RECEIVED

JUN 17 1988

Federal Communications Commission
Office of the Secretary

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

In the Matter of	]	
	]	
Review of Technical	]	MM Docket No. 87-267
Assignment Criteria	]	
for the AM Broadcast	]	
Service.	]	

COMMENTS OF THE NATIONAL ASSOCIATION OF BROADCASTERS ON SECTIONS I AND IV OF THE NOTICE OF INQUIRY

National Association of Broadcasters
1771 N Street, N.W.
Washington, D.C. 20036
(202) 429-5346

Michael C. Rau
Vice President, Science & Technology

Stanley Salek
Staff Engineer

Barry D. Umansky
Deputy General Counsel

June 17, 1988

TABLE OF CONTENTS

SUMMARY i

A. Introduction and Summary. 1

B. Principles Which Should Govern The Commission's Review Of AM Allocations Policies. 4

C. Issues Raised in Section I -- Technical Assignment Principles. 7

1. Section A: Protected Contours. 7

2. Section B: Minimum Usable Field Strength. 8

3. Section C: Atmospheric and Man Made Noise. 11

4. Section D: Co-Channel and Adjacent Channel Protection Ratios. 12

D. Issues Raised In Section IV -- Antenna Systems. 15

E. The Commission Should Begin Rule Making To Change The 50% RSS Exclusion Rule To A 25% Exclusion Rule. 16

F. Conclusion. 18

Appendices:

Appendix A "AM Technical Assignment Criteria, An Examination of Issues Raised in MM Docket No. 87-267," by Harrison J. Klein, P.E., June 17, 1988.

Appendix B "AM Radio Interference Study, Final Report, MM Docket No. 87-267," by B. Angell And Associates, Inc., June 1988.

Appendix C Tape Index, B. Angell AM Radio Interference Study

SUMMARY

In these comments on the two remaining sections of the Commission's Notice of Inquiry, the National Association of Broadcasters reiterates its view that the Commission should promptly begin rule making proceedings to improve the quality of -- and reduce the interference on -- the AM broadcast band. In teh context of this proceeding, we can think of no more urgent technical activity for the Commission. In order to aid the Commission in this task, NAB has submitted with this filing two in-depth reports. The first is a technical analysis of the issues raised in the proceeding; the second is an audience listening study examining the tolerance of contemporary AM listeners to co-channel and first adjacent channel AM interference.

The results of these studies emphasize the need for the Commission to revise many of its AM technical standards. Indeed, NAB's studies provide several of the tools with which the Commission can pursue this task. Because of the need to examine further the results of these studies, especially in conjunction with our review of other parties' comments on this phase of the inquiry, NAB has not offered specific details on how these technical standards should be revised. However, we intend to provide additional guidance for the Commission in Reply Comments to be submitted later this summer.

As fundamental principles of AM allocations policy, NAB believes that the public interest is best served when the Commission's technical standards accurately predict coverage and interference. We believe that accurate technical standards best serve the interests of the AM industry as a whole. These technical standards should be rooted in the subjective expectations of AM service quality held by the listening public. Finally, the outcomes of these proceedings should be applied to future AM allocations in the expanded AM band, 1605-1705

kHz.

These comments specifically respond to the Commission's request for views on (1) protected contours (wherein, as noted above, we withhold specific suggestions but give our initial recommendation that revised protection ratios, rather than revised protected contours, is the more appropriate course to follow), (2) minimum usable field strength (wherein we refer to the findings of our audience listening study), (3) the allocations policy relevance of man-made and atmospheric noise (wherein we concur with the Commission's proposal to create "noise zones" in the United States) and (4) co-channel and adjacent channel protection ratios (wherein we again emphasize the need for revisions that will achieve reduced interference on the AM band).

Additionally, our comments review the benefits that may be gained through implementation of revised antenna designs. These comments describe the two experimental operations we will be conducting in the very near term. One involves a skywave-reduction AM antenna. The other experiment will test a "low-profile" antenna design aimed at affording daytime-only AM stations with relatively low post-sunset and/or nighttime authority the opportunity to provide more effective service to their listeners.

