

FCC MAIL SECTION

Federal Communications Commission

FCC 99-126

JUN 17 10 27 AM '99

DISPATCHED BY **Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
An Inquiry Into the Commission's	)	
Policies and Rules Regarding AM	)	MM Docket No. 93-177
Radio Service Directional Antenna	)	RM-7594
Performance Verification	)	

### NOTICE OF PROPOSED RULEMAKING

**Adopted: May 28, 1999**

**Released: June 11, 1999**

**Comment Date:** [ 45 days after publication in the Federal Register ]

**Reply Date:** [ 60 days after publication in the Federal Register ]

**By the Commission:**

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## I. Introduction

1. This *Notice of Proposed Rulemaking* ("Notice") is part of a broad-based streamlining initiative to overhaul Mass Media Bureau policies and licensing procedures. The Commission recently released a *Report and Order* that introduced substantially shorter and simpler certification-based application forms, established new broadcast application licensing procedures, and instituted electronic filing.<sup>1</sup> Additionally, it has outstanding a proceeding proposing numerous changes in its technical rules that will provide greater flexibility for both AM and FM broadcasters.<sup>2</sup> We propose in this *Notice* to eliminate some of our technical rules and relax others to materially reduce the regulatory and compliance burdens on AM broadcasters using directional antennas. There are approximately 4,790 AM radio stations presently licensed in the United States, of which about 40% operate directionally during either daytime or nighttime hours. In order to control interference between stations and assure adequate community coverage, directional AM stations must undergo extensive "proofs of performance" when initially constructed, and from time to time thereafter, to verify conformance with authorized operating parameters. The field strength measurements associated with these "proofs" and the technical exhibits which we require under our current rules impose a substantial financial burden upon these AM broadcasters, a burden not incurred by licensees in the other broadcast services. This *Notice* seeks to reduce our regulatory requirements to the minimum necessary to achieve our policy objectives of controlling interference and assuring adequate community coverage.

2. Five broadcast consulting engineering firms ("Joint Petitioners")<sup>3</sup> initiated this proceeding by filing a joint petition for rulemaking which suggested that the use of technological advances could materially reduce or eliminate the measurement burdens imposed on AM broadcasters by the present rules. The Joint Petitioners requested a thorough examination of these rules and alternate means of directional antenna system verification. The Commission subsequently issued a *Notice of Inquiry* ("NOI")<sup>4</sup> seeking comments as to appropriate rule changes. In response to the *NOI*, the Commission received 25 comments and 16 reply comments.<sup>5</sup> In general, the comments and reply

<sup>1</sup> See *1998 Biennial Regulatory Review -- Streamlining of Mass Media Applications, Rules and Processes, Report and Order* in MM Docket No. 98-43, 12 FCC Rcd 23506 (released Nov. 25, 1998); 63 Fed. Reg. 70,039 (Dec. 18, 1998).

<sup>2</sup> See *1998 Biennial Regulatory Review -- Streamlining of Radio Technical Rules in Parts 73 and 74 of the Commission's Rules, Notice of Proposed Rulemaking and Order* in MM Docket No. 98-93, 13 FCC Rcd 14849 (1998). See also *1998 Biennial Regulatory Review -- Streamlining of Radio Technical Rules in Parts 73 and 74 of the Commission's Rules, First Report and Order* in MM Docket No. 98-93, FCC 99-55 (released March 30, 1999).

<sup>3</sup> The five broadcast consulting firms which filed the joint petition for rulemaking in 1991 are duTreil, Lundin & Rackley ("DLR"); Hatfield and Dawson Consulting Engineers, Inc. ("Hatfield & Dawson"); Lahm, Suffa & Cavell ("LSC"); Moffitt, Larson & Johnson, Inc. ("MLJ"); and Silliman & Silliman.

<sup>4</sup> 8 FCC Rcd 4345, 58 FR 4345, released June 29, 1993.

<sup>5</sup> A list of commenters and reply commenters is listed in Appendix A.

comments share the view that rule changes are warranted to relieve directional antenna licensees from the high cost and large amount of time currently required in verifying the proper adjustment of AM directional antenna arrays.

## II. Computer Modeling versus Proofs of Performance

3. The mathematical formulas for calculating the radiation characteristics of AM directional antennas are contained in 47 C.F.R. §§ 73.150, 73.152 and 73.160. These formulas are also contained in the Bi-lateral Agreement between the United States and Canada relating to AM Broadcasting, and the Bi-lateral Agreement between the United States and Mexico relating to AM Broadcasting. The International Frequency Registration Board of the International Telecommunications Union also uses these formulas for administering the Region Agreement for Broadcast Service in Region 2.<sup>6</sup> All technical parameters necessary to determine compliance with domestic and international interference standards, and with domestic community coverage requirements, for each domestic and international station are contained in the Commission's AM engineering database. These data include electrical height, distance and direction from a reference point, relative radiofrequency current amplitude and phase, for each tower in the array. Following construction of a directional antenna system and adjustment of its antenna currents and phases, the permittee must conduct a proof of performance to determine whether the radiation pattern produced by the array conforms with the predicted radiation pattern.

