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

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FCC 85-328
35929

In the matter of	)	Docket No. 20735
	)	RM-1301, RM-1974
Changes in the Rules Relating	)	RM-2655
To Noncommercial, Educational	)	
FM Broadcast Stations	)	

Memorandum Opinion and Order
(Proceeding Terminated)

Adopted: June 20, 1985 ; Released: June 27, 1985

By the Commission: Commissioner Rivera not participating.

Introduction

1. The Commission has under consideration several petitions for reconsideration of the Third Report and Order (Third Order) in the above referenced matter and responsive pleadings. (See 49 Fed. Reg. 45146 (November 15, 1984).) The Third Order presented a solution to a long-standing problem of interference caused to reception of television Channel 6 (TV-6) by the presence of noncommercial, educational FM broadcast stations (NCE-FM). Both TV-6 and NCE-FM interests filed petitions for reconsideration. Additionally, a compromise solution was jointly submitted which offered a basis for resolving all of the outstanding issues in this proceeding.

2. The Commission's solution in the Third Order was presented as a neutral approach to resolving the problem. However, neither side accepted the new rules in total. In virtually every issue, the Commission's conclusion received support from one side and criticism from the other side, depending on whether the decision supported or contradicted the commenter's position. This reaffirms the Commission's belief that the solution adopted in the Third Order was indeed a balanced approach to this complex question. Nevertheless, in this Memorandum Opinion and Order, we have carefully reconsidered each issue and adjusted the conclusions contained in the Third Order based on the additional filings, especially the joint compromise solution.

Background

3. This proceeding was initiated by a petition for rule making filed in 1972 by the Corporation for Public Broadcasting (CPB), requesting a review of the rules governing the assignment of NCE-FM stations. Although several issues have been considered in the overall proceeding, the Third Order focused on the resolution of the interference problem between NCE-FM stations and TV-6 stations. This problem occurs primarily because the two services operate immediately adjacent in frequency. When television receivers are tuned to Channel 6 (82-88 MHz), they may also receive signals in the NCE-FM band (88-92 MHz). Although advancements in the design of television receivers may eventually eliminate the interference problem, this proceeding has attempted to provide an interim solution.

4. The Commission's goals in dealing with this vexing problem were to: 1) allow for expansion of the NCE-FM service, 2) have minimal negative impact on the TV-6 viewers, and 3) offer a realistic approach for satisfying the needs of all interested parties. The solution adopted by the Commission in the Third Order represented a balanced approach attempting to satisfy these goals. The compatibility criteria adopted allowed new NCE-FM stations to cause objectionable interference to no more than 3 square miles of a TV-6 station's Grade B coverage area. This was accomplished by limiting the power of the NCE-FM stations based on frequency of operation and field strengths of the TV-6 stations at the NCE-FM transmitter sites. Flexibility was left to the NCE-FM stations to "engineer-in" stations based on use of several interference remedies. NCE-FM stations were given a choice of how much responsibility they desired to accept based on the power levels of the stations (i.e., increased power required increased responsibilities).

5. Both the NCE-FM and TV-6 interests opposed the solution adopted by the Commission and jointly petitioned for a stay of the new rules. Along with the stay, the Commission had to impose a freeze on NCE-FM and TV-6 applications, as no applications could be granted pending resolution of the interference problem. (See 50 Fed. Reg. 5073 (February 6, 1985).) One outcome of the stay was to delay government funding of NCE-FM stations as provided by the National Telecommunications Information Administration (NTIA) during this fiscal year.

6. In addition to the timely filed petitions, comments, and replies, the Commission, on May 28, 1985, received a joint proposed solution for the interim period. Both NCE-FM and TV-6 interests participated in drafting the submission. 1/ On June 3, 1985, the docket was re-opened to allow all parties to comment on the proposed compromise solution. A complete list of commenting parties and abbreviations for those parties is provided in Appendix A.

Joint Compromise Solution

7. Before discussion of the various issues raised in reconsideration, a brief introduction of the compromise solution is in order. We have weighed heavily that proposal and the comments received in reply in arriving at the reconsideration decision. Although a few groups opposed it, the compromise is a solution that representatives of the major interest groups from both sides believe is workable.

8. The compromise before us can be considered in two parts: 1) specific provisions for NCE-FM applicants and TV Channel 6 licensees; and 2) various actions to be taken by the NCE-FM parties, TV-6 parties, and the Commission. First, the solution proposes specific rules outlining a complex method of computing acceptable NCE-FM facilities based on limiting interference to no more than 3,000 persons for new stations or decreasing the

1/ The compromise solution was jointly submitted by representatives of: Association of Maximum Service Telecasters, Inc.; National Association of Broadcasters; Taft Broadcasting Company, McGraw-Hill Broadcasting Company, Inc. and Storer Broadcasting Company; Corporation for Public Broadcasting; National Public Radio; and National Federation of Community Broadcasters.

predicted amount of interference when modifying existing stations. Various allowances are made for filters, receiver antenna directivity, and vertical polarization. Further adjustments can be made for replacement service from TV translators, satellite stations, and reception of same network affiliates. Considerations for existing interference from co-channel and adjacent channel television stations can also be incorporated in computing acceptable facilities. Both parties clearly indicated that they could not support excising or modifying any portions of the proposal.

9. The Commission continues to believe that the Third Order represented a reasonable accommodation of the competing interests of the NCE-FM and TV-6 communities. However, the success of any such solution depends, in large part, on the perception of the parties that it is a fair balancing of their competing interests. It is apparent that the respective camps did not believe that the Third Order fairly accommodated their interests. Thus, it is reasonable to assume that our efforts to preserve TV-6 service and provide new NCE-FM service would be marred by extended litigation of parties at odds with each other and the perceived inadequacies of the Commission's solution. In such circumstances, the overall ends of the Commission and the interests of the public would be better served by adoption of the compromise solution. Although that solution does not represent the views of all parties, it is one that major participants believe is fair. As such, it has a greater likelihood of succeeding to the overall benefit of the public by protecting TV-6 service and providing new NCE-FM service without interminable litigation.

Issues

10. There are several issues to be considered in this matter. We have attempted to present these issues in a manner similar to that found in the various filings. The issues to be considered are as follows:

1. Television Receiver Standards
2. Effective Interference Model
3. Engineers in Charge Licensing Discretion
4. Undesired Signal to Desired Signal (U/D) Ratios
5. Population Considerations
6. NCE-FM Basic Power Levels
7. Allowances for Interference Remedies
8. Adjustments for Alternatives and Existing Interference
9. Collocation
10. NCE-FM Grandfathering Rights

Each issue will be developed separately with special reference to the compromise solution.

Issue 1: Television Receiver Standards

11. Several commenters again suggested that the Commission should adopt receiver standards because improvements in television interference immunity criteria would virtually eliminate the interference problem. The basis of this contention, that better rejection of the FM band would ameliorate the problem, is because the interference is caused by deficient television receivers and not by spurious or improper emissions broadcast by NCE-FM stations.

12. In lieu of adopting new standards immediately, CPB, NTIA, and MAET urged that receivers be improved through the adoption of incentives by decreasing the protection criteria or by specifying a schedule for implementing voluntary standards. The parties to the compromise solution urged "the Commission to adopt, by October 1, 1987, mandatory television receiver standards to decrease or eliminate the interference which NCE-FM operations can cause to Channel 6 reception." They noted that the need for interim rules should diminish as the potential for interference decreases.

13. The Commission concurs with the need for receiver improvements. However, even if the Commission were to adopt receiver standards to cope with the problem, that would be a very long-term solution. A recently released report from the Electronic Industries Association/Consumer Electronics Group (EIA) indicates that 50 percent of all color televisions bought 15 years ago are still in service. (EIA Color Television Replacement Study, April 1985, by Market Facts, Inc.) The report further states that 4 out of 5 sets are still in service after 10 years. Therefore, even if the sets being produced today had significantly better rejection of the FM band than those produced yesterday, the impact could not be realized for at least a decade or longer. This provides little immediate relief to either the NCE-FM or TV-6 interests.

14. Given the long-term nature of this solution, we feel it is better to allow the television receiver manufacturers additional time to set and implement voluntary criteria. The EIA has established a committee to develop such standards and is in the process of drafting a specific measurement procedure. The Commission will continue to monitor the committee's progress. As pointed out in the Third Order, at paragraph 9, the Commission will exercise its statutory authority to set such immunity criteria if the industry fails to do so in a reasonable time. Even the lesser option of establishing incentives, schedules, or "due dates" appears premature unless the receiver industry fails to act positively on its own. From the evidence before us, the industry appears to have every intention of developing improved immunity standards on its own; thus, we decline to establish timetables at this time. Therefore, upon reconsideration, the Commission reaffirms its decision in the Third Order by not adopting mandatory television receiver performance criteria at this time.

Issue 2: Effective Interference Model

15. The effective interference model, as devised by the Commission's Office of Science and Technology, was used in developing the acceptable power levels adopted in the Third Order. Its use was opposed by TV-6 interests. The FM interests generally supported it. NPR and NFCB supported the model as an improved method of accounting for the probablities of service and interference, while the TV Petitioners and others such as Channel 6 felt that the effective interference model predicts less interference than actually will occur. In addition to the accuracy argument, CPB in agreement with the TV Petitioners noted that effective interference was of little practical use because the computer program (TVINT) failed to predict where the interference will occur.