0.55λ or Franklin antennas? -particularly 1610–1700

Also, NAB requests the Commission to initiate rule making to change the 50% RSS exclusion rule to a 25% RSS exclusion rule.

NAB urges the Commission, following the receipt of reply comments, to initiate promptly a series of rule makings aimed at reducing interference on the AM band. Additionally, NAB recommends that the technical findings developed in this proceeding be applied to the adoption of high-quality AM technical standards for purposes of implementing the expanded AM band (1605-1705 kHz).

RECEIVED

JUN 17 1988

Federal Communications Commission
Office of the Secretary

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

In the Matter of	]	
	]	
Review of Technical	]	MM Docket No. 87-267
Assignment Criteria	]	
for the AM Broadcast	]	
Service.	]	

COMMENTS OF THE NATIONAL ASSOCIATION OF BROADCASTERS ON SECTIONS I AND IV OF THE NOTICE OF INQUIRY

The National Association of Broadcasters ("NAB")[1] hereby submits its comments pursuant to Section 1.415 et seq. of the Commission's Rules, in response to the Notice of Inquiry ("Notice")[2] in the above-captioned proceeding.

A. INTRODUCTION AND SUMMARY

On February 1, 1988, NAB filed comments in response to Sections II and III of the Commission's Notice.[3] We challenged the premise underlying many of

---

[1]NAB is a nonprofit incorporated association of radio and television broadcast stations and networks. NAB membership includes more than 5000 radio stations, 960 television stations and the major commercial broadcast networks.

[2]Notice of Inquiry in MM Docket No. 87-267, FCC 87-245, 2 FCC Rcd 5014 (1987).

[3]In response to a "Motion for Extension of Comment and Reply Comment Dates" submitted by NAB on December 1, 1987, the Commission, on December 15, 1987, released an Order Granting Motion for Extension of Time for Filing Comments and Reply Comment (DA 87-1823). NAB's Motion referred to our undertaking of major technical and audience perception studies that would be relevant to many of the issues raised in the Commission's Notice. In its Order, the Commission decided to bifurcate the inquiry in terms of the deadlines for the submission of comments on particular issues. The Commission decided to require comments on February 1, 1988 on Sections II and III of the Notice (dealing with "additional assignment considerations" and "related technical issues," respectively). It deferred the comment date on Sections I and IV (dealing with "technical assignment principles" and "antenna systems," respectively) to today.

the proposals embodied in the Notice -- that the Commission should provide enhanced opportunities for new stations and expansion of existing operations as well -- all of which, without accurately defined technical standards, would contribute significantly to the levels of intolerable interference now experienced by AM radio listeners. We also urged the Commission to revise its AM technical standards and policies to ensure less interference on the band.

Today we reaffirm our position on these "phase one" issues. As described in more detail below, in the Comments submitted today we offer significant evidence that the Commission's current technical standards fail to depict with accuracy the levels of interference actually experienced by AM listeners. Interference levels predicted by current FCC methods and protection ratios simply do not reflect what listeners hear and in many cases, are forced to suffer. Application of FCC standards to a particular AM station significantly overestimates that station's actual coverage. What matters to the public's interest in receiving the AM station of choice is not what is estimated by FCC rules but what is experienced by listening to the AM band.

For these reasons, NAB strongly urges the Commission to establish AM interference standards and calculation methods that more precisely characterize AM coverage and interference. We are providing two comprehensive studies in the record of this proceeding. These studies will enable the industry and the Commission to assess the current state of the AM band and to recommend specific strategies for technical improvement. The first study, included as Appendix A, is entitled "AM Technical Assignment Criteria: An Examination of Issues Raised in MM Docket No. 87-267," conducted by Harrison Klein of the consulting engineering firm of Hammett & Edison (hereinafter referred to as the "Klein Report"). The Klein Report's specific conclusions will be discussed later in these

comments as they are relevant to specific questions posed by the Notice. In brief, the Klein Report analyzed the relationship among factors such as atmospheric and man-made noise, minimum usable field strength, co-channel and adjacent channel protection ratios, and RSS methods for calculating interference at night. The Klein Report also develops computer programs for use by interested parties in designing AM allocation criteria.[4]

