaining proposals.

ISSUES

Power and Antenna Height Requirements

7. *Proposal*. In the *Notice*, we listed examples that illustrate how some reasonable combinations of antenna height above average terrain (HAAT) and effective radiated power (ERP) do not conform to the maximum and minimum requirements of any station class. We stated that this problem becomes particularly acute with Class C1 and Class C facilities, and that the current station classification scheme may impose unnecessary operating restrictions on licensees.

8. To rectify this problem, we proposed a new parameter that we termed the "index" for each class of station. This index is a function of both the HAAT and ERP of a station and it relates generally to the coverage of the station. Use of the index would replace the "equivalence method currently mandated for overheight power reduction⁸ and serve as an alternative to the minimum power requirements for each class. Principally, we would use it to determine the class of stations with HAAT/ERP combinations that do not fall within the current rules. We proposed a specific formula based on maintaining as a constant the maximum predicted distance to the 1 mV/m field strength contour for each class of station. Index maxima were adjusted to permit the largest number of existing stations to be unaffected by the proposed change.

9. *Comments*. The National Association of Broadcasters (NAB), in its comments, does not object to the index method for new stations, but requests that it not be used to downgrade existing stations. NAB characterizes the index proposal as an "ironic return to similar procedures required prior to the current coverage matching method, and compares the proposed formula's effect to that of a

graphical depiction of the permissible facilities in each class formerly contained in the engineering charts of our rules.

10. The Association for Broadcast Engineering Standards, Inc. (ABES) supports the concept of replacing the tables of power and height requirements and the equivalence method with a table of maxima, a formula, and an index table. ABES dissents, however, to the specific formula and index table proposed, stating that the proposed method using a single formula is flawed. ABES compares the results obtained using the proposed method versus those obtained using the equivalence method, and suggests an alternative method that employs five slope values (essentially five equations). ABES claims that the single formula we proposed is too simplified and leads to excessive inaccuracy. Also, ABES identifies incorrect height limits resulting from round-off error in our proposed method. ABES believes that its substitute method is not unduly complicated and would result in greater accuracy.

11. Eight commenters are opposed to our proposed index method of classification. Generally, these commenters find the method to be cumbersome, inaccurate, and too complex. It was apparent that some commenters were also unsure of how to use the method. Doug C. McDonell (McDonell), an engineering consultant, describes the index method proposal as a "backdoor approach to implementation of a minimum height [requirement] for all classes of stations." McDonell said that the description of the index method in the *Notice* was "confusing." A.D. Ring & Associates, P.C. (Ring), an engineering consulting firm, agrees with those opposing the index proposal, and recommends that a table showing maximum power limits and maximum and minimum distances to the 1 mV/m field strength contour for each class be adopted instead.

12. A number of commenters suggest that the Commission classify FM stations using a method based on the predicted distance to the 1 mV/m field strength contour instead of the proposed index method. They point out that such contour-distances are read from the propagation curves,⁹ and consequently track the curves exactly, whereas the index method only approximates the curves. Three commenters, noting the difficulty of obtaining consistent visual readings, urge the Commission to publish an "official digitization and interpolating formula" that would facilitate the use of computers to produce consistent values. Hammett and Edison, Inc (H&E), consulting engineers, submitted extensive comments explaining its digitization and interpolation method, and recommends that the Commission adopt its interpolation algorithms and digitized values as the preferred method of reading the F(50,50) and F(50,10) curves. Ring also believes the Commission should consider the establishment of uniform propagation curve definition point tabulations and interpolation algorithms in order to consistently simulate the FM and TV curves, but within the context of a new proceeding. Several commenters suggested that the gaps in allowable facilities be filled by creating more classes of FM stations.

13. *Discussion.* In order to license FM stations efficiently, we must be able to classify them rapidly and accurately. Our principal goal in proposing the index method was to provide a clear-cut means of classifying FM stations according to their antenna HAAT and ERP. However, the commenters are primarily concerned with how accurately the power reduction formulas derived from the proposed index numbers track the propagation curves in

the rules. Although the index method would remove uncertainty from our station classification process, it would not track the propagation curves as accurately as the current equivalence method or any other contour-distance method. Furthermore, it is apparent from the record that the index method could easily be misunderstood or incorrectly applied. In some situations, the numerical rounding procedure required by the index method causes unexpectedly large departures from the maximum facilities limits in the rules. Thus by adopting the index method, we might be allowing round-off error to unduly influence the design or operating parameters of FM stations.¹⁰ We believe that these drawbacks outweigh the benefits that the index method would provide in terms of solving the station classification problem.

14. Having considered the concerns raised in the comments, and reassessed the benefits and drawbacks, we will not adopt the index method. Instead, we are amending our rules to provide a detailed explanation of the method we have used to classify stations since the effective date of Docket 80-90. This method looks first to the maximum and minimum ERP and HAAT limits in our rules, and then, for only those stations that fall outside of these limits, it relies on a comparison of the station's "reference distance with six "class contour distances" that we are listing in the rules.¹¹ Exceptions to the minimum power requirements are allowed for stations with relatively high effective antenna height and for stations whose reference distance exceeds the class contour distance for the next lower class. We believe that following this procedure for station classification is the best course of action at this time.¹² See Rule Sections 73.210 and 73.211 in Appendix B.

15. On March 2, 1987, we reclassified FM stations pursuant to our decision in Docket 80-90. In implementing the reclassification, we decided, pending further action in this proceeding, to refrain from downgrading those Class C stations that do not meet the minimum ERP requirements, provided that the predicted distance to their 1 mV/m field strength contour exceeds the maximum predicted distance to the 1 mV/m contour for Class C1 (72 km).¹³ Had we adopted the index method, some of these stations would have been reclassified. However, under the method we are adopting instead, all of these stations will remain Class C.

