

FCC 62-866

BEFORE THE  
FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

<p style="text-align: center;">In the Matter of REVISION OF FM BROADCAST RULES, PARTICULARLY AS TO ALLOCATION AND TECHNICAL STANDARDS Petition of FM UNLIMITED, INC. For changes in FM Station Assignment Rules</p>	}	<p style="text-align: center;">Docket No. 14185  RM-94</p>
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FIRST REPORT AND ORDER

BY THE COMMISSION: COMMISSIONER FORD CONCURRING AND ISSUING  
A STATEMENT IN WHICH CHAIRMAN MINOW CONCURS.

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*I. Introduction*

1. The Commission has under consideration its Notice of Inquiry, Notice of Proposed Rule Making, and Memorandum Opinion and Order in the above-entitled matters (FCC 61-833, issued July 5, 1961), and the comments and reply comments submitted in the proceeding by interested persons. This proceeding was instituted for the purpose of determining what changes in the FM rules and technical standards are necessary for the optimum development of this broadcast service, and how the expansion of the service can be achieved with the least amount of delay and burden on the Commission, applicants, and other parties. Some tentative conclusions were drawn from our preliminary studies and experience and set forth in the Notice, especially with regard to the need for a fixed "go-no go" type of processing procedure, new FM propagation curves, and for an over-all plan designed to make the best possible use of the respective channels in the FM band (a table of fixed minimum mileage separations between co-channel and adjacent channel stations was proposed). Specific proposals, in some instances in the alternative, were advanced and outlined in the Appendix to the Notice. In addition, questions were asked about specific matters such as antenna and receiver performance, and the matter of the extent of AM-FM program duplication to be allowed was raised.

2. A number of parties submitted comments. These ranged from views on one or two specific topics, such as duplication of AM programs on FM stations, to opinions on many of the subjects covered in the Notice. The parties included such varied segments of the industry as networks, broadcasters, educational organizations, and equipment manufacturers.<sup>1</sup> Unfortunately, very little supporting data was

<sup>1</sup> Parties filing comments in Docket 14185: Gainsville Broadcasting Co., Inc., Gainsville, Texas; Radio Station WFAH, Alliance, Ohio; KXTR-FM, Kansas City, Mo.; WOHI and WOHI-FM, East Liverpool, Ohio; WPBC, Minneapolis, Minn.; University of Connecticut, Storrs, Conn.; KAMA-FM, Dallas, Tex.; WKFM, Chicago, Ill.; High Fidelity Broadcasters, Inc., Bethesda, Md.; Rutgers University, New Brunswick, N. J.; Jampro Antenna Co., Sacramento, Calif.; Western Slope Broadcasting Co., Inc.

submitted by most of the parties. In the important area of station assignment principles, for example, while some parties made specific suggestions as to re-shuffling of channels among certain large cities, no one submitted any specific data, even on a sample basis, showing possible allocations over an area as a whole. However, the comments and replies were helpful to the Commission, and have been given careful consideration in connection with all of the decisions reached.

3. The present document represents the Commission's conclusions as to many of the matters raised in the earlier Notice, including adoption of minimum mileage separations between co-channel and adjacent channel stations, which will be strictly adhered to as in the television service, classification of stations and maximum and minimum facilities for each class, division of the country into Zones different from the present Area 1 and Area 2, and similar matters. However, further consideration of this matter has led us to the belief that the long-term optimum use of this band of frequencies may well be best insured by a Table of Assignments, assigning particular channels to individual communities, similar to that in television (see §3.606 of our Rules).

4. We are issuing simultaneously herewith a Further Notice of Proposed Rule Making with respect to the concept of such a Table and the principles and priorities to be used in working it out. Work on a tentative table has been begun, and it is expected that a tentative Table will be released shortly. The Further Notice also relates to other subjects set forth therein.

## *II. Over-all Objectives*

5. While differing in their recommendations, the commenting parties in general agreed that there is need to examine the FM situation, with a view to providing for the orderly and efficient development of that service. No one quarreled with the over-all objectives set forth in the Notice as those to be pursued in this development, as in the standard broadcast service—(1) provision of some service to all of the nation, or as much as possible; (2) provision of as many program choices to as many listeners as possible; and (3) service of local origin to as many communities as possible (see the earlier Notice, para-

KREX-FM, Grand Junction, Colo.; Bruce F. Elving, Duluth, Minn.; KFML-AM and FM, Denver, Colo.; Burden Associates, Mount Kisco, N. Y.; Intercollegiate Broadcasting System, Washington, D.C.; Association of Federal Communications Consulting Engineers, Washington, D.C.; Donald J. Lewis, New York, N. Y.; Meredith Broadcasting Co., KCMO-FM, Kansas City, Mo.; National Association of Broadcasters, Washington, D.C.; WIBF, Jenkintown, Pa.; KMLA Broadcasting Corp., Los Angeles, Calif.; WTAX, Inc., Springfield, Ill.; American Broadcasting Company; WKRQ-TV, Inc., Mobile, Ala.; Washington Post Company; Southern Broadcasting Corp.; (KTOD-FM), Sinton, Tex.; Havens and Martin, Inc. (WCOD), Richmond, Va.; KCBH (FM), Los Angeles, Calif.; Columbia Broadcasting System, Inc.; A. Earl Cullum, Jr., Dallas, Tex.; National Broadcasting Company, Inc.; Radio Corporation of America, New York, N. Y.; Zenith Radio Corp., Chicago, Ill.; FM Unlimited, Inc., Chicago, Ill.; Storer Broadcasting Co., Bulletin Co. (WPBS), Philadelphia, Pa.; Lohnes and Culver, Washington, D.C.; Time-Life Broadcast, Inc. (WFBS-TV), Indianapolis, Ind.; WOOD-FM, Grand Rapids, Mich.; KLZ-FM, Denver, Colo.; Department of Education, Puerto Rico; Group of Licensees of FM stations (FM broadcasters); WBEN, Inc., Buffalo, N. Y.; Capitol Broadcasting Co., Inc. (WRAL-FM), Raleigh, N. C.; Concert Network, Inc. (WBCN), Boston, Mass.; National Association of Broadcasters; King Broadcasting Co., (KING-FM), Seattle, Wash.; WYZZ, Wilkes-Barre, Pa.; WUOM, Ann Arbor, Mich. (noncom); R. A. Isberg, San Francisco, Calif.

graphs 6 and 7). As we pointed out in the earlier Notice, these objectives are in part in conflict with each other, as is true with any broadcast service where the number of channels is insufficient to meet the possible demands of all communities. This problem is most sharply focused by the situation prevailing in the northeast section of the country. Most of this area, and probably all of it which is heavily populated, receives at least one usable FM service, and to this extent our first objective has been achieved. But FM assignments have been concentrated to a great extent in the larger cities and surrounding metropolitan areas, precluding in many instances the making of Class B assignments, or even lower-power Class A assignments, in other communities in the same area. While this assignment process up to now has provided the residents of many of the larger cities and metropolitan areas with a plenitude of service to choose from, and thus worked toward achievement of the second objective mentioned, at the same time it has worked to prevent achievement of the third objective, provision of local outlets for as many communities as possible. At present it is not possible to provide a first FM station to some sizable communities in this region, to serve as an outlet for local expression, although service is available to these communities from stations in other places. Some larger cities are limited to fewer channels than their population warrants. Likewise, it appears that achievement of the second objective—plentiful choice of services—has been hindered as far as area and populations outside of the immediate vicinity of the larger population centers is concerned.