NAB's second study, included as Appendix B, is entitled "AM Radio Interference Study" prepared by B. Angell and Associates, Inc. (hereinafter referred to as the Angell Study). This study examined the tolerance of AM listeners to co-channel and first adjacent channel AM interference for both wide and narrow receiver bandwidths.[5] At Appendix C is a description of the sound samples played for those listeners who participated in the five-city study.[6]

The Commission, in several parts of the Notice, references the need for, and relevance of, subjective listening studies.[7] We funded the Angell Study to help the Commission and industry understand what the listening public expects of AM radio service quality. The scope of the Angell Study and its methodology were given public scrutiny by the Commission's Advisory Committee on Radio

---

[4]With these Comments NAB has provided the Commission with copies of the entire Klein Report. While NAB has no plans to file the computer programs in the record of this proceeding, copies of the program diskettes and the complete Klein Report are available from NAB Station Services, (202) 429-5373 for $75.00 (NAB members) and $100.00 (non members).

[5]Respondents listened to an audio bandwidth of 9 kHz for the "wide" bandwidth receiver and 6 kHz for the "narrow" bandwidth. While these bandwidths generally are wider than many receivers now in the marketplace, our experience with participating receiver manufacturers in the National Radio Systems Committee (NRSC) leads us to believe that these bandwidths are likely to become much more prevalent in the future.

[6]NAB is providing to the Commission's file in this docket a set of audio cassettes which contain these sound samples.

[7]See Notice, supra note 2, at questions 15-A, 19-A and B.

Broadcasting[8] and its two subgroups, the Allocations Policy Subgroup and the Technical Subgroup. Only after such scrutiny did Angell actually conduct its study. Accordingly, we believe that the Angell Study's results and conclusions should be well-accepted by both the industry and the Commission.

In these comments we outline the basic principles which should guide the FCC as it reviews its AM allocations policies. Among other things, we emphasize the need to reduce the interference present on the AM band, rather than to take allocations steps that only would increase interference levels. Concerning the issues raised in Section I of the Notice, focusing on "technical assignment principles," the Klein Report and the Angell Study clearly point to the need for revised technical standards. In Reply Comments we intend to provide additional guidance on how such standards should be altered. Also, in these comments NAB recommends new FCC rules and policies on "noise zones," minimum field strength protection and protection ratios for co-channel and adjacent channel interference. We also point to the improvements that can be achieved through revised AM antenna designs and urge a revision to the agency's RSS exclusion rule.

B. PRINCIPLES WHICH SHOULD GOVERN THE COMMISSION'S REVIEW OF AM ALLOCATIONS POLICIES

Before specifically addressing the many issues in the Notice, and to aid the Commission's staff in understanding NAB's position, it is appropriate to examine certain basic principles that, in NAB's view, should underlie the Commission's AM allocations policies.

First and foremost, the public interest is best served when the

---

[8]The Advisory Committee was created by Memorandum Opinion and Order, FCC 80-537, adopted September 10, 1980. It was established under the principles of the Federal Advisory Committee Act (5 U.S.C. App. 2 Sections 1-15).

Commission's technical standards accurately predict coverage and interference. The consequences of inaccurate standards are many. Applicants for new stations or for major changes in existing stations, using FCC rules to calculate coverage and interference levels, file technical information with the Commission that misrepresents the actual interference levels that would be experienced once the application is granted. Many judgments, by the industry, business community and the Commission, rely on the Commission's technical standards to provide an accurate assessment of coverage and interference. Indeed, the major premise of technical standards presumably is to control and prevent interference. That purpose is necessarily frustrated by improperly devised technical standards. Moreover, certain of the existing FCC technical assignment principles appear to have been designed not to protect AM service responsibly, but to foster the addition of new stations, without giving any regard for the interference impact of those stations on existing and overall AM service. As a result, AM service areas supposedly protected from interference by the Commission's technical standards are not so protected, and service inaugurated in the past has deteriorated significantly over time. Indeed, the Commission's standards have allowed the agency continually to add new stations and grant major change applications while ignoring the interference price that is paid by existing AM stations and AM listeners. Poorly crafted technical standards penalize existing service and deny any means for affected stations to challenge the agency's decisions on technical grounds.