16. Several commenters requested that we classify stations solely by field strength contour distances. We are reluctant to do so at this time because of the reasonable variations that may occur when different persons read values from the propagation charts in our rules.¹⁴ In the interest of improving the consistency of calculations involving values normally read from the charts, we believe that the commenters' requests for an official digitization and interpolating formula for these curves have considerable merit. Accordingly, we plan to initiate a new proceeding addressing this proposal in the near future.¹⁵

Prediction of Coverage

17. *Proposal.* We proposed, in the *Notice*, to require that calculations for prediction of coverage be based on the maximum ERP of the main radiated lobe of the station's antenna, regardless of orientation. Currently, our rules require the use of the ERP in the horizontal plane. The purpose of the proposed change is to modernize the rules to account for the increased use of beam-tilt antennas in the FM service.¹⁶ In 1970, we revised the coverage predic-

tion procedure for TV broadcast stations to improve accuracy. In 1985, we received a Petition for Rule Making requesting similar revision to the FM rules.¹⁷

18. *Comments.* Eight commenters addressed this issue. All but one concur with or support the Commission's proposal. Edward A. Schober (Schober) opposes it, stating that errors resulting from beam-tilt antennas are negligible, that the rules already provide for supplemental showings, and that a deregulatory philosophy should permit the engineer to use good judgement to determine if deviation from the horizontal plane ERP is necessary for accuracy. NAB, Ring, and two other commenters suggested minor changes to the proposed wording.

19. *Discussion.* The purpose of this rule is to insure that when coverage is predicted for our application processing purposes, all applicants will employ the same method. It is our intention that our rules neither interfere with the proper design of FM stations, nor impede our licensees' technical efforts to provide better service to their audiences. We agree with Schober that good engineering judgment is essential when determining whether an ERP value other than the maximum should be used for coverage prediction, and we are retaining that flexibility in the rule we are adopting here. We also believe, however, that engineers should have the freedom to specify FM antenna designs that optimize coverage for the particular topography involved, without being concerned about maximizing the ERP in the horizontal plane.

20. To promote efficiency in licensing and allocation of the FM service, we believe it is important to bring our rules up-to-date with changing technology and current engineering practices. We are adopting our proposal taking into account the commenters' suggested word changes. This will result in an improvement in accuracy and it will allow the effects of beam-tilt antennas to be reflected in coverage prediction calculations. The rule will now require that prediction of coverage be based on the maximum ERP of the main radiated lobe of the FM station's antenna, regardless of orientation. See Rule Section 73.313 in Appendix B.

Intermediate Frequency (IF) Separations

21. *Proposal.* Section 73.207 specifies, by station class, the minimum distance that each FM station must be spaced from other FM stations that operate on frequencies separated by 10.6 or 10.8 MHz (53 or 54 channels apart). This spacing is required to prevent intermodulation interference in FM receivers, which employ 10.7 MHz as their first intermediate frequency (IF).¹⁸ By requiring such stations to be located at least as far apart as the specified distances, the geographical area within which a receiver would be likely to encounter two relatively strong FM broadcast signals separated in frequency by 10.6 or 10.8 MHz is reduced. The current separation distances specified for Classes A, B, and C (the original classes) were intended to avoid the overlap of 20 mV/m field strength contours.¹⁹ Nevertheless, we recognized in the *Notice* that due to an apparent miscalculation, the specified distances are insufficient to prevent such overlap. However, we are not aware of widespread IF interference problems, thereby suggesting that the existing shorter separations are adequate.

22. In Docket 80-90, we simply took the existing IF separation distances for the large Class B and C stations and applied them to the new intermediate size classes B1, C2, and C1. See paragraph 3 *supra*. This means that

stations in these new classes must meet the same separations as the largest stations, even though they operate with lower ERP and HAAT. Although this further reduces the probability of IF interference due to stations in the new classes, it also limits these stations' flexibility in choice of antenna sites.

23. We assumed that at least some relaxation in the IF separations for the new classes is appropriate, and therefore we proposed to reduce the separations to those necessary to prevent the overlap of the 30 mV/m field strength contours. We based this proposal on the current rules for the old classes, which prevent the overlap of field strength contours varying approximately from 24 mV/m to 36 mV/m.

24. *Comments.* Of the seventeen parties who commented on the IF separations proposal, seven support it, six are opposed, and four recommend taking no action until the matter can be further studied. Edens Broadcasting, Inc. (Edens) licensee of 3 FM stations, prefers that the Commission abandon separation distances and provide IF interference protection by calculation of contour overlap. Edens believes that all station classes should be held to the 30 mV/m field strength contour overlap prevention standard. Fox Broadcasting Company (Fox) reported the results of a field test carried out between two Pennsylvania FM stations which are separated by 7.4 miles, rather than the 10 miles required by the rule. According to Fox, 14 different FM receivers were tried at a location where the theoretical 42 mV/m field strength contours overlap, and no evidence of IF interference was noted. Two commenters support the relaxation of IF separation requirements, but believe that the Commission should prevent overlap of the 36 mV/m field strength contour rather than the 30 mV/m field strength contour as proposed. Key Broadcasting Corporation (KEY), licensee of WQSR, Catonsville, Maryland believes that the IF separation distance rule should be abolished altogether. Key claims that WQSR has been operating short-spaced under the IF separation requirement for 27 years and has never received any complaints of interference which could be attributed to IF short-spacing. In contrast, WDAC Radio Company, Inc. (WDAC), licensee of FM station WDAC, located in Lancaster, Pennsylvania, states that although WDAC and another nearby Class B station meet the current IF separation requirement, it has received numerous complaints from listeners whose FM receivers pick up either WDAC or the other station all across the dial because of the IF problem. WDAC suggests tightening, rather than relaxing the IF separation standards.