### III. Fundamental Considerations and Basic Assignment Tools

6. In the earlier Notice herein (paragraph 20) we set forth tentative conclusions as to two basic concepts which, we believed, might well be those which should govern future FM station assignments. The first of these was that any future assignments should be based on an *over-all plan*, designed to achieve maximum and optimum use of each channel and take into account total effect on over-all service, rather than the present system under which an applicant selects a particular frequency and (absent conflicting applications or basic qualification questions) generally the only consideration is a case-to-case weighing of service gains against whatever interference the proposed station would cause, individually, to existing stations. The second was that applications should be considered strictly on a "go-no go" basis, by which an application will either be granted or rejected depending on its compliance with fixed rules, without elaborate case-to-case weighing of various factors as at present.

7. Our earlier Notice (paragraphs 26 to 29) also set forth specific proposals with respect to two fundamental tools to be used in future FM station assignments—the propagation curves to be used, and signal ratios to be employed for determination of objectionable interference, co-channel and up to three channels (600 kc) removed.

8. The concept of an *over-all plan* is discussed later in connection with the more specific question of the type of plan to be adopted. As

to the three other basic matters just mentioned, after consideration of the views expressed we are of the opinion that our earlier proposals are correct. The reasons for these conclusions are set forth in the following paragraphs.

*Need for a "go-no go" approach; undesirability of using measurements*

9. In our earlier Notice (paragraphs 9, 18, 19) we set forth at length the reasons leading to our tentative conclusion that future FM assignments, like television assignments, should be on a "go-no go" basis, with both potential applicants and the Commission being in a position to predict, through use of criteria and procedures set forth in our Rules, whether a particular proposed operation will be granted or must be denied. The absence of such a concept in the AM service necessitates, in many cases, the elaborate consideration of various factors on a case-to-case basis in connection with each application. Service gains must be weighed against losses in each case; populations must be counted; field strength measurements and often counter-measurements are submitted to attempt to determine the exact location of contours; extent of other service available must be considered. The controversies over all of these matters often result in long, involved, and costly hearings. The whole process has led to the great delays and burdens, on the Commission, on private parties, and on the public, all too familiar in the standard broadcast service. Moreover, the absence of the fixed standards leads to the generation and filing of marginal applications.

10. Most of the parties commenting on this question agreed with this basic "go-no go" concept (although some parties also favored use of assignment tools, such as field-strength measurements, which would be difficult to fit into such a system). However, some parties believed that the Commission should retain "flexibility" even in consideration of individual cases, e.g., making grants where warranted even though the proposed operation would cause interference to existing stations within their "normally protected" contours (on the theory that the gains in service would exceed the losses from such interference). This argument must be rejected. Nearly a generation of experience with such "flexibility" in the AM field (a concept embodied in §3.24(b) of the Rules) demonstrates that, whatever advantages may accrue therefrom in some individual cases, these are outweighed by drawbacks, burdens, and delays involved, discussed in the earlier Notice and summarized in the previous paragraph. Moreover, as a practical matter such "flexibility," permitting case-to-case weighing of gains and losses in connection with each proposed operation, is incompatible with consideration of other, broader factors which should be taken into account if the FM service is to experience optimum development—the cumulative effect of a series of new operations on the service of an existing station or stations, possible later expansion of the facilities of existing stations, possible other uses of the channel sought more consistent with our general objectives, the efficiency of the proposed assignment, and, in sum, the general relation-

ship of the proposed grant to the present and future over-all situation of the medium. These matters, it appears, must be resolved on the basis of fixed rules, generally applicable, which can be used by the Commission, its staff, and by private parties, to determine the disposition to be made of an application or potential proposal.

11. As to use of field strength measurements, the rules presently provide for their use in FM assignments (though they are seldom if ever used), but in the earlier Notice (footnote 9) we proposed to delete all reference to measurements in the Rules so that assignments would be made entirely on the basis of propagation curves or data derived therefrom. The Association of Federal Communications Consulting Engineers (AFCCE) and some other parties urged that measurements should be used as an FM assignment tool, to make allowance for terrain variations. The subject of terrain considerations is discussed later; however, as far as use of measurements is concerned we must reject the AFCCE's suggestion and adhere to our earlier proposal. This is because field strength measurements are not an exact tool. It must be borne in mind that the results obtained by measurements, in a particular situation, will vary with locations chosen, time of day, season, and method of taking. Even in a particular situation, involving the same small area and period of time, measurements taken by one party often indicate that interference would exist, while measurements taken by another party indicate absence of interference—a phenomenon all too familiar in AM hearings. Consideration of conflicting measurements would obviously be completely incompatible with a “go-no go” approach. Where a complete set of measurements is properly made, it may give a fairly good idea of a station's coverage area in the absence of interference. But, since the extent of a station's actual service area is usually limited by interference, service measurements are of relatively little value in the absence of interference measurements, and the latter are extremely difficult and complicated to make to an extent sufficient to be useful. Therefore—as in television—it is preferable to use the propagation curves adopted here, based on analysis of a large number of measurements.

12. *Propagation curves to be adopted.* In the earlier Notice (paragraphs 26 and 27) we proposed to replace the present FM propagation curves used for determining interference (Figure 1 of § 3.333, based on groundwave propagation only), with more up-to-date curves, which among other things take into account tropospheric propagation—using for service and interference respectively the F(50,50) and F(50,10) curves proposed for low band VHF television (Channels 2 to 6) in Docket 13340. No party disagreed with the decision to adopt new curves, and most comments on this matter favored those proposed. However, the AFCCE suggested that (1) service should be determined on the basis of an F(50,90) curve, in order to guarantee a higher quality of service; and (2) for adjacent channel assignments, that interference should be determined on the basis of the F(50,50) curve, on the ground that at the shorter distances involved nearly “steady state” propagation conditions prevail.

13. In our view, our original proposal in this respect (which was earlier supported by the Radio Propagation Advisory Committee (RPAC), a government-industry group) is correct. As to AFCCE's suggestion concerning use of the F(50,90) curve for service, the distinction between this and our proposal amounts to a difference in the area to be protected, AFCCE's proposal amounting to protection of a smaller area, thus permitting somewhat closer assignments. Imposition of this unduly high standard as to what constitutes adequate reception would mean loss, through non-protection, of generally useful service outside of the protected contour, and would unduly limit stations' service areas.<sup>2</sup> TV service is evaluated on the F(50,50) basis, and the same should apply here. In the absence of any good basis therefor, there is no reason to complicate our rules by addition of a third curve.

14. As to the idea of evaluating first adjacent channel interference on an F(50,50) basis, at close-in distances there is relatively little difference between fields at a particular location as shown by this and by the F(50,10) curve, and therefore it makes relatively little difference which is used. At larger distances from the transmitter, there is a greater difference between the curves, as signal variations create more of a time factor.<sup>3</sup> At these distances the conditions urged by AFCCE in support of this proposal cease to exist, and, in order to afford adequate protection from occasional interference it is necessary to employ an F(50,10) curve. Therefore, use of the F(50,50) curve would be inappropriate. It should be added as a general observation, that both of these AFCCE suggestions would result in minimizing the extent of protection to be afforded existing stations, so that more and closer assignments may be made. Adoption of these suggestions would be inconsistent with our basic decision herein, that (except for certain stations now operating with great height and power, discussed below) stations are entitled to a greater degree of protection than that afforded by present rules, in order to avoid destruction of useful service. AFCCE's suggestions must be rejected.