Second, we believe that the Commission's technical standards should be rooted in the subjective expectations of AM service quality held by the listening public. In determining the public interest, the Commission should be compelled to consider whether the service estimated by the agency's rules comports with the

service actually perceived and desired by the listening public. As we show below, there is a vast difference between what the Commission believes the AM service provides and what the public believes AM stations should be able to provide.[9]

Third, we strongly believe the Commission should move expeditiously in conducting appropriate rule makings designed to establish a consistent set of improved calculation methods and technical standards. We can think of no more urgent technical activity for the Commission to undertake. Beyond their relevance to existing AM service, the outcomes of these proceedings must be applied to the future AM allocations and technical assignments on the expanded AM band, 1605-1705 kHz.[10] An improved set of technical standards would permit AM service to be inaugurated on the expanded band in a fashion that truly meets the technical needs and expectations of the listening public. NAB will provide additional suggestions on these and other aspects of AM band expansion in comments to be filed in response to the Commission's Fourth Notice of Inquiry in Docket No. 84-467, supra.

Finally, whatever AM technical standards are adopted, there will come a time -- in the short term wherein the existing AM band is concerned -- when the AM spectrum becomes completely exhausted. While new AM stations can be added in the expanded band (perhaps in conjunction with a reduction of congestion on the existing band),[11] we strongly object to endless "shoehorning-in" of additional

---

[9]The Commission should also consider that the terms "service quality" and "service" do not solely refer to audio quality; they include the relative importance and availability of a particular radio program to particular AM listeners.

[10]See, e.g., Fourth Notice of Inquiry in General Docket No. 84-467, FCC 88-72, released June 3, 1988.

[11]For some time NAB has supported the concept of daytime-only AM stations "homesteading" at least a portion of the station allotments in the expanded AM band and, after a period of years (when these expanded band stations become financially viable) ceasing operation of the daytime-only facilities, perhaps in

stations and causing new interference to existing stations where there is essentially no more room on the AM band.

C. ISSUES RAISED IN SECTION I -- TECHNICAL ASSIGNMENT PRINCIPLES

In Section 1 of the Notice, the Commission addresses a number of very fundamental issues relating to the allocation and assignment of AM broadcast stations. These issues include the appropriate values of normally-protected contours, the nature of receiver characteristics and subjective listener satisfaction levels to use in the determination of minimum signal strength values, the role and impact of natural and man-made noise levels, and the appropriate values for co-channel and adjacent channel RF protection ratios. Below are NAB's responses to specific questions raised in this section.

1. Section A: Protected Contours.

Question 15-A of the Notice asks whether, taking into account today's listener habits, the field strength values of the normally-protected contours currently in the FCC rules are still appropriate. Based on only an initial analysis of the Klein Report and the Angell Study, there appears to be ample evidence of the need to change many of the Commission's AM technical standards. However, we do not, at this time, recommend that the agency alter the applicable protected contours. The public interest goal of providing AM service is much more dependent on the protection ratios used to protect a given contour. NAB takes no specific position at this time on how these ratios should be altered, pending further assessment of the two reports and a review of other parties' initial

---

conjunction with the issuance of federal tax benefits for doing so. See e.g., NAB Comments in General Docket 84-467, filed February 6, 1988 at 5-7.

filings.[12]

Question 15-C asks for an assessment of the benefits and costs to the broadcasting industry and to the public that would result from changing or not changing the field strength values of the protected contours. In NAB's view, the broadcasting industry is not so much looking for "benefits" or "costs" associated with particular protected contour signal strengths; rather, what is desired by the industry as a whole is a protected contour that is accurate and that is, in fact, protected from interference. We do not necessarily believe that protected contours should be changed simply for the sake of change. Protected contours only define the limit of AM service or non-interference and must be rationally considered together with co-channel and adjacent channel interference criteria. What is most important, from NAB's view, is that a protected contour provide some reasonable guarantee that future additions of new or modified AM stations will not degrade existing AM service.