25. ABES recommends that the Commission defer action on the IF interference proposal until more extensive laboratory investigation by the Commission and the industry can be carried out. NAB submitted the results of a laboratory test it conducted of thirteen contemporary FM receivers. Their results indicate that susceptibility to IF interference is a function of the particular receiver and varies over a wide range. Noting that even the more expensive receivers it tested are not necessarily immune, NAB believes that the proposed rule should not be amended at this time. National Public Radio (NPR) and Ring both suggest that voluntary receiver performance standards should be developed by manufacturers or the consumer electronics industry before the Commission considers relaxation of the IF separation distance rule.

26. *Discussion.* The record with regard to the issue of IF separations is inconclusive. Several of the commenters believe that there is no problem and that IF separations should be relaxed for all of the station classes new and old. Others state that the IF interference is a serious problem and that we should not relax our requirements. NAB's test results indicate a wide variation in receiver performance, suggesting that there is room for improvement in this area. To this end, we agree with NPR and Ring that voluntary industry receiver performance standards would be helpful.

27. In keeping with our objective to promote efficiency in the allocation and use of the FM broadcast spectrum, we must weigh the benefits of increased site flexibility for our FM licensees against the risk of increased interference for members of the listening public. Unlike co-channel interference, for which our allotment standards are a controlling factor, IF interference results primarily from receiver inadequacies. Although we have not received complaints attributable to IF interference, it is plausible that, as suggested by one of the commenters, our lack of such complaints may result from the inability of those experiencing interference to identify its cause.

28. Our purpose in proposing the reduced separation distances for Class B1, C1 and C2 stations was simply to adjust the rules to provide approximately the same standard for these new classes as has existed for Class A, B and C stations since 1965. The record before us, however, neither clearly supports nor opposes our proposal. Additionally, it raises the larger question of whether an across-the-board relaxation for all station classes, based on fresh data, might be desirable. Such a relaxation, if possible without significant increase in interference, would provide the considerable advantage of greater site location flexibility for all FM licensees.

29. Based on the limited record²⁰ before us, we must reluctantly conclude that adoption now of the separation distances we proposed for the new classes, based on preventing overlap of the 30 mV/m contours, would be premature. Although we are not now changing the IF minimum distance separations for the new station classes, we believe that we should not continue to hold indefinitely these classes to a stricter standard than the one that has produced no complaints over a period of 22 years. Furthermore, we believe a more complete and comprehensive record would enable us to determine an appropriate standard that would result in reduction of IF separations for all station classes. We are encouraged by evidence in the record that a substantial number of contemporary receivers exhibit a high immunity to IF interference, and would permit a significant relaxation in the required separations. Accordingly, we plan to issue a Further Notice of Proposed Rule Making in this proceeding looking toward such a relaxation.²¹

Short - Spaced Stations

30. *Proposal.* Section 73.213 of our rules provides a table of routinely permissible modifications that apply only to FM stations at locations authorized prior to November 16, 1964 (grandfathered short-spaced stations) that did not then and still do not meet the minimum distances specified in Section 73.207. Some of these grandfathered short-spaced stations were reclassified to Class C1, C2 or B1, as a result of actions taken in Docket 80-90.²² However, the table of modifications does not contain provisions for the new classes. As a temporary matter, in that

docket, we added a NOTE following Section 73.213 which states that, for the purposes of that section, Class B1 and C2 stations are considered to be Class B stations and Class C1 stations are considered to be Class C stations. See paragraph 3 *supra*.

31. In the *Notice*, we proposed to update the rule, not by adding the new station classes, but instead by replacing the table and the entire text of the rule with a single paragraph that would permit grandfathered short-spaced stations to be modified or relocated, provided that their 1 mV/m field strength contours are not extended toward any short-spaced station. We also asked for comments as to whether we should retain the policy of considering facilities increases for short-spaced FM stations pursuant to an agreement between the stations and a showing that such an arrangement is in the public interest.

32. *Comments.* Eight commenters support our proposal primarily for the reasons that we presented. Of note, Dick Broadcasting Company, Inc. (DBC), licensee of WKDF(FM), Nashville, Tennessee, even though it is currently operating short-spaced, fully supports our proposal. DBC would restrict itself and other licensees of grandfathered short-spaced stations from making modifications that would further reduce the separation. On the other hand, NAB believes that the rule we proposed is not practical and that it unduly restricts flexibility for short-spaced licensees. Thirteen commenters, most of which are licensees of short-spaced FM stations, oppose our proposal because it would reduce the flexibility they now have to upgrade, modify or expand facilities. They claim that they will need this flexibility in the future in order to move their coverage areas in response to population movement and growth.

33. Beasley Broadcast Group (BBG), a licensee of several grandfathered short-spaced stations, believes that the Commission should allow such stations to disregard second and third adjacent channel short-spacings rather than to include them in the proposed contour restrictions. BBG claims that second and third adjacent channel short-spacings have little impact. DBC, however, cites the problem of loss of service to the listening public resulting from short-spacing on adjacent channels.