*Signal ratios for determining interference*

15. Under the present FM rules (§3.313(b)), objectionable interference exists where: (1) for co-channel stations, the undesired signal exceeds 1/10 of the desired signal; (2) for first adjacent channel stations (200 kc removed), the undesired signal exceeds 1/2 of the desired signal; (3) for stations two channels (400 kc) removed, the undesired signal is more than 10 times the desired signal; and (4) for stations three channels (600 kc) removed, the undesired signal is more than 100 times the desired signal. In the July Notice (para-

<sup>2</sup> AFCCE's proposal is for protection of existing stations to the 1 mv/m contour as determined by the F(50,90) curve. With respect to adjacent channel assignments this would mean substantially less protection than that provided either under our present basic assignment system, or the interim procedure based on the F(50,50) curve.

<sup>3</sup> Under present protection principles (based on the 1 mv/m contour) and signal ratios, for first adjacent channel stations the interfering contour is the 0.5 mv/m (54 dbu) contour. For a station operating with 1 kw E.R.P. and effective antenna height of 500 feet, this contour lies 20 miles from the transmitter under the F(50,50) curve and 21.5 miles under the F(50,10) curve. For a station operating with 20 kw and 2,000 feet antenna height, contour lies 62.5 miles or 71.5 miles from the transmitter, respectively.

graphs 28 and 29) we invited comments upon the question of whether these or some other interference ratios should be adopted as the basis for FM assignments; we did not propose any specific changes.

16. Most of the commenting parties favored maintenance of the present ratios, in the absence of persuasive data to the contrary. Those changes suggested were generally in the direction of higher ratios—i.e., more protection—especially as to first adjacent channel interference. Zenith and RCA submitted data based on measurements of their receivers' performances. Otherwise, relatively little specific information was furnished. Some parties urged that the present adjacent channel ratio, while perhaps satisfactory for regular FM broadcast operations, is not enough to protect multiplexed operations—stereophonic broadcasting and subsidiary communications operation—which involve use of more of each FM channel. Zenith, pointing out that the signal-to-noise ratio for stereophonic broadcasting is about 23 db poorer than for monophonic broadcasting, on the basis of measurements on its receivers, urges that the desired to undesired co-channel ratio be raised to 100 to one (40 db), and first adjacent channel ratio to 20 to one (26 db). Zenith does not recommend any change in second or third adjacent channel ratios.

17. The limited information submitted, plus data gathered and prepared by the Commission's staff, persuades us that the present ratios should not be changed. They are sufficiently accurate for the system of minimum mileage separations which we adopt herein. As for stereo and SCA multiplex operations, as Zenith concedes, the higher protection ratios necessary for such operations are balanced by the fact that the service range thereof is less than that of regular FM service. Therefore, a series of ratios (or spacings based thereon) affording adequate protection to regular service will also afford appropriate protection to these other types of service.<sup>4</sup> The spacings we adopt herein, substantially wider than required under present practice, will achieve this result.

18. It should be noted that, since we are herein adopting a table of minimum spacings between stations, there is no longer any need for interference ratios in the rules. The rules set forth in the Appendix hereto do not contain such provisions.

#### *Channels*

19. In the July Notice, we did not propose any change in the basic FM channel structure—100 channels of 200 kc width each, with the lower 20 reserved for educational use. We did propose as possibilities: (1) using a group of 20 contiguous channels for use by low power Class A stations, instead of the 20 Class A channels now interspersed throughout the commercial portion of the band; and (2) reserving

<sup>4</sup>As to the first adjacent channel ratio (which was the one most commented on) one of the problems in making FM assignments, on the basis adopted herein or any other basis, is that the two-to-one ratio is a positive one, meaning that first adjacent channel spacing necessary between stations tends to approach the required co-channel spacing—a situation substantially limiting the number of FM assignments which can be made. Raising the ratio above what it is now would make provision of an adequate number of assignments even more difficult than it is at present, and therefore should not be done unless a really persuasive showing—much more than anything presented here—is made.



a group of 20 contiguous channels for use by high power "Class C" stations, designed for wide area coverage and protected out to a considerable distance.

20. One party (High Fidelity Broadcasters, Inc.) advanced a rather elaborate system by which Class A stations would be accommodated, not in the regular 100 FM channels at all, but in "interleaved" channels to be located 100 kc from the present frequencies (i.e., 92.2 mc, 92.4 mc, etc.). Interference ratios to be applied to these odd channels were specified, and it was proposed that these stations operate with vertical polarization. This proposal, as advanced here, has several deficiencies, and must be rejected. First, we have little information as to how such a plan would operate, what the correct ratios should be, and what benefits would be derived from it. No sample allocation plan was submitted, nor was any showing made as to the impact of a large number of these stations on Class B and other assignments. The requirement that vertical polarization be used would place a severe burden of incompatibility on these stations, and might well defeat the objective sought. The matter of 100 kc channeling will be further considered by the Commission.

21. The matter of use of the 20 channels now reserved for education is discussed below; for reasons stated we retain the present reservation.

*Channels for use by low power Class A stations*

22. Comments expressed both support for and opposition to the idea of making Class A assignments on 20 channels at one end of the commercial band, instead of on the 20 channels now assigned for Class A use, interspersed throughout the commercial band. No specific showings or analyses were presented on either side. The chief arguments advanced in favor were: (1) as pointed out in the Notice (paragraph 33), the making of a large number of Class A assignments would be facilitated if, in general, the only adjacent channel problems involved were other Class A assignments rather than higher power Class B stations; and (2) there would be less interference problems with Class B stations. One argument advanced against the idea was that, if all Class A stations were together at one end of the band, listeners would tend to ignore them and concentrate on the Class B stations in the remainder of the band, which, with their greater facilities and resources, tend to offer more attractive programming.

23. Since the Notice was issued, the Commission's staff has made studies on this question, with respect to the crowded Northeastern section of the country, the area constituting television Zone I. These studies indicate that, for that area, such a shift is not desirable. The chief problem is the number of Class B stations now assigned on the 20 channels at either end of the commercial band, which are so numerous that, for the shift to have any significance, these Class B's would have to be shifted to the remaining 60 Class B channels. The staff's study indicated that this cannot be done, consistent with any

sort of appropriate spacings between co-channel and adjacent channel stations such as those set forth in the Notice.<sup>5</sup> Of 112 Class B stations in this area on the lower 20 channels, only 46 could be thus accommodated on the remaining 60 channels; 66 could not. For the most part, the ones which could not be reassigned are those in and around the large cities of this region. The problem is that these areas in and around the large cities have more than 15 Class B assignments each, which has been possible under the present system (which can yield 20 Class B assignments even in the city itself), but would not be possible with the shift of Class A channels to a contiguous band. Under that system, if proper spacings are to be maintained, no city and its surrounding area could have more than 15 Class B assignments. The proximity of this area to the Canadian border also presented some problems.

24. With this number of Class B stations which would have to be left in the contiguous band, it would be possible to reassign only 43 of the 71 Class A stations in television Zone I which operate on Class A channels above Channel 240, consistent with proper spacings. Thus, it appears that the idea of a contiguous band is neither feasible nor desirable in this portion of the country, which is herein designated FM Zone I, co-extensive with television Zone I. Likewise, for the same reasons, it appears inappropriate with respect to that portion of California (south of the 40th parallel) where present assignment conditions are generally similar, and which is herein designated Zone I-A.