2. Section B: Minimum Usable Field Strength.

In Section B of the Notice the Commission asks for comment on the many factors that affect the determination of minimum usable field strength ("E_{min}"). These include subjective listener measurements necessary to determine listener satisfaction and the various technical factors necessary to calculate E_{min}.

At pages 3-5 of the Klein Report, the issues and calculations of E_{min} are thoroughly discussed. With respect to E_{min}, the principal conclusion of the Klein Report is that:

> Minimum usable field strength can vary widely depending on atmospheric and man-made noise environment and/or required system performance. No single protected contour is appropriate for

[12]Question 15-B, therefore, is not addressed by NAB at the present time.

> all circumstances. Differing requirements should be accommodated by the Commission's allocation scheme.[13]

If the Commission desires to increase the accuracy of its service/interference calculations, it will be necessary to accommodate better the geographic variations of atmospheric noise.[14] However, it does not seem appropriate to consider values of noise-limited E_{min} where the AM service is presently limited by interference. Question 19-A asks whether additional subjective listener measurements are necessary to determine listener satisfaction. We believe the answer to this question is yes,[15] and in response to the Notice we provide in the Angell Study a comprehensive study of listener reactions to AM interference. In brief, listeners were asked to grade constantly deteriorating signal-to-interference ratios for both co-channel and adjacent channel interference.

One of the principal conclusions of the Angell Study is:

> The minimum acceptable D/U (desirable/undesirable) ratio for co-channel interference with musical program material was 26 dB. For talk programming with either music or talk interference, 40 dB was the minimum acceptable co-channel D/U ratio. For adjacent channel interference, the corresponding ratios were 16 dB for music, 16 dB for talk with talk interference and 20 dB for talk with music interference.[16]

This conclusion and the supporting tabulations clearly show that the Commission's first adjacent channel protection ratio of 0 dB falls seriously short of protecting the pubic from AM interference. The current co-channel protection ratio of 26 dB may still be appropriate. We discuss these matters below.

Question 19-C asks what receiver characteristics should be employed for

---

[13] Klein Report at 1.

[14] See the discussion of atmospheric noise, infra.

[15] Thus, Question 19-B is not in point.

[16] Angell Study at 2.

determination of E_{min}. As noted in the Klein Report, receiver characteristics are an essential component of the E_{min} determination. Our tentative view is that the Commission should use NRSC-1 audio deemphasis and a narrow bandwidth configuration to determine E_{min}. The Standard was created after nearly two years of work and has now become widely accepted.[17] The NRSC-1 standard brings uniformity to the equalization of AM receivers and provides a benchmark from which AM station engineers can tailor the sound of their stations. For allocation planning purposes, it seems appropriate to use narrow bandwidth as a planning factor. If wide bandwidths were used as a planning factor, the resulting allocation system would essentially ignore the millions of narrow bandwidth receivers now on the market and the fact that many wide bandwidth receivers also have narrow bandwidth positions. We also recognize the importance of preserving AM service in weak signal areas, regardless of whatever protection ratios the Commission adopts.

For purposes of the expanded AM band, NAB also urges the Commission to determine technical standards based on a narrow bandwidth. Even though, at present, there are few, if any, receivers capable of receiving the frequencies 1605-1705 kHz, future receiver designs, in all likelihood, will continue to have narrow bandwidth capabilities. In essentially vacant spectrum, using narrow bandwidth as a planning factor will create an allocations system at 1605-1705 kHz that produces a high quality AM radio service. Accordingly, our initial view is to use narrow bandwidth as a criterion for the existing AM band and also for the expanded AM band.

Question 19-D asks what reference level of listener satisfaction should be

---

[17]On November 6, 1987, NAB filed a Petition for Rule Making asking for FCC adoption, in its Rules, of the transmission portions of the NRSC-1 Standard for AM broadcasting.

used for determining E_{min}. While further analysis is warranted, NAB would support a 90% satisfaction level for use in the expanded AM band.

3. Section C: Atmospheric and Man-Made Noise

In Section C the Notice addresses the proper allocations considerations for man-made and atmospheric noise.[18] Noise is a technical factor that is considered in the calculation of E_{min}.[19]The Notice raises the possibility of creating "noise zones" for U.S. AM broadcasting as a means to more accurately predict service contours.