34. *Discussion.* Grandfathered short-spaced stations have had 22 years to take advantage of Section 73.213 of our rules to optimize their facilities. We believe that continuing to allow these stations to routinely modify their facilities in ways that increase the risk of interference is not in the public interest. The FM allocation is becoming increasingly occupied, and continuing to grant routinely modification requests that increase the probability of interference tends to run counter to our objective of promoting efficiency in the use of this spectrum.

35. We are therefore adopting our proposal to limit the modifications routinely permitted for grandfathered short-spaced stations to those that do not extend their 1 mV/m contour toward the 1 mV/m contour of any other station to which the minimum separation is not met. For the purposes of Section 73.213, we will consider short-spacing to apply to four of the categories specified in Section 73.207 -- co-channel, first, second and third adjacent channels.

36. We will continue, however, to consider mutual agreements between grandfathered short-spaced stations for facilities increases when it is shown that the public interest would be served.²³ When evaluating public interest showings for this purpose, we take into consideration the

additional areas and populations that would receive primary service; the extent of interference that would result, and the availability of other aural services in these areas. If, after careful consideration of these factors, we find that the implementation of such an agreement would serve the public interest, we will waive Section 73.213 to allow the 1 mV/m contour of the grandfathered station to be extended towards the 1 mV/m contour of a short-spaced station.

Distance Calculation

37. *Proposal.* We proposed to increase the precision of the coefficients in the distance calculation equations in Section 73.208 of the rules.²⁴ Some precision in these coefficients was inadvertently lost when the equations were converted to metric and truncated. We had received some questions concerning the exact conversion factors used, and we wished to provide the same degree of precision as was provided in the tables formerly in the rules.

38. *Comments.* Several commenters oppose the distance formula proposals because they believe that any error introduced by the current formulas is too small to be significant, and because they expect the corrected formulas to take longer to run in their computers.

39. H&E and Ring support the proposed corrections. Ring states that there is no reason for less accurate formulas to be retained in the Commission's rules. H&E points out the inconvenience of having to use one equation in order to comply with the Commission's rules, then to recalculate using the more accurate full-precision equations in order to match actual topographic maps. H&E submitted an exhaustive analysis of the subject, comparing six different methods for distance calculations, and recommends that the Commission adopt the full-precision, non-truncated trigonometric series. Ring also suggests that use of Table I in Section 73.698, which provides rounded degree-decimal equivalents for minutes and seconds, no longer be mandatory as exact conversion factors are easier to use.

40. *Discussion.* We are adopting the more precise coefficients for distance calculation as proposed, and revising the rule section for clarity. There is no reason to maintain a set of imprecise equations in our rules when the loss of precision is an inadvertent result of our prior English-to-metric units conversion. We find the argument of increased computer time unpersuasive. The limiting factor for accuracy in calculations concerning distance should be the geographical coordinates provided, not the Commission's rules, particularly in the FM broadcast service, where commercial allotments and assignments are based on calculated distances. We are also incorporating Ring's suggestion to allow the use of exact conversion factors in lieu of the degree-decimal conversion table in the rules.²⁵ See Section 73.208 in Appendix B.

Editorial Changes

41. Finally, we proposed to (1) specify more clearly the area constituting a quiet zone in Boulder County, Colorado as a box bounded by particular latitude and longitude lines, rather than as the "vicinity" of a specified point; and (2) amend the rule permitting replacement of the transmitting antenna of an FM (or TV) broadcast station without prior Commission authorization in order to clarify that it is intended only for those situations in which there

is no change in the coverage characteristics. We are adopting these editorial changes as proposed. See Sections 73.1030 and 73.1690 in Appendix B.

OTHER MATTERS

42. At paragraph 17 in the *Notice*, we proposed to simplify the procedure by which an applicant may obtain an unoccupied FM channel at a lower class than is allotted. Specifically, we proposed to allow application directly for the lower class without the currently required rule making, if the filing window period elapsed and the channel was unapplied for. One commenter addressed this issue, supporting our proposal. However, we have decided to address this matter in a separate proceeding that will deal with the larger issue of downgrading existing stations as well as vacant channels. Therefore, we shall not amend our rules with regard to allotment downgrades at this time.

43. Applications received prior to the effective date of these rules will be processed in accordance with the rules most advantageous to the applicant.

44. Pursuant to the requirements of Section 604 of the Regulatory Flexibility Act, 5 U.S.C. Section 604, a Final Regulatory Flexibility Analysis has been prepared as follows:

Final Regulatory Flexibility Analysis

I. Need and Purpose of Rule

To provide more efficient use of the spectrum allocated for FM broadcast stations, the Commission increased the number of FM station classes in 1983, which allows more stations to be assigned. This action, however, caused certain technical inconsistencies in the Commission's rules governing station classification, grandfathered short-spaced stations, and IF interference separation distances. Additionally, the Commission's rules governing coverage predictions and distance calculations needed updating and revision. Classifying stations on the basis of effective radiated power, antenna height above average terrain, and distance to a specified signal strength contour will remove ambiguities caused by the earlier action. Allowing grandfathered short-spaced stations to modify routinely their facilities only in ways that do not increase the risk of interference will promote efficiency in the use of the FM broadcast spectrum. Revising and updating the coverage prediction and distance calculation rules will increase the accuracy of these procedures.

II. Flexibility Issues Raised in the Comments

Commenters suggested that the Commission adopt station classification rules based on distance to signal strength contour rather than a calculated index as the Commission originally proposed. Licensees of grandfathered short-spaced stations requested that the Commission continue to permit them to routinely modify their stations in ways that can increase the risk of interference.