25. With respect to the rest of the country, herein designated Zone II, by and large the FM band therein is presently less occupied, and there would not to the same extent be the question of either superimposing the new channel structure on existing stations or moving the latter. However, even so, it does not appear that there is anything to be gained from creating a contiguous Class A band. Conceivably, it could result in more Class A assignments over-all, and probably would if towns were distributed in a more or less geometric pattern across the country. But, even in Zone II, there is often need for numerous assignments in a particular relatively small area. In these situations, the potential Class A assignments under the contiguous band approach is substantially less than where the A channels are interspersed. Moreover, removing the Class A channels from their present interspersed positions throughout the commercial portion of the band would complicate the making of Class C assignments (which in the staff's work so far has proved more difficult than making Class A assignments), since all of the Class C first adjacent channel problems would involve other Class C's, with the greater adjacent channel spacing requirement involved.

25a. Two parties (Earl Cullum and High Fidelity Broadcasters, Inc.) urged that all commercial channels should be used without

<sup>5</sup> The separations used in the studies were somewhat shorter than those proposed in the Notice. For co-channel, first adjacent channel, and second and third adjacent channel, they were, respectively: between Class B stations, 150, 90, and 40 miles; between Class A stations, 70, 35, and 15 miles; and between Class A and Class B stations, 115, 70, and 40 miles.

distinction as to classes of stations—i.e., low power Class A stations and higher power Class B or C stations would use the same channel. This concept we must reject, because it represents an inefficient use of channels. This is true because unduly wide spacings are necessary in order to protect the lower power stations from co-channel interference caused by the higher power operations.

#### *IV. Type of Assignment Plan To Be Adopted for Commercial Channels*

26. As mentioned, we have concluded that whatever plan is adopted herein as a basis for FM assignments, it must be of a "go-no go" character, as is the television assignment plan. This does not of itself determine what kind of plan should be adopted, since an assignment system might be very simple, or it might involve relatively complex computations and formulas, and still, as long as the end result is certain, it would meet this test. There are discussed later herein certain rather radical plans proposed by some of the parties, which we must reject for reasons stated. The principal alternatives, meriting serious consideration, are three: (1) protection of existing stations to a particular field strength contour, such as 1 mv/m; (2) the type of plan proposed in the Notice, a set of minimum co-channel and adjacent channel mileage separations between existing and proposed stations (which would almost necessarily have to be based on assumed maximum facilities for both); and (3) a Table of Assignments, similar to that formerly used in FM and now used in television, based on minimum separations but involving the assignment of particular channels to particular communities.

27. *Protection to a particular contour.* Several commenting parties argued against the Notice proposal and in favor of simply a "go-no go" principle by which an application would be considered on the basis of whether or not the operation proposed objectionable interference (according to the new curves and present ratios) to existing facilities. Perhaps the most vigorous proponent of this idea was the *AFCCE*, whose proposal is for assignments essentially on the same basis now obtaining under our interim processing procedure—protection of existing stations to their 1.0 mv/m contours on the basis of their existing facilities and those proposed in the application, using the curves and signal ratios adopted herein. *AFCCE* proposes to retain essentially the present rules relating to maximum facilities—20 kw E.R.P. and 500 feet effective antenna height in "Zone I," and no maximum elsewhere—and no minima other than those now in the rules. Other parties supporting this general concept proposed other protected contours—e.g., 1 mv/m for Class A, 0.5 mv/v for Class B, and 0.1 mv/m for Class C stations—and maximum and minimum facilities along the lines proposed in the Notice.

28. The proponents of this plan, vis-a-vis the mileage separation concept as proposed in the Notice, argue that this is the way by which the maximum number of new assignments can be made, whereas, at least with the fairly wide spacings proposed in the

Notice, under a mileage separation scheme relatively few new stations could be assigned in areas where there is present or likely future demand therefor. It is argued that a mileage separation system, based on maximum facilities, is wasteful of spectrum space and amounts to protection of often non-existent "service", since many stations do not now and likely, for economic reasons, never will operate with anything approaching maximum facilities. It is also urged that such a system must necessarily be based on assumed uniform terrain conditions and more or less uniform distribution of cities and population—neither of which conditions in fact exists. Therefore, it is urged, applications should be evaluated individually, on a simple "protected contour" standard, such as the 1 mv/m. Those parties favoring mileage separations as opposed to the "protected contour" concept (which included the N.A.B. and the networks) referred to the pressures for non-complying grants which, it is believed, a "protected contour" concept would always entail; to the possibility of conflict between parties as to the exact location of any given service or interference contour (even using the curves); to the desirability of giving existing stations leeway to increase their facilities; and to the general consideration of over-all efficiency.

29. The AFCCE proposal obviously would permit a greater number of assignments; in fact it may properly be termed a "squeeze-in" proposal, under which any combination of facilities (no matter how small), and directional antenna suppressing radiation in particular directions, would be permitted as long as existing 1 mv/m contours are protected. It must be rejected, for a number of reasons. First, there is the consideration of over-all efficiency of channel use. As far as co-channel and first adjacent channel operations are concerned, any new assignment creates interfering signals over much greater distances than the extent of its service area—thus creating islands of service in the midst of seas of interference. If protection is only to the 1 mv/m contour of existing stations, service outside that contour (which many stations render) will be destroyed. There comes a point of diminishing returns beyond which additional assignments on a channel, even though nominally protecting the 1 mv/m contour of existing stations, result in over-all inefficiency of use. Second, this plan would merely tend to perpetuate an already undesirable situation, by encouraging the "squeezing in" of numerous assignments operating with near-minimum facilities—an inefficient use of channels, especially those designed for use by medium or higher power stations. Third, existing stations (both those now in existence, and those which might be authorized from now on under such a system) would be forever limited to their existing facilities—often the small and (from an assignment standpoint) inefficient facilities referred to above. Especially now that FM shows signs of developing an economic base sufficient to support relatively large scale operations, we do not believe the public interest would be served by such a limitation.

30. To a certain extent, these objections would be met by adoption of some of the variations of this concept urged by others—

protection of existing facilities of some classes to a lower field strength contour, and adoption of a reasonably significant minimum for facilities, at least on some channels. However, none of these would meet the last objection mentioned above—limitation of stations to their present facilities. Moreover, this “protected contour” concept has the same disadvantage as does any plan other than a Table of Assignments, in that it requires the making of assignments on the basis of present “demand,” without consideration of future or other needs which have not yet been crystallized into application form.

31. It is also to be observed that the “protected contour” concept would not even necessarily afford the “go-no go” certainty we believe indispensable. For example—as has happened in the past—the filing of an application seeking a new station, which would approach but not quite cause interference within the 1 mv/m contour of an existing station, may lead to the filing by the existing station of an application for increase in height or power, which if granted would involve interference to or from the new proposal. Under these circumstances obviously a hearing would be required, to determine which application should be granted. It would appear that we would then be in the same position we are now—contour locations would have to be determined, populations counted, other services evaluated, etc. Thus nothing would be gained.

32. For these reasons, we conclude that a plan based only on a “protected contour” concept is not sufficient, and must be rejected. Therefore, we adopt, as the basis of assignments a table of minimum co-channel and adjacent channel mileage separations, discussed below, which we believe to afford the best basis for orderly, efficient, and effective development of the FM broadcast service. This is based on protection of stations of the various classes to a particular service radius, using the curves and signal ratios mentioned above, and assuming the maximum facilities for both existing and proposed stations.

33. We do not conceive that this plan will involve the “waste,” or crippling effect on the development of FM, that AFCCE and others allege. That it may in some instances mean, for the moment, protection of non-existent “service” where stations operate with relatively small facilities, is outweighed by the provision of opportunity for expansion as the economic basis of the medium increases. Terrain factors can be taken into account in such a plan, to the extent appropriate, as discussed below. It does not, as AFCCE argues, involve an assumption as to distribution of population or cities (which could, and as we propose will, be taken into account in a Table of Assignments).