16. No new arguments were presented here. Neither the effective interference model nor the conventional method of interference prediction can accurately determine exactly where the interference will occur. Even the parties in the compromise solution acknowledge, "the interference prediction

method [conventional] used in this proposal is based on probabilities and therefore all persons within the predicted interference area will not actually receive interference."

17. We continue to believe that the effective interference model provides a good tool for examining the net effect of interference on TV-6 service. Even if its predictions differ from the conventional method (and in many cases the predictions between the two methods are almost equal), effective interference provides a realistic method upon which to build a protection plan. However, we need not belabor that point here because we agree that the effective interference model in its current form (i.e., the TVINT program) is unable to provide an NCE-FM applicant or the TV-6 licensee with an acceptable means to define the boundaries of an interference area. Athough the effective interference model can display those locations where interference is likely through a graphics enhancement, we will accept the industry's current reluctance to use this approach. The compromise solution is based on the ability of both sides to define where interference is likely to occur. Currently, that can most easily be done by conventional methods.

18. Upon reconsideration, we reject the petitioners' contentions that the effective interference model is fundamentally flawed, but we find its use inappropriate in implementation of the joint compromise.

Issue 3: Engineers in Charge Licensing Discretion

19. Most commenters rejected the idea of the Commission's Engineers in Charge (EIC) involvement in the station licensing procedure. Basically, the Engineer in Charge would have ascertained that the many interference complaints normally received at the outset of NCE-FM operation were resolved before final licensing. Both sides opposed this procedure primarily because no specific guidelines were given to assure a uniform policy nationwide. Although we believe such a policy could be developed and successfully implemented through the Engineers in Charge, the majority of commenters appeared to favor other, more specific, alternatives to resolve this interference question.

20. For the compromise solution to work it will be necessary for the TV-6 licensee to be aware of the number of persons in its audience who are receiving interference from an NCE-FM licensee. To assist with this the Commission will funnel all interference complaints it receives about NCE-FM operation to the TV-6 licensee. Then the TV-6 licensee can pursue resolution of these complaints with the NCE-FM licensee and assure that the required number of filters have been installed. Since the TV-6 licensee will perform the complaint monitoring role originally envisioned for the FCC Engineer in Charge, we will, upon reconsideration, remove the Engineer in Charge from the complaint resolving and licensing procedure.

Issue 4: Undesired Signal to Desired Signal (U/D) Ratios

21. On this issue, both interests were on opposite sides. The NCE-FM commenters supported the Commission's use of a fixed U/D ratio reference; whereas, TV-6 commenters felt that the U/D ratio should vary with the TV-6

signal strength. 2/ NPR and NFCB contended that the Commission was correct in using the U/D ratio for -65 dBm received signal strength universally throughout the whole Grade B service area. They claimed that as the TV-6 field strength increases, viewers use lesser quality antennas, causing little improvement in the signal present at the antenna terminals of the television receivers. WJAC-TV, the TV Petitioners, and others believed that the U/D ratio should vary because using the lower U/D ratio uniformly would degrade higher quality pictures more noticeably than lower quality pictures. In addition, the Channel 6 Commenters stated that the Commission erred in its judgement that Channel 6 reception would be most susceptible to interference from educational FM stations closest in frequency to the Channel 6 facility; and thus, the U/D ratios presented in the Second Further Notice of Proposed Rule Making (Second Further Notice) and used in the Third Order were incorrect. EIA noted that it submitted pictorial evidence of the nonlinear nature of the interference which supports the TV Petitioners demonstration that considerable interference would occur. 3/

22. In brief, the NCE-FM interests relied on the concept that the television service contours were defined such that the same "standard criterion of service," (that is, "acceptable quality to a median observer") 4/ is avaliable at the Grade A contour as is available at the Grade B contour of the TV station with the probability of receiving that quality decreasing as one moves further from the TV transmitter. Assumptions of receiving antenna installations typical of suburban and near-fringe areas are incorporated in order to achieve the same quality of service at both contours.

23. On the other hand, the TV Petitioners argued that signal levels at television receivers do vary from -65 dBm near the Grade B contour to -15 dBm near the television transmitter and it is inappropriate to equalize the strength of the received television signal based on differing received antenna systems. Thus, it contended that "the only rational basis upon which to base an allocations system which considers signal strength is to equate received signal strength with predicted field strength, which will diminish as one moves away from a television transmitting antenna and increase as one moves

2/ In the Second Further Notice of Proposed Rule Making (47 Fed. Reg. 24144 (June 3, 1982)), the Commission proposed to use the ratios of desired to undesired (U/D) signal strengths which would cause "just perceptible" interference to the TV reception. The desired TV signal strength was held at a constant -65 dBm level to simulate acceptable reception typically found at the Grade B contour.

3/ EIA noted that it was not referenced in the Third Order or the list of commenters attached in Appendix B. The Commission acknowledges this oversight and wishes to assure both EIA and Channel 6 Commenters that their views were reviewed and fully considered within the arguments of other parties. We found the arguments presented by Channel 6 Commenters about the data irregularities to be unfounded because its arguments were not supported with actual evidence. Further, the acceptance of the suggested ratios by the other parties minimized its objections.

4/ See Third Notice of Further Proposed Rule Making, Docket Nos. 8736, 8975, 8976, 9175; FCC, March 21, 1951; and Sixth Report and Order, Docket Nos. 8736, 8975, 8976, 9175; FCC, April 11, 1952.

closer to it." Several showings, including a tape demonstration, were submitted indicating the effects of using the uniform U/D ratio on picture qualities of differing signal strengths.

24. This difficult subject of relating signal strengths at the television receiver terminals based on the field strength of the transmitted station is further complicated by defining probabilities of service considering "acceptable" quality and varying TASO grades. Additionally, the arguments made by both sides are essentially correct. As the NCE-FM interests contend, the definition of Grade A and Grade B service contour denotes that 70% of the locations at the Grade A contour and 50% of the locations at the Grade B contour receive the same quality of service; thus, the same quality of service is received at both locations but more viewers at the Grade A are likely to receive an acceptable picture quality. On the other hand, the TV-6 interests are correct in stating that higher field strengths occur close to the transmitter site and so better service quality is received at some locations of higher field strengths.

25. In this debate over picture quality, there were no new arguments. The Commission in the Third Order chose to offer NCE-FM applicants a reasonable expectation of providing service within the television station's service area by allowing more than "just perceptible" degradation of better picture qualities. Our expectation was that television viewers would not experience interference at levels that would cause less than "passable" (or TASO 3) picture qualities and we noted that no data was presented that convinced us that serious picture degradation would occur.

26. Therefore, it was with considerable concern that the Commission evaluated the showings and viewed the video tape supplied by the TV Petitioners which allegedly showed significant degradation of high quality television pictures applying the U/D ratio selected by the Commission. Upon study, however, we believe the TV Petitioners used an incorrect U/D ratios to produce the tape. In the Third Order, we adopted power limits based on a 21 dB U/D reference (26 dB minus 5 dB for required remedies). It appears that the tape presented to the Commission used U/D ratios of 25 dB or 26 dB. Our concerns remained, however, due to the other showing, submitted by Jules Cohen, based on theoretical analysis of perceptible difference between TASO grades which supported the TV Petitioners' contention of resulting in picture qualities of "not usable" (TASO 6).

27. To gain additional insight into the interference results, the Commission's staff from the Mass Media Bureau conducted some non-conclusive but informative tests similar to those conducted by the industry in making the tape demonstration. Four television receivers were examined with desired signal levels of: -65 dBm, -45 dBm, -25 dBm, and -15 dBm. These levels generally correspond respectively to picture grades of TASO 3, TASO 2, TASO 1, and TASO 1. 5/ For completeness of the record, the results of those tests using a constant 21 dB U/D reference, adjusted for frequency, are included in

5/ See Appendix B for the definition of TASO Grades 1 to 6. These grades of picture quality were developed in Engineering Aspects of Television Allocations, Report of the Television Allocation Study Organization (TASO) to the Federal Communications Commission, March 16, 1959.

Appendix B as TASO grade degradations versus undesired signal presence. Except for one receiver, degradation was usually not below TASO 3 (passable) picture quality. This was far less severe than the tape presented by the TV Petitioners.

28. The compromise solution must be considered in light of our investigations and the reply comments. Based on our limited sample, it appears that the use of a fixed U/D reference would not result in excessive interference to many television receivers. However, the use of varying ratios as proposed in the compromise solution would lessen the likelihood that excessive interference would occur. Thus, we find that the use of better than minimum standards offers the viewing public added security that actual interference should always be less than predicted. Thus, upon reconsideration, we will adopt the method employing variable ratios. The Commission recognizes that this decision may be altered based on the data forthcoming from the immunity tests planned by EIA and based on the field survey of actual FM interference to Channel 6 reception that the parties of the joint agreement have pledged funds to a combined total of $250,000. Indeed, MAET in reply to the joint proposal claimed that its field experience indicates that the actual interference experienced is much less than that predicted. The joint agreement requested the Commission to update the performance data on the rejection capabilities of newer television receivers within the next 12 months. In this regard, the Commission will have some data on newer receivers within this time period. Additional information is also anticipated from other sources, such as, the EIA testing and the field survey.