NAB supports the concept of establishing noise zones in the U.S. As indicated in the Klein Report, atmospheric noise may vary by as much as 60 dB.[20] A technical factor with such a potentially large variation simply must be accommodated in the Commission's allocation scheme. It should be possible to establish two or more noise zones with minimal administrative difficulty.

With respect to man-made noise, however, it may not be appropriate to establish noise zones. At Section 73.182(e) of the Rules, the Commission suggests using a signal strength of 2 mV/m or greater to serve communities with populations larger than 2,500. Based on CCIR Report 258-4,[21] it should be possible to modify Section 73.182(e) to provide further guidance on signal coverage requirements in the presence of man-made noise. Nearly all relevant technical references agree that the extent of the man-made noise is proportional to the populations of communities.[22]

---

[18]Notice, supra note 2 at paras. 20-25.

[19]See Klein Report at 2.

[20]Id.

[21]Id. at 2 and Klein Report Appendix B.

[22]Klein Report at 2.

Question 25-A concerns the source of data that should be used in determining atmospheric noise levels in the United States. NAB has no objection to use of CCIR Report 322-3, attached as Appendix A to the Klein Report and submitted with these comments. In the course of preparing the Klein Report, NAB and Hammett & Edison were unable to uncover any other satisfactory study of U.S. atmospheric noise. Whatever the possible error in the noise map calculations of CCIR Report 322-3, given a 60 dB variation of atmospheric noise in the U.S., any use or accommodation of atmospheric noise in Commission allocation decisions must be considered to be a significant improvement in technical accuracy.

Question 25-B asks whether the U.S. should be divided into noise zones and whether the noise values should be averaged during the year. As discussed above, our initial view is that some division of the U.S. into two or more noise zones is appropriate. NAB may offer more specific guidance in Reply Comments.

Question 25-C concerns the appropriate basis for drawing the boundaries of noise zones. NAB leaves this issue for the Commission to determine via further rule making, if necessary. The Commission previously has successfully undertaken the establishment of zones for allocation purposes in Sections 73.205 and 73.609 of the Commission's Rules.

4. Section D: Co-Channel and Adjacent Channel Protection Ratios

Section D of the Inquiry considers the crucial issues of adequate co-channel and adjacent channel protection ratios.[23] As the Commission notes, the task of determining protection ratios is complicated and depends on many factors, technical and non-technical. In the Klein Report and the Angell Study, NAB has attempted to provide the tools necessary for determining appropriate protection

---

[23] Notice, supra note 2 at paras. 26-35.

ratios.

At the outset, we note that both NAB studies conclusively show that the Commission's first adjacent channel protection ratio is entirely inadequate to protect AM stations from interference.[24] It simply must be changed.[25] The Klein Report concludes:

> Existing protection ratios are entirely inadequate to prevent adjacent-channel interference, even with today's narrowband receivers. New protection ratios can be calculated that will reflect present and future technical parameters such as the NRSC-1 audio standard.[26]

We urge the Commission to conduct rule making on this ratio as soon as possible, in order to prevent occurrence of additional interference. We note, however, that in paragraph 32 the Notice states that "a high level of protection can significantly restrict the number of stations permitted to use the spectrum in a given area." In essence, the Commission is stating that some "compromise" of technical standards is needed to accommodate a greater number of AM stations. However, as stated in NAB's initial comments in this proceeding,[27] such a course is the exact opposite of where the Commission should be going. Revised technical standards should be used to "clean up" the band, rather than clear the path for additional interference. Were the Commission to pursue this "more stations is always better" approach in the existing AM band, the listening public would be a major loser, not the "diversity winner" intended by the Commission.

---

[24]See Klein Report at 5-8.

[25]Even assuming the use of worst-case receiver characteristics, and use of NRSC preemphasis and bandlimiting, to achieve a co-channel protection ratio of 26 dB the first adjacent protection ratio must be at least 14 dB. The current FCC standard is 0 dB.

[26]Klein Report at 1.

[27]See NAB Comments in MM Docket No. 87-267, filed February 1, 1988, at 3-12.