34. AFCCE argues that a mileage separation plan would be both crippling on the one hand, as to “Zone I” (the Northeast), and unnecessary on the other, as to “Zone II” (the rest of the country). It is asserted that under the wide spacings proposed in the Notice, only about eight out of 49 applications pending as of last summer for Zone I facilities could be granted—many fewer than under AFCCE’s

proposal. We do not conceive that use of the criteria adopted herein will have anything like the restrictive effect asserted with respect to this portion of the country. It should be borne in mind that the spacings adopted herein are shorter than those proposed in the Notice, permitting some assignments which could not have been made under our original proposal but can be made under the standards here adopted, consistent with assignment efficiency and the public interest. Analysis of the approximately 50 applications now pending for new stations in Zone I (as of June 1962) indicates that a number of them can be granted under the standards now adopted, a number of others can probably be granted substantially equal facilities on channels other than those requested, and a number could not be granted anyhow, even under the AFCCE proposal, because they involve interference within the 1 mv/m contours of existing stations. It must be borne in mind that in most of Zone I FM assignments are now approaching the saturation point, no matter what basis of assignments is used, as shown by the fact that as of January 18, 1962 there were approximately 580 commercial FM assignments in this area, compared to a total of 644 provided in the Table of Assignments formerly used in the FM service, as amended up to February 12, 1952. Analysis of the approximately 50 applications for new stations in Zone II (as of June 1962) indicates that many of these can be granted under our new standards, others can be accommodated on other channels, and some could not be granted even under the AFCCE's proposal, because of the interference which would be caused. With respect to Zone I-A (Southern California), the situation with respect to the ten pending applications appears to be about the same as Zone I.<sup>6</sup> In any event, whatever restrictions are entailed by the mileage separation plan adopted here as compared to the AFCCE proposal, in terms of applications which might be granted under it but cannot meet the spacings adopted here, are outweighed by the overall efficiency and preservation of service, and orderly opportunity for expansion, provided by our plan.

35. With respect to Zone II, AFCCE's argument is that there the demand for channels is and will remain substantially less, and therefore the assignment situation is self-correcting and no over-all plan need be adopted. This we believe erroneous. In some parts of Zone II, such as the coastal Pacific Northwest and the area around Dallas-Fort Worth, there is already a tight situation as to possible FM assignments. Moreover, it may be expected that demand will increase in the future, along with interest in FM and population and economic growth. Clearly, if FM is to proceed to orderly development in this portion of the country, now is the time for an over-all plan.

<sup>6</sup> The total of 110 applications represents no more than about 90 potential grants on any basis, since some of them are mutually exclusive. Of the 110, about 67—80 in Zone I, six in Zone I-A, and 31 in Zone II—would be the first FM stations in their communities, and if granted would thus fulfill one of our important assignment objectives in this and the other broadcast services, provision of a first local outlet. To the extent that these could be granted under a system such as AFCCE's, but cannot be granted (or comparable facilities provided) under our new standards, this is of course *pro tanto* a disadvantage. But, as stated in the text, the disadvantage is outweighed by the advantages accruing from the mileage separation plan adopted here.

36. *The Table of Assignments.* In the July Notice (paragraph 23) we discussed the idea of re-instituting a Table of FM assignments, similar to that in effect from 1945 to 1958. This we rejected, for essentially the same reasons the earlier Table was abandoned, that it appeared to be an unnecessary and cumbersome step in the assignment process. Those parties commenting on this matter appeared to agree.

37. However, on further consideration, we have reached the tentative conclusion that the public interest will best be served by adoption of such a table, just as in television, based on the mileage separations adopted herein, for substantially the same reasons set forth in the Sixth Report in 1952 (see the Sixth Report and Order in Dockets 8736, 8975, 8976, and 9175, released April 14, 1952, paragraphs 12 to 18). Briefly, these are: (1) a pre-engineered Table is the best way to insure efficiency of channel use, better than leaving channel use to the more or less random determination of application filing;<sup>7</sup> (2) a Table is the best way of making provision for future needs which are not at the moment ripe for expression in application form—e.g., needs of smaller communities, and of areas where support for FM is lacking at the present time; (3) a Table forms a better way of insuring compliance with §307(b) of the Act — calling for fair and equitable distribution of facilities — than does the random application process, which necessarily has to a degree a “first come first served” aspect.

38. The priorities and bases to be used in the Table are discussed in the Further Notice simultaneously adopted. Comments thereon, and upon the basic idea of a Table, are invited.

#### V. *Zones, Classes of Stations, Maximum and Minimum Facilities Zones*

39. Presently, under §3.202 of the Rules, for the purpose of FM allocations the country is divided into two Areas — Area 1, a portion of the Northeast considerably smaller than present television Zone I, and Area 2, the rest of the country. Our proposal in the Notice (paragraph 35) was—under one alternative, “Plan II”—to expand Area 1 so as to make it roughly co-extensive with television Zone I, extending as far west as the Mississippi. Actually, both at present and under the proposed “Plan II,” the “zone” concept has significance only with respect to the facilities used by high power stations, the maximum permitted being less in Area 1.

40. Some parties favored abolition of zones altogether, as being a more or less arbitrary and discriminatory concept. It was asserted, for example, that stations of considerably more power than the present Area 1 maximum—20 kw E.R.P. and 500 ft. a.a.t., or equivalent—can perform at least as valuable a function in the more populous and crowded Northeast, where there is economic support for large

<sup>7</sup> For example, in the Notice we raised the idea of *maximum*, as well as *minimum*, separations, designed to insure efficiency of channel use. Further consideration leads us to the view that this fairly complicated concept (which involves adjacent channel as well as co-channel considerations) can best be applied as a general guide in working out a Table, rather than used as a specific rule in dealing with individual applications.

scale operations and high quality programming, as they do in less populous parts of the country. Other parties supported the zone concept, for generally the same reasons mentioned in the Notice—that because of the crowded assignment conditions and closely populated character of the Northeast, there is both little opportunity for and less need for great facility “Class C” stations rendering wide area coverage; whereas in the West, with its sparser population, more widely separated cities, and fewer existing stations, there is both a great need for high power stations providing such coverage, and opportunity for such assignments. As to the appropriate division of the country into zones, most parties commenting favored something along the lines of our proposed “Plan II,” or something corresponding to TV Zones I and II.

41. After due consideration, we conclude that the public interest would best be served by division of the country into three zones, as proposed by AFCCE and ABC. Our conclusion is based upon the differences between the general areas of the country referred to above, which make high powered stations, rendering wide area coverage, both less needed and much less feasible in the Northeast than in the West, where population is sparser and cities are often much further apart. In view of the populous character of the Northeast, with its many cities, it appears that stations operating with facilities in the general order of the present Area 1 maximum should be able to have an adequate basis of economic support. There appears to be no reason, either from the standpoint of the character of the areas or of administrative conveniences, why FM “Area 1” should not be co-extensive with television Zone I. Therefore, as suggested by some of the parties, we are redefining Area 1 to make it and TV Zone I the same.

42. It also appears that conditions in much of California either are or may soon become the same as the Northeast in these respects. Therefore, as AFCCE and ABC suggest, we are defining that portion of California below the 40th parallel of latitude (which lies north of San Francisco) as “Zone I-A.” Assignment rules here will be the same as in Zone I, because of the similarity of conditions.