4. Several computer models have been developed over the years to calculate many operating characteristics of particular importance to engineers designing, installing and adjusting AM antenna systems. These models are generically referred to as "method of moments" programs, "matrix" programs, or "NEC" programs.<sup>7</sup> These programs, unlike the formulas in the rules, deal with "internal" array parameters such as impedances, currents and voltages at locations within the power distribution and radiation system.<sup>8</sup> These internal parameters are also used to determine the specifications for system components such as capacitors, inductors, meters, etc., and to adjust antenna systems following construction.

5. Several commenters suggest that proofs of performance may not be necessary for arrays adjusted pursuant to NEC programs. They note that the current proof of performance requirements were developed decades ago before the advent of NEC programs and modern instrumentation to monitor array performance. They contend that proofs are subject to inaccuracies inherent in field strength measurements caused by proximity effects, scattering and local electromagnetic environmental effects. They also contend that measurements may vary as a result of changes in ground conductivity due to seasonal effects and changes in land development along propagation paths. These commenters take the position that modern software and instrumentation make possible the satisfactory adjustment of directional arrays without reliance on field strength measurements.

6. About half of the commenters oppose elimination of the proofs of performance, although most of these support relaxation of the current proof requirements.<sup>9</sup> Most of these commenters

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<sup>6</sup> MF Broadcasting 535-1605 kHz, Rio de Janeiro, 1981.

<sup>7</sup> NEC programs are based on the Numerical Electromagnetics Code moment method of analysis developed at the Lawrence Livermore Laboratory, Livermore, California.

<sup>8</sup> These programs also aid designers in evaluating the effects of nearby potential reradiating objects.

<sup>9</sup> Commenters opposed to elimination of proof requirements include: Greater Media, Inc.; Independent

acknowledge that computer models such as NEC can be useful in analyzing array parameters, but retain the view that, despite their imperfections, ground-based field data provide the best indication of proper antenna system operation and that the rules should continue to rely on this core performance verification system. Some favor proofs of performance because, unlike theoretical models, field strength measurements reflect real-world conditions. Carl T. Jones Corporation, for example, "believe[s] that verification of array performance without field strength measurements will always be of questionable accuracy." Many commenters express concern that the results produced by NEC programs are extremely dependent on input parameters. Mullaney Engineering, Inc., warns that, just because a computer provides an answer, doesn't make it correct. Echoing this sentiment, Capital Cities/ ABC, Inc., refers to the "ease with which NEC can give wonderfully wrong answers." Others point out that, without field strength measurements, operators would have no independent means of verifying proper adjustment in the event of malfunction or failure of the internal monitoring instrumentation.

7. We have two fundamental concerns in adopting a methodology for array adjustments based on computer modeling programs. First, we are concerned that this methodology may not always properly limit radiation in critical directions toward other stations. There appears to be general agreement that different engineers, depending on their levels of expertise, could calculate operating parameters differently for a given antenna system. Additionally, the record reflects substantial reluctance toward abandoning field strength measurements as the most reliable method of documenting proper adjustment of AM directional antennas. Prevention of interference among AM broadcast station remains a core regulatory function of this Commission. From the record before us at this time, we cannot conclude that this function would continue to be accomplished if the requirement for proofs of performance were eliminated for stations adjusted pursuant to computer modeling programs.

8. Secondly, we are concerned about extending our AM regulations into new technical areas. Our primary regulatory interest in this area has always been restricted to AM directional antenna design and adjustment. Permits are issued only after applicants demonstrate that an array is designed to meet the Commission's basic technical requirements: adequate interference protection to other stations and adequate signal coverage to the community of license. Licenses are issued only after permittees demonstrate that their arrays have been adjusted in accordance with their permits. With the exception of certain instrumentation requirements, the Commission does not regulate the design of circuitry internal to antenna systems, nor does it regulate the methodology employed in the adjustment of antenna systems. We are concerned that adopting a methodology based on computer modeling could draw the Commission into controversial issues relating to the adequacy of adjustment programs and procedures, leading to delays in authorizing new service, rather than simply limiting our involvement to the *results* of antenna system adjustments. Thus, we propose not to adopt such a methodology to determine whether arrays conform to authorized radiation patterns. We seek comment in this regard.

### III. Directional Antenna Proofs of Performance

9. An antenna proof of performance of an AM directional array establishes whether the radiation pattern of the AM station is in compliance with the radiation pattern authorized by the station's construction permit or license. There are two kinds of proofs of performance: (1) a full proof, in which a large number of measurements of the station's signal are made to establish the shape of the radiation patterns, and (2) a partial proof, which requires a lesser number of measurements to show that the station

continues to operate as it did during the last full proof. Each full proof generally consists of two sets of measurements -- nondirectional measurements and directional measurements. A minimum of 30 points along each of 8 radials is presently required for a full proof. Thus, the simplest directional antennas require 240 nondirectional measurement points *and* 240 directional measurement points. Complex arrays require more radials, and thus, more measurement points. Because a single radial may extend 34 km or more from the transmitter site, a significant amount of time is required to travel between measurement points, and to complete a full or partial proof. We believe that allowing measurements at fewer points and along fewer radials can sharply cut the time and cost of conducting a proof of performance, and that relaxing our proof requirements can be accomplished without affecting the technical integrity of the AM service.