Issue 5: Population Considerations

29. MST, the TV Petitioners, NPR, and NFCB, among others, argued that allowances should be made for population density. The TV Petitioners indicated a willingness to accept a loss of 1,000 to 3,000 viewers (depending on the method used to compute the loss) as a result of a new NCE-FM station. Both sides argued that failure to take population into account results in incorrect power levels. The TV-6 interests favored decreased NCE-FM power levels as a result of higher population density and the NCE-FM interests desired higher power levels in low population density areas. Channel 6 Commenters pointed out that the Commission's use of average households in TV-6 service areas is unrealistic and should be revised.

30. Upon reconsideration, we concur that population density should be taken into account. We originally tried to simplify the power calculation by using average population density. Use of population unfortunately must complicate the process of power determination, especially when attempting to define where the affected population resides and whether any mitigating factors should be taken into account (e.g., same network service). Such issues lead to controversies and require tremendous amounts of time from applicants, TV-6 interests, and Commission staff. The compromise solution offers a procedure that, while complex, is rigidly controlled by specific standards which should avoid most arguments over the population affected. We believe it takes the concerns of both sides into account and provides a reasonable solution.

31. The choice of 3,000 population affected for each new station and a decrease of 2 affected viewers for each 1 newly affected viewer for existing stations making changes was agreed upon as a reasonable compromise. Restrictions based on interference limited to 3,000 people is a factor that

has consistently been suggested in comments to this proceeding. For the Commission to make further studies of the effects of these values would delay this proceeding further and possibly undermine the delicate balance that the compromise represents. Therefore, we will accept these standards. Again, we will expect further investigations (the actual interference study) to confirm the continued use of this number.

Issue 6: NCE-FM Basic Power Levels

32. The Third Order provided for two basic power levels: Level 1 and Level 2. Level 1 power was meant to allow for a limited amount of interference without placing heavy responsibility on the NCE-FM stations for eliminating interference. Level 2 was a higher power, but NCE-FM stations were to correct all interference complaints.

33. Again, both sides disagreed on the effects of the levels adopted. TV-6 interests denoted the effects of these new power levels on their service areas. For example, the TV Petitioners presented several maps showing interference at the newly permitted power levels. An analysis of Station WRTV Channel 6 in Indianapolis, Indiana, licensed to McGraw-Hill, indicated that the current authorization of 400 watts would be allowed to increase to 50,000 watts; and thereby, it claimed severe interference would occur. KAUZ, KCEN, WJAC-TV, and several others noted that as many as 40 separate applications were pending that would cause additional interference within their Grade B service area. WPSD, WATE, Chronicle, and others demonstrated through affidavits, letters, news articles, and even pictures that the interference the public has had to contend with over the years is severe.

34. On the other hand, NPR, CPB, NFCB, St. Olaf College, and other NCE-FM interests commented that the power levels are too low. GPTC wrote that such restrictive power levels would make statewide NCE-FM networks difficult. MAET noted that its stations have been operating successfully above those permitted by the Third Order and all complaints have been resolved satisfactorily. Family Stations suggested that the NCE-FM levels were unfair because if the restrictions on the NCE-FM stations were extended to the commercial band, the Capital Cities station in Providence, R.I. (Channel 222) would be reduced from 100 kilowatts to 2.9 kilowatts. Further, most NCE-FM commenters did not favor having the upper Level 2 power limited. Rather, they preferred to add remedies to the Level 1 power with no power maximums (other than for the class of station).

35. Upon reconsideration, we note that the compromise solution provides a good balance between these views. Although various applications, such as that noted by Mt. Vernon, may not be acceptable without amendment, we must establish a procedure that is considered a workable solution. The power levels of the facilities are individually computed to cause interference to no more than 3,000 persons (or to decrease the number of viewers affected in the case of existing stations' modifications). Specific standards are used to predict interference areas. This should make it easier for all parties to agree to the predicted effects of new NCE-FM stations, and end the ambiguity over the effects of different power levels and associated remedies.

36. We take this opportunity to reaffirm that power levels less than 100 watts ERP will not be permitted. Nothing in the reconsideration or the comments suggested that this previous decision should be reversed. We wish to clarify that acceptable powers are computed for a minimum center of radiation at 100 feet above average terrain. Adjustments for higher centers of radiation, using the F50/50 charts so that the calculated distances to the 1 mV/m contours remain constant, to achieve conformance with other rules (such as these interference standards) that require a reduction in power to less than 100 watts, will not be permitted.

37. The Commission acknowledges that FM stations on Channel 220 must consider its effect on Channel 6 television stations while those seeking to operate on Channel 221 do not. We find the argument by Family Stations, and others about extending the power restrictions to the commercial band to be outside the scope of this proceeding. There is nothing in the record convincing us to extend such restrictions to the commercial band or to arbitrarily alter the prediction criteria.

Issue 7: Allowances for Interference Remedies

38. Almost all commenters favored the Commission taking a stronger position on the remedial value of various options. In the Third Order, we declined to assign benefit values for the individual remedies, deferring to the judgments of the individual licensees in their own unique situations. Especially, in the areas of vertical polarization and transmitter placement with regard to TV receiving antenna orientation, there appears to be general agreement among the commenters. Indeed the compromise solution offered values that were agreeable to both sides.

39. Vertical Polarization. NTIA, NCE-FM interests, and TV-6 interests generally want or will accept an allowance for vertical polarization of the FM transmitting antenna. The value that appears acceptable to both sides is 10 dB, or 16 dB if the predicted interference is in rural areas. The Commission finds no problem with these values, recognizing that the more densely populated an area, the more the correct value will tend toward 10 dB. The compromise solution also presents a formula for mixed polarity that is based on these figures. No opposing comments were received. Therefore, upon reconsideration, we have no reservation about adopting specific values for vertical polarization as presented in the compromise solution.

40. We note that, in the case of existing NCE-FM stations, the compromise solution suggests that the value of the vertical adjustment be decreased by 3 dB (or half the power) if an affected TV-6 licensee purchased an applicant's antenna. The provision would require existing NCE-FM stations, which voluntarily wish to operate with vertical polarization with powers above that authorized for new stations, to give affected TV-6 licensees the option of purchasing the applicant's antenna with the incentive of limiting the NCE-FM station to half the vertical power adjustment. If the TV-6 licensee declines, then the NCE-FM applicant purchases its own antenna and receives the full power adjustment. The Commission recognizes that for TV-6 stations

experiencing interference, it is desirable for NCE-FM stations to employ vertical polarization. Additionally, for a NCE-FM using vertical polarization, operating at half the normally authorized vertical component of the NCE-FM station's power should further improve the interference situation. Thus, although unusual, this proposal provides an incentive for an existing educational station to replace an otherwise usable horizontally polarized antenna; and consequently, decrease the amount of interference that TV-6 viewers may be experiencing. Therefore, the rules will be amended to encourage both parties to explore this compromise as a means of alleviating existing interference. Family Station requested that the option to offer the purchase be given first to the NCE-FM station. However, the NCE-FM station has other options available for making changes besides the use of vertical polarization and need not pursue this vertical polarization option. Consequently, we maintain that the NCE-FM applicant does have the first option in deciding whether to operate vertically polarized; and, therefore, the rule will be adopted as proposed.

41. TV Receive Antenna Directivity. To account for the directivity of home receiving antennas, the TV Petitioners proposed an allowance of 6 to 16 dB for predicted interference locations depending upon the antenna's distance and azimuth from both the NCE-FM and the TV-6 transmitters. The NCE-FM interests desired at least a 10 dB allowance for the front-to-back ratio of outdoor television antennas outside the Grade B contour. Here, the parties agreed on an adjustment of 6 dB throughout the whole service area with applicability dependent upon the interference location being inside or outside the Grade A contour.

42. This appears to be a reasonable compromise acceptable to both parties. It recognizes the differing signal relationship of the television receiver location with respect to both the NCE-FM and TV-6 transmitters, and, therefore, is adopted.

43. Filters. MAET suggested that filters should be able to provide up to 20 dB or more of protection. They based this finding on tests of a new "Pico Filter." Even the TV Petitioners suggested that filters may be a useful solution if the population resorting to their use is kept to a minimum. On page 22 of their petition for reconsideration, they stated, "...filters are an arguably practical solution to at least part of the problem."

44. The compromise solution presents a unique proposal regarding this question. Rather than assigning a specific value of effectiveness (a dB level), it suggested a limit to the number of people to be considered part of an effective filter program. It provided that interference to up to 1000 people could be remedied through the use of filter installations.

45. We support this proposal. The Commission encourages filter installation as a means of alleviating interference. The fact that the NCE-FM stations have to bear the cost of poor television receiver performance is unfortunate, but we recognize the usefulness of filters as an effective remedy. In the case of modifications of existing stations, the proposal requires that 2 filters be installed for every new person that loses predicted service due to the change in facilities. Because filters can improve picture quality, this proposal would be a benefit to the television public and, therefore, is adopted.