43. In reaching these conclusions, we have considered two other suggestions as to what the appropriate zones should be. One is that Zone I should include present Area 1 plus any U.S. Census standard metropolitan statistical area, said to be a way of insuring that high power, wide area stations would be assigned only in truly rural areas. This we must reject, both because it would be unduly confusing and subject to change with every Census, and because it would by no means necessarily achieve a desirable result.<sup>8</sup>

44. The other suggestion is based on propagation characteristics. It is urged that we recognize, in FM as in VHF television, the greater tropospheric propagation along the Gulf Coast, and take similar account of the same phenomenon along the Southern California coast south of Santa Maria. Recognizing the merit in both of

<sup>8</sup> High power stations in standard metropolitan areas, especially in the South and West, may well render a much needed service to wide rural areas having little other service. Moreover, it may be that support from such areas is desirable if high power operations of good quality are to be provided.



these positions from a strictly technical standpoint, we must nonetheless reject them. As to the Gulf Coast area of the South (television Zone III), if adequate opportunity is to be afforded for the development of FM—which, as an aura service, can be expected to support more stations than television—a large number of assignments must be made therein. These cannot be made if we impose minimum mileage separations substantially larger than in the rest of the country, as in television. The great facility “Class C” stations on 60 channels which we provide for herein in Zone II will have, using the spacings selected and the curves, protected service areas substantially larger than their counterpart “Class B” stations in Zone I; and therefore, even if in this area interference is more severe than that indicated by the curves adopted herein, these stations will have adequate protection. There does not appear to be in this area the need for extremely wide area coverage which exists, for example, in the sparsely settled western plains and intermountain areas, so the public will not suffer from the closer spacings. It should also be borne in mind that, whether stations are assigned on a separation basis or via a Table, only a very small percentage of spacings will be at or near the minimum. Using special spacings for a “Zone III” would also considerably complicate whatever assignment process is used, since, unlike television with its one class of stations and only co-channel and first adjacent channel interference problems, FM has two classes of commercial stations and interference considerations are present up to three channels removed. A long series of separations would have to be worked out between Class A and Class C stations on either side of the zone line, up to three channels removed.

45. As to coastal Southern California, this area is already so crowded that probably few additional assignments can be made<sup>9</sup>, at least as to other than low power Class A stations. Therefore the separation used becomes of less importance, and, in order to make whatever assignments are possible, we must adhere to the Zone I spacings.

#### *Classes of commercial stations*

46. The FM Rules presently provide for two classes of stations on commercial channels: (1) low power “Class A” stations, operating with no more than 1 kw E.R.P. and 250 ft. antenna height above average terrain, or equivalent, assigned in both Area 1 and Area 2 on Class A channels; and (2) higher power “Class B” stations on 60 Class B channels, operating in Area 1 with no more than 20 kw and 500 feet or equivalent (and in no event more than 20 kw), but with no fixed maximum on facilities in Area 2.<sup>10</sup> In the July Notice, we proposed to retain these classes of stations but to add a third class—larger “Class C” stations, designed to render wide area coverage

<sup>9</sup> For example, there are 20 Class B assignments within a radius of 40 miles of Los Angeles. In addition, there are 15 Class A assignments in the same area. The San Diego area has 13 Class B assignments.

<sup>10</sup> Section 3.204(a)(2) provides that normally the maximum in Area 2 will be the same as in Area 1, but greater height and power will be encouraged and considered, on an individual basis, where undue interference would not result to existing stations or potential assignments. The NAB pointed out that as of 1961, there were 261 Area 2 Class B stations authorized with power between 20 and 74.9 kw, and 63 with more than 75 kw.

where it is needed. We set forth two alternative proposals for assignment of these stations: "Plan I," under which 20 channels (contiguous in the band) would be used for Class C assignments in both Areas; and "Plan II," under which Class C stations would be assigned only in Area 2, on all of the present 60 Class B channels, and no more Class B assignments would be made in that Area (Area 1 would continue to have Class B assignments).

47. The concept of having three general classes of stations drew support from many of the parties. AFCCE opposed it, urging simply maintenance of the *status quo* in this respect, with no maximum in Area 2. Two parties (Zenith and FM Unlimited) urged that there is need for "Class C" stations in both sections of the country, as proposed in our "Plan I"; both urged provision of more than 20 channels therefor. Other parties favored "Plan II," asserting that: (1) it involves less sweeping changes from present practice; (2) in the Northeast (Area 1, as expanded) there is neither great need for nor much opportunity for such higher facility stations; (3) there is need for such assignments in the sparsely settled West, and this may require more than 20 channels; (4) setting aside a band of channels, such as 20, for use by high power stations, gives stations so assigned an undue competitive advantage (in other words, all stations in the same market should as far as possible be relatively equal in facilities.)

48. For the reasons last mentioned and discussed earlier in connection with zones, we conclude that our "Plan II" is more in the public interest and should be adopted. In Zone I, and Zone I-A (California) where conditions are similar, Class A and Class B stations will be assigned, on the channels now specified therefor. In Zone II, which includes most of the country, Class A stations will be assigned on the 20 channels now reserved therefor (see paragraph 25, above), and on the remaining 60 channels Class C stations will be assigned. There will be no new Class B assignments in this area. We have given consideration also to reserving 20 channels for greater facility Class C stations in Zone II only, with Class B assignments on the remaining 40 channels; but we conclude that this would not only be difficult to do effectively (because of existing use of channels in some parts of Zone II, but would lead to an undesirable situation because of the factor of competitive inequality mentioned above. There will always be differences in station facilities, where stations are assigned for different purposes, as we recognized years ago in setting up Classes A and B. But, where nothing much is to be gained, we do not believe the public interest is served by building into our assignment plan competitive superiority for a relatively few stations operating on a limited number of channels.<sup>11</sup>

<sup>11</sup> High Fidelity Broadcasters, Inc., a Maryland Class A FM broadcaster, proposed perhaps the most radical reallocation of any party, including shifting Class A stations to "interleaved" channels (already discussed), removing the reservation of any particular channels for education, having Class B-1 and Class B-2 stations (the former, in Area 1, the same as present Class B, the latter, in Area 2, operating with somewhat greater facilities), and using the 20 percent Class A channels for high-power Class C stations in Area 2 only. This must be rejected, not only because of its great complexity and the problems connected with "interleaving," mentioned above, but because of the factor of competitive inequality just referred to.

*Facilities for new commercial stations*

49. *Minimum facilities.* As to minimum facilities, the present rules require provision of a 3 mv/m signal over the principal city (§3.311(c)), and otherwise provide only that the rated transmitter power shall not be less than 250 watts for Class A stations and 1 kw for Class B stations (§§3.203(a) and 3.204(a)). As to Class B stations, at least, these minima are of no real significance from an over-all assignment standpoint. Because of the pressure to "squeeze in" stations, the result has been to clutter up many of these channels with a number of small-scale facilities, making for inefficient channel use. It was for this reason that in the Notice we proposed minima, in terms of height and power (or equivalent), for the various classes of stations: 100 watts and 100 ft. for Class A, 1 kw and 250 ft. for Class B, and 20 kw and 500 ft. for Class C.

50. The commenting parties for the most part favored this idea for new assignments (although some suggested it apply only to Class B and Class C stations). Various minima were suggested,<sup>12</sup> including absolute minima on antenna height above average terrain (as well as "equivalence"), and alternative minima where sufficient antenna height might not be feasible. It was also suggested that the minima for Class B and Class C should be higher than the maximum for the next lower class, so there would be no "overlap" of station classifications.