Nearly all the technical issues specified by the Commission in Questions 35-A through 35-H are addressed in the Klein Report and the Angell Study, or have already been discussed in these comments. With respect to second adjacent channel interference, the Klein Report shows how use of the NRSC-1 transmission standard makes a dramatic difference in the levels of second adjacent channel interference.[28] Without NRSC-1 transmission, a protection level of -8 dB is necessary at the second adjacent channel for 26 dB of co-channel protection at the 0.5 mV/m contour.[29] Using NRSC-1 transmission and current receivers, the Klein Report shows that 22 dB less protection is needed (-30 dB).[30] Therefore, and because the current allocation standard provides less than 30 dB of protection,[31] maintaining use of the Commission's current allocation standard (prohibited overlap of 2 mV/m and 25 mV/m contours) to supply protection for second adjacent channel stations must be considered to be a minimum level of protection. If anything, a slight increase in second adjacent channel protection is warranted.

Finally, for purposes of internal consistency and technical accuracy, we suggest that the Commission consider replacing the current overlap standard with a suitable protection ratio to be considered at the protected contour.

D. ISSUES RAISED IN SECTION IV -- ANTENNA SYSTEMS

In Section IV of the Notice the Commission discusses potential rule changes regarding the AM broadcast antenna. As the Commission notes, NAB

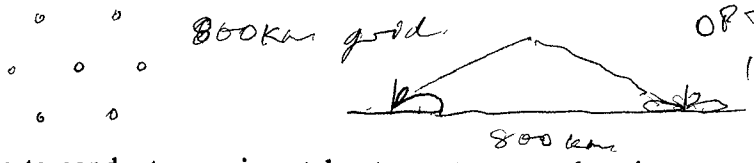
---

[28] Klein Report at 7 and 8.

[29] Id. at Figure 2.

[30] Id.

[31] Id. at note 10.



OPTIMIZE
1600 - 1700 nighttime
1 kW N
5 kW N
? ← STUDY

plans to conduct experimental antenna tests at a location owned by Howard University in Beltsville, Maryland. The first series of tests is designed to achieve separate control over skywave and groundwave signals. If successful, use of such an antenna can be effective in reducing skywave interference on the AM bands. These tests have been well planned and should begin later this year.[32]

again
0.5 - 0.6 λ
or
Franklin.

In the second series of tests, NAB plans to develop a standardized "low profile" antenna that may prove beneficial for low-powered AM stations desiring to better cover their communities. An AM daytimer on a regional channel, for example, having received a low post-sunset and/or fulltime power authorization, often is unable to adequately cover his or her community because of these low power levels and high received interference levels. Due to the presence of many other strong nighttime signals, the coverage areas of daytimers operating at night is quite limited, even when using what otherwise might be considered high power levels, such as 500 watts. As a technical matter, merely increasing power, even ten-fold, is not a realistic solution for daytimers and, without adequate protection ratios, is not in the best technical interests of the AM band as a whole. Increasing power at night generally will not achieve the coverage gains that are necessary to cover adequately a licensed community. Moreover, increased interference would occur on the band, thereby limiting the service areas of other nighttime stations.

A far more practical approach is to develop a way to serve communities better by low-powered AM stations using economical AM antennas. A daytimer operating at night needs to use every available watt of energy in the most efficient manner. If a daytimer is constrained to use lower power, then that

---

[32]On May 27, 1988 NAB filed with the Commission an application (Form 442) for a new experimental radio station to be authorized under Part 5 of the Rules.

lower power should operate in the most central location of the desired community area. Technically, it is possible to design and operate a physically shorter AM broadcast antenna. Such an antenna is not now permitted by current FCC rules. A physically short antenna could be located at many more locations than a "full size" broadcast antenna, thus providing more flexibility for a daytimer desiring to serve the licensed community at night.