III. Significant Alternatives Considered But Not Adopted

The Commission originally proposed to classify FM stations using a calculated index method. However, this method was found to be cumbersome, inaccurate and too complex by the commenters. Also, the Commission pro-

posed to relax the IF interference separation distances for the new classes of stations it had created in an earlier action. Laboratory data and comments indicate that additional information is needed to determine the appropriate extent of such a relaxation.

45. The proposals contained herein have been analyzed with respect to the Paperwork Reduction Act of 1980 and found to contain no new or modified form, information collection and/or record keeping, labeling, disclosure, or record retention requirements, and they will not increase or decrease burden hours imposed on the public.

46. Authority for the action taken herein is contained in Section 303 of the Communications Act of 1934 as amended.

ORDERING CLAUSES

47. Accordingly, IT IS ORDERED That Part 73 of the Commission's Rules and Regulations ARE AMENDED, as set forth in Appendix B below, effective November 9, 1987.

48. IT IS FURTHER ORDERED That those Class C stations that, as of March 2, 1987, were operating with an ERP less than 100 kW, HAAT greater than 300 meters, and distance to the 1 mV/m field strength contour exceeding 72 km, and consequently were not reclassified pending action in this proceeding, ARE DESIGNATED Class C.

49. IT IS FURTHER ORDERED That the Petition for Partial Reconsideration filed by Hudson Group Limited Partnership of Pennsylvania IS DISMISSED.

50. IT IS FURTHER ORDERED That *Public Notice* No. 75-1347, released December 15, 1975 IS AMENDED, as set forth in a revised *Public Notice*, attached as Appendix C.

FEDERAL COMMUNICATIONS COMMISSION

William J. Tricarico
Secretary

APPENDIX A

The following submitted comments addressing our specific proposals in this proceeding:

West Central Broadcasting, Inc.
Callais Broadcasting, Inc.
EJM Broadcasting
Stannard Broadcasting Company, Inc.
WKDZ, Inc.
H.R. Williams, Jr (KPSM)
Americom
Capital Broadcasting, Inc.
Enterprise Publishing Company
E.O. Roden And Associates, Inc.
Garamella Broadcasting Company
Hayco Broadcasting, Inc.
Hudson Broadcasting Corporation
Lakeland Broadcasting, Inc.

La Porte County Broadcasting, Inc.
Tri-Cities Broadcasting, Inc.
WBIP Broadcasting Corporation
Edward A. Schober (Radiotechniques)
Wath, Inc.
A.D. Ring & Associates, P.C.
Dick Broadcasting Company, Inc.
Lasalle County Broadcasting
WCME, Boothbay Harbor, Mawe
Kinzua Broadcasting Co., Inc.
New Jersey Class A Broadcasters Assoc.
Clear Channel Communications, Inc.
WSEA-FM, Georgetown, Del.
Beasley Broadcast Group
Capitol Broadcasting Corporation
National Public Radio
Association of Federal Communications Consulting
Engineers
Southland Communications, Inc.
Bart Walker
Key Broadcasting Corporation
Mountain Tower
John J. Davis Associates
Carlos Juan Colon Ventura
Broadcast Engineering And Equipment Maintenance
Co.
Russell and Susan Kinsley
Communications General Corporation
Sunshine Wireless Company
Doug C. McDonell
Association for Broadcast Engineering Standards, Inc.
Brown Broadcasting Service, Inc.
Stansell Communications, Inc.
Hammett and Edison, Inc.
Columbia FM, Inc.
Eric R. Hilding Southwest Communications, Inc.
Dwyer Broadcasting, Inc.
Adventure Communications, Inc.
Corporation for Public Broadcasting
Edens Broadcasting, Inc.
Magnuson & Associates, Inc.
Scripps Howard Broadcasting Company
Harvitt Broadcasting Corporation
Fox Broadcasting Company
KGB, Incorporated
Greenup County Broadcasting, Inc.
Catawba Valley Broadcasting Company, Inc.
Triple D Properties, Inc.
Lawrence Behr Associates, Inc.
Lasalle County Broadcasting, Inc.
KLOK Radio, Ltd
Voice of The Orange Empire, Inc.
National Association of Broadcasters
WDAC (FM), Lancaster, Pennsylvania
Dutreil-Rackley

Additionally, 310 licensees of Class A broadcast stations and 60 Congressional or State Government officials filed reply comments supporting a suggestion made by Clear Channel Communications, Inc. in their comments, that the ERP and HAAT limits for Class A stations be increased. In the *First Report and Order*, the Commission found that Clear Channel's suggestion is outside the scope of the *Notice* and declined to consider it further in this proceeding.

APPENDIX B

47 CFR Part 73 is amended as follows:

1. The authority citation for Part 73 continues to read as follows:

Authority: 47 U.S.C. 154 and 303.

2. 47 CFR 73.208 is amended by revising paragraph (c) to read as follows:

§ 73.208 Reference points and distance computation.

* * * * *

(c) The method given in this paragraph shall be used to compute the distance between two reference points, except that, for computation of distance involving stations in Canada and Mexico, the method for distance computation specified in the applicable international agreement shall be used instead. The method set forth in this paragraph is valid only for distances not exceeding 475 km (295 miles).

(1) Convert the latitude and longitude of each reference point from degree-minute-second format to degree-decimal format by:

(i) dividing minutes by 60 and seconds by 3600 then adding the results to degrees; or,

(ii) using Table I of § 73.698.