51. As far as new commercial assignments are concerned, we adhere to the view that certain minima should be imposed, but only as to power. In some instances, a station may have a reasonably favorable antenna location with respect to its principal community, and at the same time have a negative antenna height with respect to the average of all eight radials. In this situation it would be unduly burdensome to require increase in power to meet an "equivalence" standard. Adequate safeguards in this respect are provided by our present rules (herein reaffirmed), requiring a signal of at least 3 mv/m over all of the principal community, and where possible location so as to have line of sight over that community. (Sections 3.311 and 3.315). The rule we adopt herein is that—except where antenna height is so great that use of the specified power would exceed the *maximum equivalence standard* (in which case that standard will govern)<sup>13</sup>—new stations must operate with no less than the following effective radi-

<sup>12</sup> Three specific proposals were: Earl Cullum, none for Class A, 10 kw and 250 ft. (or equivalent) for Class B or C. High Fidelity Broadcasters, Inc., Class A, 500 watts and 100 ft. or 100 watts and 250 ft.; Class "B-1" (B's in Area 1), 1.2 kw and 500 ft. or 12 kw and 150 ft.; "B-2" (B's in Area 2) 8 kw and 500 ft. or 60 kw and 200 ft.; Class C, 300 kw and 600 ft. or 100 kw and 1,000 ft. FM Unlimited: Class A, 1 kw and 250 ft. minimum height of 75 ft.; Class B, 20 kw and 500 ft., minimum height a.a.t. of 250 ft.; Class C, 200 kw and 1,000 ft., with minimum height a.a.t. of 1,000 ft.

The minima proposed by High Fidelity are designed to insure that Class A and B stations render urban service at least 50% as far as, and Class C stations at least 85% as far as, they would if operating with maximum facilities—a standard in general considerably higher than that provided by the requirements we adopt herein. But, desirable as this may be from an over-all efficiency standpoint, we believe such high minima would tend to restrict the development of the service.

<sup>13</sup> These exceptional situations will probably occur mostly in Zone I, where, under the standards adopted below, Class B stations will have maximum facilities of 50 kw and 500 ft. a.a.t., or equivalent. Where antenna height exceeds about 1,250 feet (as it does, for example, with the New York City stations located on the Empire State Building) such stations could not be permitted, much less required, to operate with as much as 5 kw.

ated powers: Class A, 100 watts; Class B, 5 kw; and Class C, 10 kw. These minima are lower than those proposed in the Notice and most of those proposed by the parties; but in our view they are enough to safeguard over-all efficiency and at the same time they are low enough to permit reasonably economical operation and thus encourage the development of the service. Since there will not be Class B and Class C stations in the same area, and since Class A stations operate on separate channels, there is no need for concern about the "overlapping" of facilities of the different classes.

*Maximum facilities for commercial stations*

52. *Class A.* The July Notice proposed to retain the present maximum on the facilities of low power Class A stations—1 kw and 250 feet above average terrain, or equivalent. No commenting party urged a lower figure; some supported this and others urged higher figures, such as 2.5 kw and 250 feet, 5 kw, or even 10 kw and 250 feet. It was urged that more power is necessary especially in the case of Class A stations located in metropolitan areas near large cities, to overcome man made noise, built-up area conditions, etc., as well as in order to compete with the numerous more powerful Class B stations in the city. We believe there is merit in this argument. Further staff studies have shown that an increase in the maximum facilities of stations on this class can be provided, and at the same time an adequate number of assignments on these channels can be provided for. A maximum of 3 kw and 300 feet above average terrain (or equivalent) appears to be appropriate, and is adopted herein. These facilities, which under the mileage separations adopted below would give a service radius of 15 miles, appear to be great enough to meet the problems resulting from the present restriction, and at the same time not large enough to create serious over-all assignment problems.

53. *Class B.* The July Notice proposed to retain for Class B stations the present Area 1 maximum, 20 kw and 500 feet above average terrain, or equivalent. Some parties supported this figure (as far as Area 1 is concerned, which under our decision herein is the only area where Class B stations would be assigned). Others urged an increase, some going as far as 20 kw or even 100 kw at 1,000 feet. These proposals must be rejected, because, as already mentioned, there is neither great need nor much opportunity for making such high power assignments in Zone I, and if made they would preclude other needed assignments. Of more merit are suggestions made by two parties (CBS and WQR) concerning the need for some increase, particularly in order to afford adequate coverage of metropolitan areas which are expanding rapidly with suburban development. It is pointed out, for example, that from the center of lower Manhattan, (where a number of New York City FM stations are located), it is 23 miles to the furthest point of that city, and the distance to the outer edge of most of the New York-northern New Jersey urbanized area is from 35 to 40 miles. Similar situations prevail in some other cities. Therefore, it is urged, an increase in maximum facilities to 50 kw and 500 feet (or equivalent) should be permitted, in order to permit provision of

a 3 mv/m signal to a distance of 24 miles and a 1 mv/m signal to a distance of 33 miles. We agree with these views, and accordingly are herein amending our rules to provide that the maximum facilities for stations herein classified as Class B (i.e., those stations in Zone I and I-A operating on Class B-C channels) shall be 50 kw E.R.P. and 500 feet above average terrain, or equivalent.

54. *Class C.* As to Class C stations—which under our decision herein will be assigned only in Zone II—these stations, often serving sparsely settled areas where there are relatively few sizeable communities, are expected to render wide area coverage, and therefore must be permitted to operate with great height and power where possible. In the Notice, we proposed a maximum of 100 kw and 2,000 feet above average terrain, or equivalent. The commenting parties who suggested specific figures either supported this or proposed other maxima which are generally comparable (e.g., 200 or 300 kw and 1,000 feet). In this respect, therefore, we affirm the proposal in the Notice, and for Class C stations (i.e., stations in Zone II operating on commercial channels other than Class A) the maximum facilities permitted will be 100 kw and 2,000 feet above average terrain, or equivalent.

55. AFCCE and other parties argued that there should be, as now, no absolute maximum on facilities in Zone II, where (it is asserted) there is and will be less need for assignments than any problems tend to be self-correcting. This contention must be rejected. Not only is the absence of such a restriction completely inconsistent with a mileage separation table and a table of assignments, but, even in the absence of such assignment plans, it permits grants of great height and power which may preclude future needed assignments. In short, it is wasteful, inconsistent with any rational over-all approach, and not in the public interest. All other services are subject to such restrictions, and FM Zone II should be also.

56. Use of E.R.P. greater than the “maximum” specified (where antenna height is low) is discussed below in connection with “equivalence”. For reasons stated, we must reject this concept.

## VI. Signals, Protected Areas, and Separations

### *Signals for service*

57. The present FM standards (§3.311(b) of the Rules) provide that in general a signal of 50 uv/m is sufficient for service to rural areas, and a signal of 1 mv/m is required for service to city, factory and business areas, with 3 mv/m required over the station's principal city. In the July Notice we asked for comments about these values, and we specifically proposed to retain the 3 mv/m value as a basis for principal city coverage.

58. From the comments received, which were for the most part general in nature, we see no reason to change these concepts, and they are reaffirmed. Most of the parties commenting favored the 3 mv/m figure for principal city service as appropriate. One party suggested that the corresponding low band television VHF value, 74 dbu (5

mv/m) be used instead; but no data in support of this suggestion was advanced and the suggestion is rejected. For convenience, we adopt the standard of 70 dbu, which corresponds to 3.16 mv/m.