46. The Commission recognizes that there may well be some difficulties in equating filter installations (or television sets) to population. There could arise a situation where the NCE-FM applicant is required to install more filters than there are television sets, or to "cure" more interference than exists. We clarify that the requirement is that a certain number of filters be effectively installed; and as such, one home may have more than one filter installation and any means may be used to achieve the installation (such as detailed instructions). In addition, the rule requires that the filters be installed only in the predicted interference area. In this regard, we will rely on the arguments made by the NCE-FM applicant and the TV-6 licensee that the obligation has been met. However, all parties should be flexible in this matter because it is most unlikely that any method can predict the exact interference area with precision. Thus, the Commission will use discretionary judgment when evaluating whether this obligation has been met. In addition to the NCE-FM applicant providing "goodwill" services, the TV-6 station is encouraged to accept responsibility for receiver deficiencies especially outside the predicted interference area and pursue a joint cooperative venture in this area of filter installations. As for whether a filter is effective, noninjurious to the television signal, and installed "as a condition of its license," the Commission believes that in general, these are inappropriate terms for rules. Our interpetation is that these factors are implicit in the rule requiring the installation of filters. However, we have retained the requirement that the NCE-FM applicant provide sufficient information for the TV-6 licensee to verify the installation.

47. Other Remedies. Although other remedies (such as terrain shielding) may be possible, the record does not support adoption of further "standard" allowances. The compromise solution suggests that a special showing be allowed for exceptional terrain conditions. In this matter, we concur that exceptional circumstances may be taken into account but we expect this to be limited to situations such as an intervening mountain range rather than rugged terrain in general. (See §73.313 (e) for a similar exception when computing antenna heights above average terrain.)

Issue 8: Allowances for Alternatives and Existing Interference

48. Additional allowances for alternatives, such as cable penetration, market share, or translators were suggested. Some commenters proposed that existing interference to TV-6 stations from co-channel and adjacent channel television stations should also be considered when computing the NCE-FM station's power limit. Fortunately, parties on both sides agreed upon how some of these elements can be taken into account. The proposed rules provided specific standards concerning how to account for alternate television service from TV translator, satellite stations, and some network affiliates (ABC, NBC, and CBS), as well as, consideration of existing interference from other co-channel and adjacent channel television stations. We therefore will permit adjustments to the NCE-FM station's power for these situations based on those suggested in the compromise solution.

Issue 9: Collocation

49. Both interests supported collocation (within 400 meters) as a good solution to the interference problem. The TV Petitioners requested that NCE-FM applicants be required to coordinate with the TV Channel 6 station to assure matched antenna patterns. Similarly, the NCE-FM interests asked that

TV-6 licensees be required to permit access to their transmitter site. In addition, the compromise solution presents power values that vary from those adopted in the Third Order. It also specifies that coordination be required through the use of similar antenna design (either physical structure or vertical pattern matching).

50. Upon reconsideration, we concur that antenna pattern is important to assure uniform U/D ratios throughout the television station's service area. We therefore require that the FM station's predicted antenna pattern be matched to the TV station's predicted antenna pattern as suggested in the compromise solution. While the Commission declines to require the TV-6 licensees to provide space for the NCE-FM transmitters, we do encourage close cooperation and will consider the degree of cooperation (or lack thereof) in deciding disputed cases. In addition, we see no difficulty in adopting the agreed upon power limits of the compromise. (See Table B in Appendix C.)

Issue 10: NCE-FM Grandfathering Rights

51. TV-6 interests generally opposed grandfathering of all existing NCE-FM stations. KOIN-TV suggested that there is no basis for grandfathering and that the Commission failed to comply with the Administrative Procedures Act by not providing sound reasoning for grandfathering. They indicate that grandfathering is not supported by the record, and yet the TV Petitioners, in their comments to the Second Further Notice supported grandfathering of existing and operational NCE-FM stations, except in cases subject to litigation. The TV Petitioners would require existing NCE-FM stations desiring to make changes to comply with the new rules. Channel 6 Commenters, and KAUZ-TV opposed grandfathering, noting that existing interference could be reduced because many NCE-FM stations would be authorized much less power under the new rules. KOIN-TV, in reply, concurred with grandfathering of existing stations "except where a change in channel would cure the interference" and opposed grandfathering of any outstanding construction permits or pending applications.

52. The NCE-FM interests desired more relaxed grandfathering provisions. NPR and CPB would allow changes to existing stations, at the grandfathered power levels, if the stations would agree to resolve all new complaints as a result of the changes. St. Olaf College submitted that 53.2 percent of the NPR stations would forfeit their grandfathered powers if they made changes and the St. Olaf station would have to go off the air. The University of Southern California requested that grandfathered stations be allowed to "trade" interference areas. MAET supported easing the grandfathering restrictions.

53. Upon reconsideration, we believe that the compromise solution offers an acceptable resolution by grandfathering stations authorized prior to December 31, 1984, and providing options for existing stations to make changes while limiting their ability to create new expansive areas of interference. For example, stations may change facilities or locations without being subject to the new station rules if the population predicted to gain TV Channel 6 service is twice the population predicted to lose TV Channel 6 service. Existing licensed stations are grandfathered at their current facilities, however, and can continue to operate as authorized. We cannot justify

requiring existing stations to come under the new rules if no changes are made. In fact, we believe such an action would be contrary to the Communications Act of 1934, as amended. Those stations for which a construction permit has been issued, as of December 31, 1984, need not conform to the new station rules and will be considered as existing stations for the purpose of further modifications. However, those applications for license with oppositions, or those still in litigation, where the TV-6 station can definitely show that actual interference is excessive, will be decided on a case-by-case basis, possibly invoking some of the solutions adopted by this proceeding.

Implementation

54. Pending applications for construction permits for new stations or modifications of existing stations have until October 1, 1985, to amend their application to comply with the new rules adopted herein or provide a showing that the existing application is in compliance. After this date, all applications that are not in compliance or have not responded may be returned. Those applicants applying for funding from the National Telecommunications and Information Administration (NTIA) must submit to the Commission by June 30, 1985, a letter certifying that their application will be acceptable under these rules either "as is" or "by amending power, height, or site to . . ." as required. Applications will not be returned to the beginning of the processing line due to the filing of these amendments.

Other Matters

55. As the final step in the review process of the NCE-FM rules, the Third Order also made some general changes to the processing rules. GPTC noted that the new definition for objectionable interference between FM stations significantly increases the interference area. It stated that waivers based on allowing 5% or less of the proposed service area to receive interference would be vastly more difficult to obtain. One example showed that the area to receive objectionable interference would rise from 640 sq. mi. under the old definition to 1700 sq. mi. under the new. GPTC requested that since the change was made to eliminate an anomaly for second and third adjacent channel requirements, the old definition should be sustained for co-channel and first-adjacent separations.

56. Before discussing the waiver process, the Commission would like to clarify this rule section. Section 73.509 requires that an NCE-FM application not cause "objectionable interference" to existing NCE-FM stations. The procedure for determining objectionable interference is the subject of this amendment. The old rule indicates that certain undesired to desired signal ratios at the 1 mV/m contour cannot be exceeded, while the new rule simply states that an undesired signal level cannot overlap the 1 mV/m (or 60 dBu) desired signal contour. Under normal circumstances, both statements result in the same requirements. It is when waivers are requested that the new definition results in a larger area of consideration. However, it is when the application severely violates the requirement and approaches the existing NCE-FM transmitter site that the first definition of U/D ratios is inappropriate. This occurs because these ratios are not valid at the higher field strengths close to the transmitter, but were developed for interference

protection at the 1 mV/m contour. For these reasons, upon reconsideration, the rule as set forth in the Third Order is affirmed. To permit waivers along the lines of those contemplated in the Commission's decision (see Public Notice; FCC 81-332, 49 R.R. 2d 1524(1981)), however, the permitted level of received interference will be doubled; resulting in a requirement of 10% or less of the proposed service area.

57. Finally, the establishment of minimum power and antenna heights requires an adjustment of class definition for NCE-FM stations to permit a continuous range of facilities. Thus, Sections 73.506(a)(3) and 73.511 have been amended to account for this oversight.

Conclusion

58. The solution presented here incorporates many of the elements in the Second Further Notice, the Third Order, and the comments filed throughout this proceeding. We feel that the joint compromise solution is but a refinement of the procedure to be used based on the record. This solution provides flexibility for growth of the NCE-FM service, minimizes interference, incorporates many of the suggestions from both sides, and encourages cooperation between TV-6 and NCE-FM licensees, permittees, and applicants. 6/ With the adoption of rules based on this compromise, we hope to end a long history of inflexibility on both sides. This action removes the freeze on acceptance and processing of applications and the stay on the new rules, as modified. We sincerely hope that all interested parties will give this solution a chance. The proceeding has lasted too long and this reconsideration provides an opportunity for action. We will continue to monitor the situation informally and offer further fine tuning, as necessary.

Regulatory Flexibility Final Analysis

I. Reason for action

To revise the decision in the Third Report and Order. The Commission, in that document, sought to minimize the chance of interference to Television Channel 6 stations caused by new noncommercial educational FM stations operating in the service area. Several commenters filed petitions for reconsideration of that decision and representatives of both the educational FM and the TV Channel 6 parties submitted a joint compromise solution.

II. Objective

To continue the development of noncommercial educational FM service with minimal loss of television Channel 6 service.

6/ KAUZ-TV and KOIN-TV urged that the rules to reduce interference to Channel 6 be applied to FM translators also. However, the FM translator rules (§74.1203) require that such stations cannot cause interference "... to the direct reception by the public of the off-the-air signal of any authorized broadcast station... nor shall an FM translator cause interference to reception by a television broadcast translator station of its input signals." This requirement, therefore, should provide sufficient protection to all television stations operating on Channel 6.