(2) Calculate the middle latitude between the two reference points by averaging the two latitudes as follows:

$$ML = (LAT1dd + LAT2dd)/2$$

(3) Calculate the number of kilometers per degree latitude difference for the middle latitude calculated in paragraph (c)(2) as follows:

$$KPDlat = 111.13209 - 0.56605 \cos(2ML) + 0.00120 \cos(4ML)$$

(4) Calculate the number of kilometers per degree longitude difference for the middle latitude calculated in paragraph (c)(2) as follows:

$$KPDlon = 111.41513 \cos(ML) - 0.09455 \cos(3ML) + 0.00012 \cos(5ML)$$

(5) Calculate the North-South distance in kilometers as follows:

$$NS = KPDlat (LAT1dd - LAT2dd)$$

(6) Calculate the East-West distance in kilometers as follows:

$$EW = KPDlon (LON1dd - LON2dd)$$

(7) Calculate the distance between the two reference points by taking the square root of the sum of the squares of the East-West and North-South distances as follows:

$$DIST = (NS^2 + EW^2)^{0.5}$$

(8) Round the distance to the nearest kilometer.

(9) Terms used in this section are defined as follows:

(i) LAT1dd and LON1dd = the coordinates of the first reference point in degree-decimal format.

(ii) LAT2dd and LON2dd = the coordinates of the second reference point in degree-decimal format.

(iii) ML = the middle latitude in degree-decimal format.

(iv) KPDlat = the number of kilometers per degree of latitude at a given middle latitude.

(v) KPDlon = the number of kilometers per degree of longitude at a given middle latitude.

(vi) NS = the North-South distance in kilometers.

(vii) EW = the East-West distance in kilometers.

(viii) DIST = the distance between the two reference points, in kilometers.

3. A new section 47 CFR 73.210, Station Classes, is added:

§ 73.210 Station classes.

(a) The rules applicable to a particular station, including minimum and maximum facilities requirements, are determined by its class. Possible class designations depend upon the zone in which the station's transmitter is located, or proposed to be located. The zones are defined in § 73.205. Allotted station classes are indicated in the Table of Allotments, § 73.202. Class A, B1 and B stations may be authorized in Zones I and I-A. Class A, C2, C1, and C stations may be authorized in Zone II.

(b) The power and antenna height requirements for each class are set forth in § 73.211. If a station has an ERP and an antenna HAAT such that it cannot be classified using the maximum limits and minimum requirements in § 73.211, its class shall be determined using the following procedure:

(1) Determine the reference distance of the station using the procedure in paragraph (b)(1)(i) of § 73.211. If this distance is less than or equal to 24 km, the station is Class A; otherwise,

(2) For a station in Zone I or Zone I-A, except for Puerto Rico and the Virgin Islands:

(i) If this distance is greater than 24 km and less than or equal to 39 km, the station is Class B1.

(ii) If this distance is greater than 39 km and less than or equal to 52 km, the station is Class B.

(3) For a station in Zone II:

(i) If this distance is greater than 24 km and less than or equal to 52 km, the station is Class C2.

(ii) If this distance is greater than 52 km and less than or equal to 72 km, the station is Class C1.

(iii) If this distance is greater than 72 km and less than or equal to 92 km, the station is Class C.

(4) For a station in Puerto Rico or the Virgin Islands:

(i) If this distance is less than or equal to 42 km, the station is Class A.

(ii) If this distance is greater than 42 km and less than or equal to 46 km, the station is Class B1.

(iii) If this distance is greater than 46 km and less than or equal to 78 km, the station is Class B.

3. 47 CFR 73.211, Power and antenna height requirements, is amended by revising the text of paragraph (a) and subparagraphs (b)(1) and (b)(2), and by removing paragraphs (d) and (e).

§ 73.211 Power and antenna height requirements.

(a) *Minimum requirements.* (1) Except as provided in paragraphs (a)(3) and (b)(2) of this section, the minimum effective radiated power (ERP) for:

- Class A stations must equal 0.1 kW (-10.0 dBk);
- Class B1 stations must exceed 3 kW (4.8 dBk);
- Class B stations must exceed 25 kW (14.0 dBk);
- Class C2 stations must exceed 3 kW (4.8 dBk);
- Class C1 stations must exceed 50 kW (17.0 dBk);
- Class C stations must equal 100 kW (20.0 dBk).

(2) Class C stations must have an antenna height above average terrain (HAAT) of at least 300 meters (984 feet). No minimum HAAT is specified for Classes A, B1, B, C2, or C1 stations.

(3) Stations of any class except Class A may have an ERP less than that specified in paragraph (a)(1) of this section, provided that the reference distance, determined

in accordance with paragraph (b)(1)(i) of this section, exceeds the distance to the class contour for the next lower class.

(b) *Maximum limits.* (1) The maximum ERP in any direction, reference HAAT, and distance to the class contour for the various classes of stations are listed below:

Station Class	Maximum ERP	Reference HAAT in meters (ft)	Class contour distance in kilometers
A	3kW (4.8 dBk)	100 (328)	24
B1	25kW (14.0 dBk)	100 (328)	39
B	50kW (17.0 dBk)	150 (492)	52
C2	50kW (17.0 dBk)	150 (492)	52
C1	100kW (20.0 dBk)	299 (981)	72
C	100kW (20.0 dBk)	600 (1968)	92

(i) The reference distance of a station is obtained by finding the predicted distance to the 1 mV/m contour using Figure 1 of § 73.333 and then rounding to the nearest kilometer. Antenna HAAT is determined using the procedure in § 73.313. If the HAAT so determined is less than 30 meters (100 feet), a HAAT of 30 meters must be used when finding the predicted distance to the 1 mV/m contour.

(ii) If a station's ERP is equal to the maximum for its class, its antenna HAAT must not exceed the reference HAAT, regardless of the reference distance. For example, a Class A station operating with 3 kW ERP may have an antenna HAAT of 100 meters, but not 101 meters, even though the reference distance is 24 km in both cases.