Whatever the outcome of the Commission's AM antenna deliberations, we consider it highly important that antennas used for broadcasting purposes be standard antennas. If there were no standards at all, almost any piece of metal -- vertical, horizontal, encased, indoors, outdoors, etc. -- could be fed AM energy and used as an antenna. It would be impossible to predict coverage, and, accordingly, impossible to prevent, or even calculate, increases in the levels of interference. NAB urges the Commission to approve just one useful and well-tested low profile antenna design. Of course all Commission technical standards that relate to protection of other stations must be applicable to any use of the AM band.

E. THE COMMISSION SHOULD BEGIN RULE MAKING TO CHANGE THE 50% RSS EXCLUSION RULE TO A 25% EXCLUSION RULE

As noted above, NAB's earlier comments in response to the Notice, filed February 1, 1988, dealt with issues contained in Sections II (Additional Assignment Criteria) and III (Related Technical Issues). In these sections, the Commission asks whether the current procedure using the so-called root-sum-square (RSS) 50% exclusion principle should be maintained.[33] The Commission suggests use of a 25%

---

[33] Notice, supra note 2 at paras. 74-80 and at question 81-A.

RSS exclusion.[34] NAB's initial comments urged a change in the current rule but declined to endorse a specific proposal, pending the outcome of several studies conducted within the Technical Subgroup of the Advisory Committee on Radio Broadcasting.[35] We also wished to consider this issue after completion of the Klein Report.

Based on our review of the Klein Report and various materials submitted to the Technical Subgroup, we now strongly urge the Commission to propose use of a 25% RSS exclusion principle in a rulemaking proceeding. After thoroughly analyzing the RSS technical principles, mathematics, and the effect of RSS calculations on AM allocations and nighttime AM service, the Klein Report concludes:

> The existing RSS calculation method using 50% exclusion results in unrealistic predictions of nighttime service and, over the years, has permitted widespread increases in interference. Use of a 25% exclusion method would more accurately portray nighttime service contours and would minimize future increases in interference.[36]

After considering the technical documents developed during the last six months, we have no hesitation in supporting use of a 25% RSS exclusion principle.

Finally, the Klein Report examined two issues that are also relevant to RSS calculation methods. First, the Klein Report examined the effect of 10%-of-the-time multiple interference calculations when the contributing 10% signals may

---

[34] Id. at para. 79.

[35] See NAB Comments in MM Docket No. 87-267, supra note 3 at 17.

[36] Klein Report at 1 and 8-11.

not share the same duty cycle.[37] The Klein Report concludes that "[t]he existing RSS calculation method produces correct estimates of total 10%-time interference even though the 10%-time values of the interferers are individually specified prior to calculating the RSS."[38] Second, and as also discussed in NAB's initial comments,[39] the Klein Report concludes that the Commission should "include the effects of adjacent-channel skywave interference by weighing each RSS contributor by the appropriate protection ratio."[40]

F. CONCLUSION

For the reasons stated herein, NAB urges the Commission soon to begin rule making to adopt revised interference and allocations policies that will ensure reduced interference on the existing band and the interference-free introduction of new AM service on the expanded AM band. While giving the Commission substantial guidance in these initial comments, NAB intends to provide more detailed information following our examination of the comments of other parties and our further assessment of the Klein Report and Angell Study. Following the submission of reply comments, the Commission should initiate promptly a series of individual rule makings aimed at achieving many of the interference-reduction

---

[37]That is, 10% signals arriving at a transmitter site from different parts of the country may not arrive at the same relative amplitude or phase, and the instantaneous differences in amplitude and phase may vary considerably as the ionosphere varies geographically. For a comprehensive analysis of the physics involved, see H. Anderson, "Signal-to-Interference Radio Statistics for AM Broadcast Groundwave and Skywave Signals in the Presence of Multiple Skywave Interferers," Appendix F to the Klein Report.

[38]Klein Report at 1.

[39]See NAB Comments in MM Docket No. 87-267, supra note 3 at 18-21.

[40]Klein Report at 1.

goals specified in the Notice.

Respectfully submitted,

NATIONAL ASSOCIATION OF
BROADCASTERS
1771 N Street, N.W.
Washington, D.C. 20036

Michael C. Rau
Vice President, Science and
Technology

Stanley Salek
Staff Engineer

(202) 429-5346

Barry D. Umansky
Deputy General Counsel

June 17, 1988