III. Legal basis

Sections 303(r) and 4(i) of the Communications Act of 1934, as amended.

IV. Description, potential impact and number of small entities affected

The rules adopted will provide assignment standards for new noncommercial educational FM stations and clarify the position of existing noncommercial educational FM stations operating within or near the TV Channel 6 service area. The rules are expected to encourage growth in educational broadcasting services, while minimizing interference to present television Channel 6 service. This action results from an agreement approved by representatives of major parties on both sides of this long-standing problem.

Existing NCE-FM stations will not be subject to the adopted rules, unless they request a modification of their facilities. New noncommercial educational FM stations will have clear guidelines for predicting the impact their operation will have on Channel 6 viewers. These rules replace ambiguous requirements with clearly defined procedures.

V. Recording, record-keeping and other compliance requirements.

Applicants for new or modified NCE-FM stations would have to provide sufficient information to verify that their obligation to effectively install an agreed upon number of filters on television receivers has been met.

VI. Federal rules which overlap, duplicate or conflict with this rule

None.

VII. Any significant alternative minimizing the impact on small entities and consistent with the stated objective

This compromise represents the most practical solution to the Channel 6 interference problem because it has the acceptance and presumed cooperation of both Channel 6 and educational FM interests. The new rules encourage both the TV Channel 6 and educational FM interests to work together, with limited Commission participation to solve any prospective interference problems.

Paperwork Reduction Act Statement

59. The proposal contained herein has been analyzed with respect to the Paperwork Reduction Act of 1980 and found to impose new or modified requirements or burdens upon the public. Implementation of any new or modified requirement or burden will be subject to approval by the Office of Management and Budget as prescribed by the Act.

Actions

60. The Secretary shall cause a copy of this Memorandum Opinion and Order, including the Final Regulatory Flexibility Analysis, to be sent to the Chief Counsel for Advocacy of the Small Business Administration in accordance with Paragraph 603(a) of the Regulatory Flexibility Act (Pub. L. No. 96-354, 94 Stat. 1164, 50 U.S.C. et seq).

61. Accordingly, IT IS ORDERED, That the subject Joint Motion IS GRANTED and, pursuant to the authority contained in Sections 4(i) and 303(r) of the Communications Act of 1934, as amended, that Part 73 of the Commission's Rules IS AMENDED as set forth in the attached Appendix C, effective up adoption pursuant to Section 5 U.S.C. s/s 553(d)(i).

62. IT IS FURTHER ORDERED, That the petitions for reconsideration listed in Appendix A ARE GRANTED to the extent indicated and in all other respects ARE DENIED.

63. IT IS FURTHER ORDERED, That the freeze on TV Channel 6 applications and noncommercial educational FM station applications as described in paragraph 5 of this document IS LIFTED.

64. IT IS FURTHER ORDERED, That the Stay ordered as described in paragraph 5 of this document IS DISSOLVED.

65. IT IS FURTHER ORDERED, That this proceeding IS TERMINATED.

66. For further information contact Kathryn Hosford or Michael Lewis at 632-9660.

FEDERAL COMMUNICATIONS COMMISSION

William J. Tricarico
Secretary

Attachment:s Appendix A: List of Commenters
Appendix B: FCC Lab Tests
Appendix C: New Rules

APPENDIX A

Summary of Commenting Parties

Joint petition for stay:

Association of Maximum Service Telecasters, Inc. (MST)
Corporation for Public Broadcasting (CPB)
McGraw-Hill Broadcasting Company (McGraw-Hill)
National Association of Broadcasters (NAB)
National Federation of Community Broadcasters (NFCB)
National Public Radio (NPR)
Taft Broadcasting Company (Taft)

Petitions for reconsideration:

Adams TV of Wichita Falls, Inc., KAUZ-TV, Wichita Falls, Texas (KAUZ-TV)
Channel 6, Inc., KCEN-TV, Temple-Waco, Texas (KCEN-TV)
Chronicle Broadcasting of Omaha, Inc. WOWT-TV, Omaha, Nebraska (Chronicle)
Georgia Public Telecommunications, Inc. (GPTC)
Informal Comments filed separately by: Deborah S. Proctor, president of Educational Information Corporation/WCPE; Nationwide Communications Inc.; and David Brown, pastor of the First Assembly of God, Bluefield, Va.
KOIN-TV, Inc., Portland, Oregon (KOIN-TV)
KOTV, Inc., Tulsa, Oklahoma (KOTV)
KTAL-TV, Inc., Texarkana, Texas (KTAL-TV)
Mississippi Authority for Educational Television (MAET)
MST
National Telecommunications and Information Administration (NTIA)
Petition filed jointly by: CPB, NFCB, and NPR. (FM Petitioners)
Petition filed jointly by: Arkansas Educational Television Commission, Central California Educational Television, Cosmos Broadcasting Corporation and Station KRMA-TV. (Channel 6 Commenters)
Petition filed jointly by: Capital Cities Communications, Inc., Chronicle, McGraw-Hill, MST, NAB, Storer Communications, Inc., Taft, and The Outlet Company. (TV Petitioners)
University of Southern California (USC)
WPSD-TV, Paducah, Kentucky (WPSD-TV)

Oppositions:

Consumer Electronics Group of the Electronic Industries Association (EIA)
CPB
NPR/NFCB
St. Olaf College, Northfield, Minnesota (St. Olaf College)
TV Petitioners
WJAC, Inc., Johnston, Pennsylvania (WJAC-TV)

Reply comments:

Alaska Public Broadcasting Commission
CPB
Family Stations, Inc., Oakland, California (Family Stations)
MAET
NPR/NFCB
NTIA
TV Petitioners

Compromise Solution

Filed jointly by representatives on behalf of: CPB; McGraw-Hill, Taft, and Storer; MST; NAB; NFCB; and NPR.

Replies

EIA
Family Stations
KCEN-TV
KOIN-TV
Letter on behalf of parties to Joint Compromise Solution
MAET
Mount Vernon Nazarene College (Mt. Vernon)
NTIA

APPENDIX B

Informal Study
Interference Effects of the Technical Standards Adopted in the Third Report and Order
(Docket No. 20735)

The undesired to desired signal levels were:

Channel	Freq.	U/D Desired (dBm) =	Undesired (dBm) -65	-45	-25	-15
201	88.1	1.0	-64.0	-44.0	-24.0	-14.0
203	88.5	6.5	-58.5	-38.5	-18.5	-8.5
205	88.9	12.0	-53.0	-33.0	-13.0	-3.0
207	89.1	21.0	-44.0	-24.0	-4.0	0.0
211	90.1	21.0	-44.0	-24.0	-4.0	0.0
215	90.9	27.0	-38.0	-18.0	0.0	0.0
220	91.9	39.0	-26.0	-6.0	0.0	0.0

a) Aural TV carriers were 9 dB below peak visual levels.

b) Video programming was obtained from off-the-air signal, translated to Channel 6.

c) FM interference was generated by an RF signal generator, modulated to ±75 kHz.

d) Desired and undesired signals were simply mixed so as to provide the desired levels and ratios at receiver inputs.

The levels of picture quality were defined as:

1. EXCELLENT. The picture is of extremely high quality as good as you could desire.

2. FINE. The picture is of high quality providing enjoyable viewing. Interference is perceptible.

3. PASSABLE. The picture is of acceptable quality. Interference is not objectionable.

4. MARGINAL. The picture is poor in quality and you wish you could improve it. Interference is somewhat objectionable.

5. INFERIOR. The picture is very poor but you could watch it. Definitely objectionable interference is present.

6. UNUSABLE. The picture is so bad that you could not watch it.

For the four TV receivers, the results are as follows:

Notes: 2/3 picture quality is observed as 2 (fine) before FM interference is introduced and 3 (passable) after;
(2) denotes the amount of attenuation (in dB) needed to restore picture to a 3 (passable) picture;
* denotes that picture would be 3 (passable) except color was lost.

Receiver No. 100 Date: 2/1/85

Channel	Freq.	U/D Desired (dBm) =	Picture Quality with Interference -65	-45	-25	OFF/ON -15
201	88.1	1.0	3/3	1/1	1/1	1/1
203	88.5	6.5	3/3	2/3	1/2	1/2
205	88.9	12.0	3/3	2/2	1/2	1/2
207	89.1	21.0	3/3	2/3	1/2	1/2
211	90.1	21.0	3/3	2/3	1/3	1/2
215	90.9	27.0	3/3	2/3	1/3	1/2
220	91.9	39.0	3/3	2/4 (2)	1/1	1/1

Receiver No. 102 Date: 2/1/85

Channel	Freq.	U/D Desired (dBm) =	Picture Quality with Interference -65	-45	-25	OFF/ON -15
201	88.1	1.0	3/3	2/3	1/3	1/3
203	88.5	6.5	3/3	2/2	1/2	1/2
205	88.9	12.0	3/3	2/2	1/1	1/2
207	89.1	21.0	3/3	2/2	1/2	1/1
211	90.1	21.0	3/3	2/3	1/3	1/2
215	90.9	27.0	3/3	2/3	1/3	1/2
220	91.9	39.0	3/3	2/5 (1)	1/1	1/1