(iii) Except as provided in paragraph (b)(3) of this section, no station will be authorized in Zone I or I-A with an ERP equal to 50 kW and a HAAT exceeding 150 meters. No station will be authorized in Zone II with an ERP equal to 100 kW and a HAAT exceeding 600 meters.

(2) If a station has an antenna HAAT greater than the reference HAAT for its class, its ERP must be lower than the class maximum such that the reference distance does not exceed the class contour distance. If the antenna HAAT is so great that the station's ERP must be lower than the minimum ERP for its class (specified in paragraphs (a)(1) and (a)(3) of this section), that lower ERP will become the minimum for that station.

4. 47 CFR 73.213 is revised in its entirety to read as follows:

§73.213 Grandfathered short - spaced stations.

Stations at locations authorized prior to November 16, 1964 that did not meet the separation distances required by § 73.207 and have remained short-spaced since that time may be modified or relocated provided that the predicted distance to the 1 mV/m field strength contour is

not extended toward the 1 mV/m field strength contour of any short-spaced station. Mutual increase in the facilities of such stations up to the limits set forth in § 73.211 may be permitted pursuant to an agreement between the affected stations and a showing of public interest. See § 73.4235.

5. 47 CFR 73.313 is amended by revising paragraph (c)(2) to read as follows:

§ 73. 313 Prediction of Coverage.

* * * * *

(c) * * *

(1) * * *

(2) To use the chart for other ERP values, convert the ordinate scale by the appropriate adjustment in dB. For example, the ordinate scale for an ERP of 50 kW (17 dBk) should be adjusted by 17 dB and, therefore, a field strength of 40 dBu would be converted to 57 dBu. When predicting the distance to field strength contours, use the maximum ERP of the main radiated lobe in the pertinent azimuthal direction. When predicting field strengths over areas not in the plane of the maximum main lobe, use the ERP in the direction of such areas, determined by considering the appropriate vertical radiation pattern.

* * * * *

6. 47 CFR 73.1030 is amended by revising the parenthetical phrase "(in the vicinity of coordinates 40°07'50" N Latitude, 105°14' 40" W Longitude)" of paragraph (b) to read "(within the area bounded by 40°09' 10" N Latitude on the north, 105°13' 31" W Longitude on the east, 40°07' 05" N Latitude on the south, and 105°15'13" W Longitude on the west)".

7. 47 CFR 73.1690 is amended by revising paragraph (c)(1) to read as follows:

§ 73. 1690 Modification of transmission systems.

* * * * *

(c) * * *

(1) Replacement of a non-directional antenna with one of the same or different type or number of bays, provided that the height above ground of the center of radiation is within 2 meters of that specified in the station authorization, the parameters are within that permitted by its class designation, and there is no change in the maximum effective radiated power.

* * * * *

**APPENDIX C
PUBLIC NOTICE**

**AGREEMENT POLICY FOR SHORT - SPACED FM
BROADCAST STATIONS EXPANDED**

The Commission will now consider mutual agreements between grandfathered short-spaced stations for facilities increases on the same channel, and/or the first, second or third adjacent channels.

By its *Public Notice*, No. 75-1347, released December 15, 1975, 57 FCC 2d 1263 (1975), the Commission reaffirmed the policy of considering agreements between grandfathered short-spaced stations (FM broadcast stations at locations authorized prior to November 16, 1964 which did not meet the minimum spacing requirements of § 73.207 of the rules and have remained short-spaced since that time) to increase their facilities beyond those routinely permitted for such stations in § 73.213 of the rules. That *Public Notice* set forth the criteria to be used in evaluating whether such an agreement is in the public interest.

This policy, however, has applied only to grandfathered short-spaced stations that were short-spaced on the same channel and/or the first adjacent channels. In order to maintain consistency with § 73.213, as amended in MM Docket 86-144, the agreement policy will now apply also to grandfathered short-spaced stations that are short-spaced on the second and third adjacent channels.

FOOTNOTES

¹ *Report and Order*, 94 FCC 2d 152(1983); *recon., granted in part and denied in part*, 97 FCC 2d 279(1984). The Commission amended the FM broadcasting rules to accommodate more stations by increasing the number of station classes.

² In general, our approach was to apply existing rules to new Classes B1 and C2 as if they were Class B, and likewise to treat new Class C1 as though it was Class C. This resulted in no increased burden for many existing stations that were reclassified.

³ For example, consider a Zone I station having facilities of 20 kW power and 140 meters effective antenna height. The power is less than the minimum requirement of 25.1 kW for Class B stations, but exceeds the 16 kW permitted for Class B1 stations using a 140 meter effective antenna height.

⁴ 51 Fed. Reg. 15927, published April 29, 1986.

⁵ Commenters are listed in Appendix A.

⁶ 52 Fed. Reg. 8259, published March 17, 1987.

⁷ On April 15, 1987, a Petition for Partial Reconsideration was filed by Hudson Group Limited Partnership of Pennsylvania, (Hudson), licensee of Class A FM Station WSFM of Harrisburg, Pa. We will dismiss Hudson's petition. Hudson claims that it is unclear from the *First Report and Order* whether the Commission considered a suggestion it made in its comments -- that Class A stations unable to upgrade to a higher class because of required separations be allowed to increase facilities to the maximum extent technically feasible while still providing full protection to other stations. Hudson newly proposes in its petition that we expand the applicability of § 73.213(a) to allow Class A stations to become short-spaced where a mutual agreement exists between the affected stations. Both proposals are outside the scope of this proceeding and will not be considered here.