#### *Protected areas*

59. In the Notice, the concept of station protection was put in terms of a particular service area radius, within which the station would be protected against objectionable co-channel and first adjacent channel interference. This was to be large enough to permit the station to obtain an adequate basis of economic support and fulfill its particular function (coverage of a city and suburbs, wide area rural coverage, or coverage of a smaller town and environs), and at the same time small enough to permit other co-channel and adjacent channel stations to be spaced sufficiently close so that an adequate number of assignments might be made. The protected radii proposed were: Class A stations, 25 miles; Class B stations, 50 miles; and Class C stations, 100 miles. With the maximum facilities proposed in the Notice, this amounted to protection to the 140 uv/m (43 dbu) contour for Class A stations, to the 178 uv/m (45 dbu) contour for Class B stations, and to the 84 uv/m (38.5 dbu) contour for Class C stations. The co-channel spacings necessary to protect these radii are, respectively, 115, 190, and 300 miles. With respect to second and third adjacent channel interference, we took cognizance of the fact that (because of the negative ratios involved) the area of such interference is small and within it the service lost is completely replaced by the service of the interfering station. Therefore, we proposed that the service radius protected against such interference would be less—10 miles for Class A, 25 miles for Class B, and 35 miles for Class C.

60. As to co-channel and first adjacent channel spacings, some parties (including the N.A.B. and CBS) supported those proposed in the Notice and urged that they not be shortened. However, more parties opposed them as too long. It was asserted that the proposed separations would prevent the making of many needed assignments;<sup>14</sup> that they would mean protection of "service" which in fact does not exist because the average FM receiver is not an expensive one and does not work well for stations over 15 miles away; that the proposed spacings ignore the fact that listeners in "in-between" rural areas, when they have better receivers, often also have directional, rotating receiving antennas which can distinguish between stations; that listeners in these "in-between" areas will suffer because future assignments would have to be too far apart to be received even with a directional antenna; and that, even if the "service" protected is technically usable, the programming of a distant station is probably of little significance to, or used by, listeners. Little specific data in support of these contentions was advanced.

61. Some of the parties offered specific proposals in this area. Earl Cullum proposed that, between co-channel high power stations, the

<sup>14</sup> For example, one party asserted that under the proposed spacings it would be impossible to provide a Class B assignment in Salisbury, Maryland, needed for wide area coverage in this rural region because of the single existing assignment to the Delmarva Peninsula south of Wilmington.

same spacings be used as in television—170 and 190 miles in Zone I and Zone II, respectively, and, between co-channel low power stations, spacings of 85 miles in Zone I and 95 miles in Zone II. This would give the high power stations protection to their 57 dbu (approximately 700 uv/m) contours, a distance of 53 miles in Zone I and 69 miles in Zone II. The low power stations would be protected to their 1 mv/m contours in Zone I, a distance of 18 miles, and to their 57 dbu contours, a distance of 21 miles, in Zone II. Corresponding first adjacent channel spacings would be 125 and 160 miles between high power stations in Zones I and II, respectively, and 45 and 55 miles between low power stations in the respective zones. High Fidelity Broadcasters, Inc., proposed an elaborate set of spacings designed to protect the 0.5 mv/m contour of all stations except Class C stations, which would be protected to their 0.1 mv/m contours. In terms of protected distances, this would mean 15 miles for Class A, 40 or 50 miles for Class B (depending on the zone) and 90 miles for Class C. Another party proposed (without reference to zones) considerably shorter spacings, based on the reasoning referred to in the previous paragraph: 95 miles co-channel and 80 miles adjacent channel between Class B's, and 60 miles co-channel and 45 miles adjacent channel between Class A's. Other suggestions, made by parties proposing only a "protected contour" concept, were for protection to the 1 mv/m contour (AFCCE), or to the 1 mv/m, 0.5 mv/m, and 0.1 mv/m for Class A, B, and C stations respectively (FM Unlimited).

62. Further consideration of this matter, and our staff's studies, have indicated that using the spacings set forth in the Notice, or even spacings as great as those proposed by Earl Cullum, it is simply not possible to make the number of assignments which must be provided if the FM service is to be of optimum value. A compromise was found to be necessary. It was found that a reasonable compromise, affording reasonably adequate protection on the one hand and yet permitting a sufficient number of assignments, is to provide protected service radii for the various classes of stations as follows: Class A, 15 miles; Class B, 40 miles; and Class C, 65 miles. Protection of these radii requires co-channel spacings as follows: between Class A stations, 65 miles; between Class B stations, 150 miles; and between Class C stations, 180 miles.<sup>15</sup> Assuming that the station is operating with maximum facilities provided for above, the spacings selected amount to protection to the following field strength contours: Class A, 927 uv/m; Class B, 562 uv/m; Class C, 944 uv/m. First adjacent channel spacings necessary to afford the same degree of protection are: between B and B, 105 miles; between C and C, 150 miles; between A and B, 65 miles; and between A and C, 105 miles. These minimum mileage separations, together with others necessitated by the plan adopted herein for educational assignments, are set forth in the Table which appears following the discussion of educational assignments. These separations will be used as the basis of our proposed Table of Assignments.

<sup>15</sup> Mileage separations have in all cases been rounded out to the nearest five-mile figure, whether higher or lower than the exact value determined from the curves and ratios.

63. It is recognized that the spacings, protected radii and protected contours just mentioned are considerably less than those proposed in the Notice and by some of the parties. This is particularly true with respect to wide area Class C stations, for which we originally proposed protection out to a distance of 100 miles, the 84 uv/m (38 dbu) contour if maximum facilities are used, with co-channel spacing of 300 miles. Such wide separations turned out to be incompatible with making an adequate number of Class C assignments. It must be borne in mind that, in any Table of Assignments, few spacings will actually be at or very close to the minimum, so that on the average, and in the majority of cases, the degree of protection afforded will be higher. This may be expected to be true, for example, in most of the sparsely populated plains and mountain West, where there are not enough sizeable communities to require a large number of closely spaced Class C assignments, and where, therefore a substantially greater degree of protection to each Class C station can be afforded. Concomitantly, this of course is the area where wide area coverage is particularly valuable, because of the distance between communities. In this respect, the situation is, as the AFCCE pointed out, self-correcting.<sup>16</sup> In sum, we conclude the separations mentioned to be those most appropriate for the optimum development of the FM service.

64. As to second and third adjacent channel interference, our proposal to have a smaller radius protected against such interference (on the basis of the "substitution of service" concept) drew some support but more opposition. It was asserted, for example, that one station does not necessarily equal another, even as between two commercial stations, and that this is true *a fortiori* where one of the stations is non-commercial educational (a situation which could arise between an educational station on Channel 218, 219 or 220, and a commercial station on Channel 221, 222, or 223). One suggested compromise was that a new station two or three channels removed should not be required to afford the existing station absolute protection to the same protected contour as would a new co-channel station, but *at least it should have to be located outside of that contour* (e.g., under the AFCCE's proposal, a new station two or three channels removed would have to be located outside of the existing station's 1 mv/m contour).

65. After consideration, we conclude that the last-mentioned suggestion is appropriate for adoption. We agree that our earlier concept of a substantially smaller protected service radius against second and third adjacent channel interference is perhaps extreme, and a greater degree of protection should be afforded. On the other hand, there must be taken into account (1) the need for making numerous assignments; (2) the fact that these interference situations do represent a complete substitution of service technically and at least to some de-

<sup>16</sup> Conditions in the various parts of Zone II are somewhat different, in that the Midwest and South are more populous, with more closely spaced communities. At one point in the staff's study, consideration was given to creation of additional "zones" to take this difference into account. However, it appeared that this would substantially complicate the assignment process, and that whatever differences exist can be accommodated because of the factors set forth in the text.