Receiver No. 29 Date: 2/1/85

Channel	Freq.	U/D Desired (dBm) =	Picture Quality with Interference -65	-45	-25	OFF/ON -15
201	88.1	1.0	3/5* (3)	2/5* (2)	1/5* (3)	1/5* (3)
203	88.5	6.5	3/5* (6)	2/5* (7)	1/5* (6)	1/5* (6)
205	88.9	12	3/5* (4)	2/5* (3)	1/5* (2)	1/5* (4)
207	89.1	21	3/5* (5)	2/5* (5)	1/5* (5)	1/5 (5)
211	90.1	21	3/3	2/4 (4)	1/4 (4)	1/4 (4)
215	90.9	27	3/3	2/4 (4)	1/4 (5)	1/3
220	91.9	39	3/3	2/3	1/1	1/1

Receiver No. 31 Date: 2/1/85

Channel	Freq.	U/D Desired (dBm) =	Picture Quality with Interference -65	-45	-25	OFF/ON -15
201	88.1	1.0	3/3	2/2	1/2	1/2
203	88.5	6.5	3/3	2/2	1/1	1/1
205	88.9	12.0	3/3	2/2	1/1	1/2
207	89.1	21.0	3/3	2/3	1/2	1/2
211	90.1	21.0	3/3	2/2	1/2	1/2
215	90.9	27.0	3/3	2/2	1/2	1/1
220	91.9	39.0	3/3	2/3	1/1	1/1

Receiver No. 31 (SAME RECEIVER WITHOUT 5 dB ALLOWANCE) Date: 2/1/85

Channel	Freq.	U/D Desired (dBm) =	Picture Quality with Interference -65	-45	-25	OFF/ON -15
201	88.1	6.0	3/3	2/3	1/2	1/2
203	88.5	12.5	3/3	2/2	1/2	1/2
205	88.9	18.0	3/3	2/2	1/2	1/2
207	89.1	26.0	3/3	2/3	1/2	1/2
211	90.1	26.0	3/3	2/2	1/3	1/2
215	90.9	33.0	3/3	2/3	1/2	1/1
220	91.9	44.0	3/3	2/4 (3)	1/1	1/1

APPENDIX C

Title 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 73.506 paragraph (a)(3) is amended to read as follows:

§73.506 Classes of noncommericial educational FM stations and channels.

(a) * * *

* * * * *

(3) Noncommercial educational FM stations (NCE-FM) with more than 0.01 kW tranmitter power output are classified Class A, B1, B, C2, C1, or C depending on the effective radiated power, antenna height above terrain, and the zone in which the station's transmitter is located, on the same basis as provided for stations on the the non-reserved FM channels in §§ 73.205 and 73.206, and the location of its 1 mV/m contour based on the maximum facilities listed in § 73.211.

Note: For NCE-FM stations authorized before December 31, 1984, the provisions of this subparagraph [§73.506(a)(3)] become effective March 1, 1987.

* * * * *

3. 47 CFR 73.509 is revised in its entirety to read as follows:

§73.509 Prohibited overlap.

(a) An application for a new or modified NCE-FM station other than a Class D (secondary) station will not be accepted if the proposed operation would involve overlap of signal strength contours with any other station whose transmitter is located more than 320 kilometers (199 miles) from the U.S.-Mexican border and operating in the reserved band (Channels 200-220, inclusive) as set forth below:

Frequency Separation	Contour of Proposed Station	Contour of Other Station
Co-channel	0.1 mV/m (40 dBu) 1 mV/m (60 dBu)	1 mV/m (60 dBu) 0.1 mV/m (40 dBu)
200 kHz	0.5 mV/m (54 dBu) 1 mV/m (60 dBu)	1 mV/m (60 dBu) 0.5 mV/m (54 dBu)
400 kHz	10 mV/m (80 dBu) 1 mV/m (60 dBu)	1 mV/m (60 dBu) 10 mV/m (80 dBu)
600 kHz	100 mV/m (100 dBu) 1 mV/m (60 dBu)	1 mV/m (60 dBu) 100 mV/m (100 dBu)

(b) An application by a Class D (secondary) station, other than an application to change class, will not be accepted if the proposed operation would involve overlap of signal strength contours with any other station as set forth below:

Frequency Separation	Contour of Proposed Station	Contour of any Other Station
Co-channel	0.1 mV/m (40 dBu)	1 mV/m (60 dBu)
200 kHz	0.5 mV/m (54 dBu)	1 mV/m (60 dBu)
400 kHz	10 mV/m (80 dBu)	1 mV/m (60 dBu)
600 kHz	100 mV/m (100 dBu)	1 mV/m (60 dBu)

(c) The following standards must be used to compute the distances to the pertinent contours:

(1) The distance of the 60 dBu (1 mV/m) contours are to be computed using Figure 1 of §73.333 [F(50,50) curves] of this Part.

(2) The distance to the other contours are to be computed using Figure 1a of §73.333 [F(50,10) curves]. In the event that the distance to the contour is below 16 kilometers (approximately 10 miles), and therefore not covered by Figure 1a, the curves in Figure 1 must be used.

(3) The effective radiated power (ERP) that is the maximum ERP for any elevation plane on any bearing will be used.

(d) An application for a change (other than a change in channel) in the facilities of a NCE-FM broadcast station will be accepted even though overlap of signal strength contours, as specified in paragraphs (a) and (b) of this section, would occur with another station in an area where such overlap does not already exist, if:

(1) The total area of overlap with that station would not be increased;

(2) The area of overlap with any other station would not increase;

(3) The area of overlap does not move significantly closer to the station receiving the overlap; and,

(4) No area of overlap would be created with any station with which the overlap does not now exist.

(e) The provisions of this section concerning prohibited overlap will not apply where the area of such overlap lies entirely over water.

4. 47 CFR 73.511 is revised in its entirety to read as follows:

§73.511 Power and antenna height requirements.

(a) No new noncommercial educational station will be authorized with effective radiated power less than 0.1 kW.

(b) No new noncommercial educational station will be authorized with effective radiated power greater than 50 kW in Zones I and I-A or 100 kW in Zone II.

(c) Stations licensed before December 31, 1984, and operating above 50 kW in Zones I and I-A, and above 100 kW and in Zone II may continue to operate as authorized.

5. A new 47 CFR 73.525 entitled "TV Channel 6 protection" is added to read as follows:

§73.525 TV Channel 6 protection.

The provisions of this section apply to all applications for construction permits for new or modified facilities for a NCE-FM station on Channels 200-220 unless the application is accompanied by a written agreement between the NCE-FM applicant and each affected TV Channel 6 broadcast station concurring with the proposed NCE-FM facilities.

(a) Affected TV Channel 6 Station.

(1) An affected TV Channel 6 station is a TV broadcast station which is authorized to operate on Channel 6 that is located within the following distances of a NCE-FM station operating on Channels 201-220:

TABLE A

NCE-FM Channel	Distance (kilometers)	NCE-FM Channel	Distance (kilometers)
201	265	211	196
202	257	212	195
203	246	213	193
204	235	214	187
205	225	215	180
206	211	216	177
207	196	217	174
208	196	218	166
209	196	219	159
210	196	220	154

(2) Where a NCE-FM application has been accepted for filing or granted, the subsequent acceptance of an application filed by a relevant TV Channel 6 station will not require revision of the pending NCE-FM application or the FM station's authorized facilities, unless the provisions of paragraph (e)(3) of this section for TV translator or satellite stations apply.

(b) Existing NCE-FM Stations.

(1) An NCE-FM station operating on Channels 201-220 with facilities authorized as of December 31, 1984, is not subject to this section if it proposes:

(i) to make changes in operating facilities or location which will maintain or decrease predicted interference as calculated under paragraph (e) of this section to TV Channel 6 reception in all directions; or,

(ii) to decrease its ratio of vertically polarized to horizontally polarized transmissions.

(2) Applicants must comply with the provision of paragraphs (c) or (d) of this section unless the application for modification demonstrates that, for each person predicted to receive new interference as a result of the change, existing predicted interference to two persons will be eliminated. Persons predicted to receive new interference are those located outside the area predicted to receive interference from the station's currently authorized facilities ("existing predicted interference area") but within the area predicted to receive interference from the proposed facilities ("proposed predicted interference area"). Persons for whom predicted interference will be eliminated are those located within the existing predicted interference area and outside the proposed predicted interference area.

(i) In making this calculation, the provisions contained at paragraph (e) will be used except as modified by subparagraph (3) of this paragraph.

(ii) The following adjustment to the population calculation may be made: up to 1,000 persons may be subtracted from the population predicted to receive new interference if, for each person subtracted, the applicant effectively installs two filters within 90 days after commencing program tests with the proposed facilities and, no later than 45 days thereafter, provides the affected TV Channel 6 station (as defined in paragraph (a) of this section) with a certification containing sufficient information to permit verification of such installation. The required number of filters will be installed on television receivers located within the predicted interference area; provided that half of the installations are within the area predicted to receive new interference.

(3) Where an NCE-FM applicant wishes to operate with facilities in excess of that permitted under the the provisions of paragraphs (c) or (d) of this section, by proposing to use vertically polarized transmissions only, or to increase its ratio of vertically to horizontally polarized transmissions, the affected TV Channel 6 station must be given an option to pay for the required antenna and, if it takes that option, the NCE-FM vertically polarized component of power will be one half (-3 dB) that which would be allowed by the provisions of paragraph (e)(4) of this section.