⁸ Overheight power reduction means that stations with antennas that exceed the maximum HAAT for their class must operate at a lower ERP such that the predicted distance to the 1 mV/m field strength contour is not increased beyond that which would result from operating at maximum ERP and HAAT. See current § 73.211(b). In this proceeding, we are substituting the term "reference HAAT" in place of "maximum HAAT", because it may be exceeded if ERP is reduced accordingly. By contrast, maximum ERP must not be exceeded under any circumstance.

⁹ The F(50,50) and F(50,10) propagation curves for FM stations are contained in § 73.333 of our rules.

¹⁰ At paragraph 11 in the *Notice*, we estimated that 49 stations would be subject to a different classification due to rounding error, under the index method.

¹¹ We use the term "reference distance" to mean the predicted distance from a station's transmitting antenna to its 1 mV/m field strength contour, rounded to the nearest kilometer. The "class contour distances" listed in new § 73.211(b) of the rules are based on the reference HAAT and maximum ERP for each station class. For stations that cannot be classified using the maximum and minimum HAAT and ERP limits in the rules, we first determine the reference distance using the station's HAAT (as defined in § 73.310(a)) and its maximum proposed or authorized ERP. This reference distance is then compared to the six class contour distances. The class of the station corresponds to the lowest class contour distance that equals or exceeds the station's reference distance. As indicated in the *Notice*, the proposed index method was designed to approximately reflect the predicted distance to the 1 mV/m contour. Thus the method adopted instead is essentially similar to, although more accurate than, the method proposed.

¹² We are not amending at this time the portion of the power and antenna height rule which provides special limits for stations in Puerto Rico and the Virgin Islands. We have received a petition for rule making, (RM 5691, *Public Notice* January 14, 1987), from Carlos Juan Colon Ventura, licensee of WSAW (FM), Viques, Puerto Rico, which requests increased power for stations in Puerto Rico and the Virgin Islands. We may propose adjustments to that portion of the rule, if warranted, after consideration of that petition.

¹³ For example, a Class C station with 85 kW ERP and a HAAT of 361 meters would have been downgraded to a Class C1 using the ERP criterion (because the minimum ERP for Class C is 100 kW), but no action was taken because the predicted distance to its 1 mV/m field strength contour is 75 kilometers. This exceeds the maximum predicted distance to the 1 mV/m field strength contour for a Class C1 station, which is 72 kilometers. See *Public Notice* "Reclassification of FM Facilities Pursuant to BC Docket 80-90", FCC 87-93, released March 24, 1987.

¹⁴ Both charts comprise a set of propagation curves drawn on a linear-logarithmic graph. The F(50,50) chart, used for service and coverage contours, contains 40 curves, and the F(50,10) chart, used for interference contours, contains 50 curves. Often, the desired value does not lie on one of the curves, but between two of them. In such cases, graphical or mathematical interpolation must be used to arrive at result. Because of limitations in printing resolution and human visual acuity, it is not unusual for different persons to obtain slightly different results.

¹⁵ That proceeding would consider which of several possible interpolation methods should be used, as well as the optimum number of data points for each method.

¹⁶ Beam-tilt antennas direct the maximum radiation downwards towards the earth's surface, rather than towards the horizon. Consequently, the ERP in the horizontal plane is less than the maximum ERP.

¹⁷ Petition for rule making was filed by the engineering consulting firm of duTreil-Rackley, November 26, 1985. In the *Notice*, the Commission dismissed this petition without prejudice, but retained it as a part of the official record in this proceeding.

¹⁸ Most consumer FM broadcast receivers use 10.7 MHz as their first IF. IF interference is characterized by the reception of the audio, often distorted, of one of the two stations involved, regardless of the position of the receiver's tuner dial. Thus, when it occurs, this phenomenon can prevent reception by the affected receiver of most or all of the FM stations in the area.

¹⁹ See *Report and Order* in Docket No. 15934, FCC 65-575, 30 Fed. Reg. 8680, July 9, 1965, 5RR 2d 1679 (adopted June 30, 1965).

²⁰ Noticeably absent from the record are comments from FM receiver manufacturers and associations that represent the consumer electronics industry. Technical analyses and data relevant to improvement in receiver IF interference immunity due to technological advancement would have been particularly welcome. In addition, the Commission's laboratory is currently evaluating IF interference susceptibility in various categories of new FM receivers, and expects to report its findings later this year.

²¹ Despite our consideration of contour overlap standards in other contexts in this proceeding, at present meeting or exceeding the required separation distances constitutes the only measure of compliance with this particular rule. Furthermore, inasmuch as we shall consider these matters in a further proceeding, at present we shall not consider alleged discrepancies between the separation distances in the rule and contour overlap calculations presumed to underlie them to constitute sufficient grounds for a waiver of § 73.207.

²² Of those reclassified, some may have lost their grandfathered status as a result of the reduced separation requirements of the new class.

²³ See § 73.4235 and *Public Notice* 75-1347, released December 15, 1975. This policy has applied only to co-channel and first adjacent channel short-spacing in the past, however, we will extend it to cover second and third adjacent channel short-spacing situations upon the effective date of the rules adopted herein.

²⁴ See *Notice* at paragraph 24. The equations we proposed are correct for distance calculations based upon Clarke's Reference Spheroid of 1866. H&E states that these are appropriate for Commission licensees' use because USGS topographic maps are based on the Clarke spheroid.

²⁵ Applicants are advised to use the formulas specified in international agreements for calculations involving stations in Canada and Mexico, to the extent that these may differ from the formula we are adopting herein.