(4) Applications for modification will include a certification that the applicant has given early written notice of the proposed modification to all affected TV Channel 6 stations (as defined in paragraph (a) of this section).

(5) Where the NCE-FM station demonstrates in its application that it must make an involuntary modification (e.g., due to loss of its transmitter site) that would not otherwise be permitted under this section, its application will be considered on a case-by-case basis. In such cases, the provisions of subparagraph (3) of this paragraph do not apply.

(c) New NCE-FM Stations. Except as provided for by paragraph (d) of this section, applicants for NCE-FM stations proposing to operate on Channels 201-220 must submit a showing indicating that the predicted interference area resulting from the proposed facility contains no more than 3,000 persons.

(1) In making these calculations, the provisions in paragraph (e) will be used.

(2) The following adjustment to population may be made: up to 1,000 persons may be subtracted from the population within the predicted interference area if, for each person subtracted, the applicant effectively installs one filter within 90 days after commencing program tests and, no later than 45 days thereafter, provides the affected TV Channel 6 station with a certification containing sufficient information to permit verification of such installation. The required number of filters will be installed on television receivers located within the predicted interference area.

(d) Collocated Stations. As an alternative to the provisions contained in paragraphs (b) and (c), an application for a NCE-FM station operating on Channels 201-220 and located at 0.4 kilometer (approximately 0.25 mile) or less from a TV Channel 6 station will be accepted under the following requirements:

(1) The effective radiated power cannot exceed the following values:

TABLE B

NCE-FM Channel	Power (kW)	NCE-FM Channel	Power (kW)
201	1.1	211	26.3
202	1.9	212	31.6
203	2.9	213	38.0
204	5.0	214	46.7
205	8.3	215	56.2
206	10.0	216	67.6
207	12.0	217	83.2
208	14.8	218	100.0
209	17.8	219	100.0
210	21.4	220	100.0

(2) The NCE-FM application will include a certification that the applicant has coordinated its antenna with the affected TV station by employing either: the same number of antenna bays with radiation centers separated by no more than 30 meters (approximately 100 feet) vertically; or, the FM vertical pattern not exceeding the TV vertical pattern by more than 2dB.

(e) Calculation of Predicted Interference Area and Population. Predictions of interference required under this section and calculations to determine the number of persons within a predicted interference area for NCE-FM operation on Channels 201-220 are made as follows:

(1) The predicted interference area will be calculated as follows:

(i) The distances to the TV Channel 6 field strength contours will be predicted according to the procedures specified in §73.684, "Prediction of coverage," using the F(50,50) curves in Figure 9, §73.699.

(ii) For each TV Channel 6 field strength contour, there will be an associated F(50,10) FM interference contour, the value of which (in units of dBu) is defined as the sum of the TV Channel 6 field strength (in dBu) and the appropriate undesired-to-desired (U/D) signal ratio (in dB) obtained from Figures 1 and 2, §73.599, corresponding to the channel of the NCE-FM applicant and the appropriate F(50,50) field strength contour of the TV Channel 6 station.

(iii) An adjustment of 6 dB for television receiving antenna directivity will be added to each NCE-FM interference contour at all points outside the Grade A field strength contour (§73.683) of the TV Channel 6 station and within an arc defined by the range of angles, of which the FM transmitter site is the vertex, from 110° relative to the azimuth from the FM transmitter site to the TV Channel 6 transmitter site, counterclockwise to 250° relative to that azimuth. At all points at and within the Grade A field strength contour of the TV Channel 6 station, the 6 dB adjustment is applicable over the range of angles from 70° clockwise to 110° and from 250° clockwise to 290°.

(iv) The distances to the applicable NCE-FM interference contours will be predicted according to the procedures specified in §73.313, "Prediction of Coverage," using the proposed antenna height and horizontally polarized, or the horizontal equivalent of the vertically polarized, effective radiated power in the pertinent direction and the F(50,10) field strength curves (Figure 1a, §73.333).

(v) The predicted interference area will be defined as the area within the TV Channel 6 station's 47 dBu field strength contour that is bounded by the locus of intersections of a series of TV Channel 6 field strength contours and the applicable NCE-FM interference contours.

(vi) In cases where the terrain in one or more directions departs widely from the surrounding terrain average (for example, an intervening mountain), a supplemental showing may be made. Such supplemental showings must describe the procedure used and should include sample calculations. The application must also include maps indicating the predicted interference area for both the regular method and the supplemental method.

(2) The number of persons contained within the predicted interference area will be based on data contained in the most recently published U.S. Census of Population and will be determined by plotting the predicted interference area on a County Subdivision Map of the state published for the Census, and totalling the number of persons in each County Subdivision (such

as, Minor Civil Division (MCD), Census County Division (CCD), or equivalent areas) contained within the predicted interference area. Where only a portion of County Subdivision is contained within the interference area:

(i) The population of all incorporated places or Census designated places contained within the predicted interference area will be subtracted from the County Subdivision population;

(ii) Uniform distribution of the remaining population over the remaining area of the County Subdivision will be assumed in determining the number of persons within the predicted interference area in proportion to the share of the remaining area of the County Subdivision that lies within the predicted interference area; and,

(iii) The population of the incorporated places or Census designated places contained within the predicted interference area will then be added to the total, again assuming uniform distribution of the population within the area of each place and adding a share of the population proportional to the share of the area if only a portion of such a place is within the predicted interference area.

(iv) At the option of either the NCE-FM applicant or an affected TV Channel 6 station which provides the appropriate analysis, more detailed population data may be used.

(3) Adjustments to the population calculated pursuant to subparagraph (2) of this paragraph may be made as follows:

(i) If any part of the predicted interference area is within the Grade A field strength contour (§73.683) of a TV translator station carrying the affected TV Channel 6 station, the number of persons within that overlap area will be subtracted, provided the NCE-FM construction permit and license will contain the following conditions:

(A) When the TV translator station ceases to carry the affected TV Channel 6 station's service and the cessation is not the choice of the affected TV Channel 6 station, the NCE-FM station will modify its facilities, within a reasonable transition period, to meet the requirements of this section which would have applied if no adjustment to population for translator service had been made in its application.

(B) The transition period may not exceed 1 year from the date the NCE-FM station is notified by the TV Channel 6 station that the translator station will cease to carry the affected TV Channel 6 station's service or 6 months after the translator station ceases to carry the affected TV Channel 6 station's service, whichever is earlier.

(ii) If any part of the interference area is within the Grade B field strength contour (§73.683) of a satellite station of the affected TV Channel 6 station, the number of persons within the overlap area will be subtracted, provided the NCE-FM permit and license will contain the following conditions:

(A) If the satellite station ceases to carry the affected TV Channel 6 station's service and the cessation is not the choice of the affected TV Channel 6 station, the NCE-FM station will modify its facilities, within a reasonable transition period, to meet the requirements of this rule which would have applied if no adjustment to population for satellite station service had been made in its application.

(B) The transition period may not exceed 1 year from the date the NCE-FM station is notified by the TV Channel 6 station that the satellite station will cease to carry the affected TV Channel 6 station's service or 6 months after the satellite station ceases to carry the affected TV Channel 6 station's service, whichever is earlier.

(iii) If any part of the predicted interference area is located outside the affected TV Channel 6 station's Area of Dominant Influence (ADI), outside the Grade A field strength contour (§73.683), and within the predicted city grade field strength contour (§73.685(a)) of a TV broadcast station whose only network affiliation is the same as the only network affiliation of the affected TV Channel 6 station, the number of persons within that part will be subtracted. (For purposes of this provision, a network is defined as ABC, CBS, NBC, or their successors.) In addition, the ADI of an affected TV Channel 6 station and the program network affiliations of all relevant TV broadcast stations will be assumed to be as they were on the filing date of the NCE-FM application or June 1, 1985, whichever is later.

(iv) In calculating the population within the predicted interference area, an exception will be permitted upon a showing (e.g., a survey of actual television reception) that the number of persons within the predicted interference area should be reduced to account for persons actually experiencing co-channel or adjacent channel interference to reception of the affected TV Channel 6 station. The area within which such a showing may be made will be limited to the area calculated as follows:

(A) The distances to the field strength contours of the affected TV Channel 6 station will be predicted according to the procedures specified in §73.684, "Prediction of coverage," using the F(50,50) curves in Figure 9, §73.699.

(B) For each field strength contour of the affected TV Channel 6 station, there will be an associated co-channel or adjacent channel TV broadcast station interference contour, the value of which (in units of dBu) is defined as the sum of the affected TV Channel 6 station's field strength (in dBu) and the appropriate undesired-to-desired signal ratio (in dB) as follows:

Co-channel, normal offset	-22 dB
Co-channel, no offset	-39 dB
Adjacent channel	+12 dB

(C) The distances to the associated co-channel or adjacent channel TV broadcast station interference contour will be predicted according to the procedures specified in §73.684, "Prediction of coverage," using the F(50,10) curves in Figure 9a, §73.699.

(D) The area within which the showing of actual interference may be made will be the area bounded by the locus of intersections of a series of the affected TV Channel 6 station's field strength contours and the associated interference contours of the co-channel or adjacent channel TV broadcast station.

(4) The maximum permissible effective radiated power (ERP) and antenna height may be adjusted for vertical polarity as follows:

(i) If the applicant chooses to use vertically polarized transmissions only, the maximum permissible vertically polarized ERP will be the maximum horizontally polarized ERP permissible at the same proposed antenna height, calculated without the adjustment for television receiving antenna directivity specified in subparagraph (1)(iii) of this paragraph, multiplied by either: 40 if the predicted interference area lies entirely outside the limits of a city of 50,000 persons or more; or 10 if it does not.

(ii) If the applicant chooses to use mixed polarity, the permissible ERP is as follows:

$$[\ H + (V/A)\ ] \text{ is no greater than } P$$

Where: H is the horizontally polarized ERP in kilowatts for mixed polarity;

V is the vertically polarized ERP in kilowatts for mixed polarity;

A is 40 dB if the predicted interference area lies entirely outside the limits of a city of 50,000 persons or more, or 10 if it does not; and

P is the maximum permitted horizontally polarized-only power in kilowatts.

(f) Channel 200 Applications. No application for use of NCE-FM Channel 200 will be accepted if the requested facility would cause objectionable interference to TV Channel 6 operations. Such objectionable interference will be considered to exist whenever the 15 dBu contour based on the F(50,10) curves in §73.333 Figure 1a would overlap the 40 dBu contour based on the F(50,50) curves in §73.699, Figure 9.

6. A new 47 CFR 73.599 entitled "NCE-FM engineering charts," is added to read as follows:

§73.599 NCE-FM engineering charts.

This section consists of the following Figures 1 and 2.

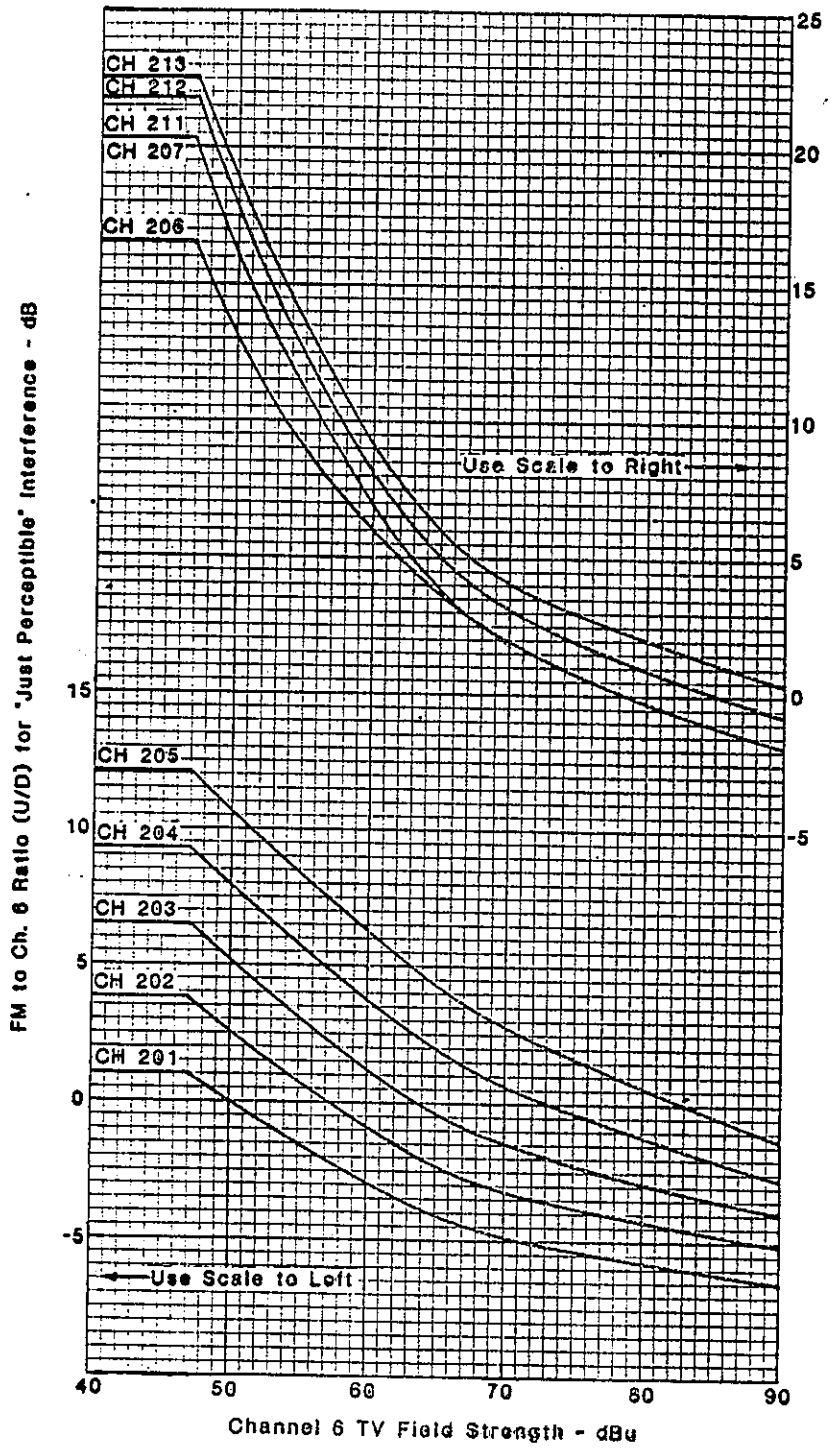

Figure 1
FM/TV 6 PROTECTION RATIOS
BASED ON MEDIAN RECEIVERS
CHANNELS 201-213

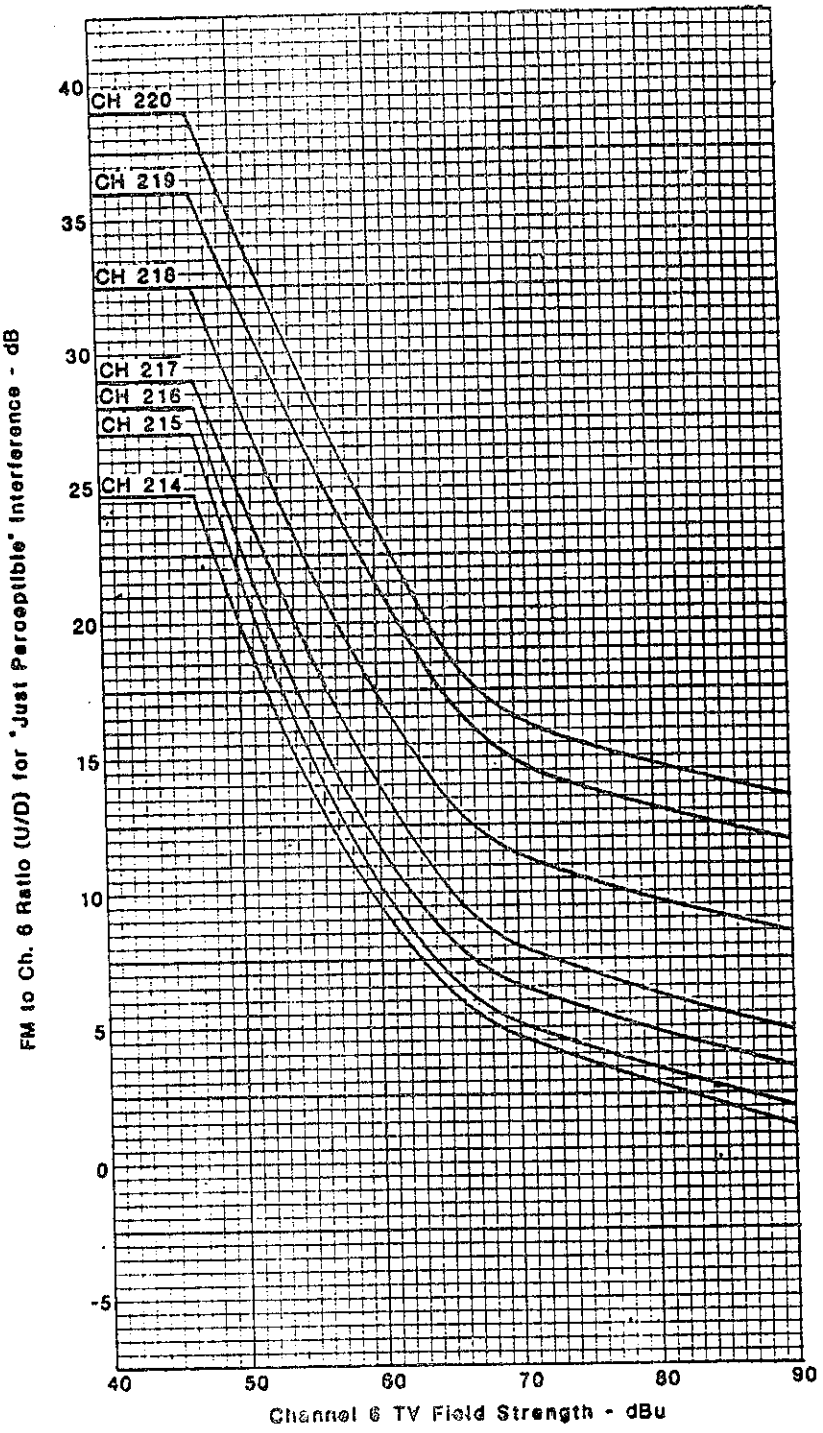

Figure 2

FM/TV 6 PROTECTION RATIOS
BASED ON MEDIAN RECEIVERS
CHANNELS 214-220