**A. Full Proof of Performance**

**1. Number of Radials**

10. The present rule, 47 C.F.R. § 73.151, requires that a permittee use a minimum of 8 radials to demonstrate that an array conforms to its authorized pattern as follows:

- (a) At least three radials in the main lobe of the pattern, one toward the azimuth of maximum radiation and one to either side of this azimuth.
- (b) At least five additional radials distributed across the pattern to show the shape of the pattern. Radials are commonly assigned to the azimuths of pattern nulls (minimum radiation) and minor lobes.
- (c) Larger, more complex arrays or unique radiation patterns generally require additional radials that are specified on the construction permit or license. These may or may not include radials required by (a) or (b).

Hammett & Edison and Carl T. Jones Corporation support a reduction in the number of radials required, suggesting that only radials along important azimuths should be required in addition to the main lobe azimuth.

11. *Proposal.* We propose to reduce the minimum number of radials required from 8 to 6 for simple directional antenna patterns and to generally require no more than 12 radials to define complex patterns.<sup>10</sup> If the major lobe, minor lobes, and nulls cannot all be accounted for by the 12 radials, pattern symmetry could be used to account for the remaining minor lobes and nulls. The radials would be distributed as follows:

- (a) One radial in the major lobe, at the pattern maximum.
- (b) At least 5 additional radials, as needed to definitely establish the pattern, generally at the peaks of minor lobes and at pattern nulls. This may include radials specified on the station's authorization. However, no two radials may be more than 90°

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<sup>10</sup> Many AM stations operate with different daytime and nighttime directional patterns. Different radials may be required for each pattern.

azimuth apart. If two radials would be more than 90° apart, then an additional radial must be specified within that arc.

- (c) Any radials specified on the construction permit or license.

Nondirectional antenna measurements would be taken along the radials used for directional measurements.

12. In addition, we propose that those few nondirectional stations which are required to conduct a full proof (due to the proximity of reradiating structures, or other atypical circumstances) should also be permitted to employ 6 evenly spaced radials, in lieu of 8.

13. Based on the Commission's experience in processing AM facility applications and the comments of Hammett & Edison and Carl T. Jones Corporation, we tentatively conclude that we can reasonably rely on fewer radials, in conjunction with the 90° maximum arc restriction, to establish nondirectional and directional patterns.<sup>11</sup> We tentatively conclude that using a smaller number of radials, or radials more than 90° apart, would not provide a sufficient number of points to identify distortion of a nondirectional pattern. We seek comment as to whether the proposed rule changes achieve an adequate balance between reducing proof requirements and maintaining sufficient documentation of proper array adjustment.

## 2. Number of Points per Radial, Length of Radials

14. The present rule, 47 C.F.R. § 73.186(a)(1), generally requires that a permittee measure at least 30 points per radial at prescribed intervals to establish the directional and nondirectional field strengths along each azimuth. We agree with Hammett & Edison that an accurate measurement of an array can be accomplished with substantially fewer measurement points. At the same time, we are mindful of Independent Broadcasting Corporation's ("IBC") caution that 10 or fewer points may not be sufficient. Capital Cities/ABC, Inc., suggests that 15 points be used.

15. *Proposal.* We propose to reduce the number of points per radial to a minimum of 15, half the present number, as well as to shorten the minimum length of the radial from 34 to 15 km. These 15 measurement points would include the very important close-in measurement points (points at less than 3 km from the transmitter site) used to determine the inverse distance field. We propose to specify intervals between these points as follows:

- (1) The closest point at a distance 10 times the maximum distance between the elements of a directional array, or at a distance 5 times the vertical height of the antenna in the case of a nondirectional station,
- (2) Close-in measurements at 0.2 km intervals, out to a distance of 3 km (unchanged from the present requirements of 47 C.F.R. § 73.186);
- (3) Measurements at 1 km intervals between 3 km and 5 km (3 points);

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<sup>11</sup> This proposal does not preclude taking measurements along additional radials, as necessary or desired, to show that the radiation toward a particular cochannel or adjacent channel station is within allowable limits.

- (4) Measurements at 2 km intervals between 5 and 15 km (5 points);
- (5) Additional measurements as necessary at greater distances to achieve at least 15 points clear of potential reradiating structures;
- (6) Measurements at any monitoring point locations along the radial (unchanged from the present rule).

16. These intervals would provide a relatively uniform distribution of data points when plotted on the Commission's logarithmic groundwave propagation curves. We tentatively conclude that the reduced number of points and shorter radial length proposed represents the minimum, which would allow verification of the performance of the antenna system.<sup>12</sup> This proposal to reduce the minimum number of measurements points per radial from 30 to 15, in conjunction with the previous proposal to reduce the minimum number of measured radials, would reduce the total number of measurement points for simple arrays by 30 points, and for more complicated arrays, by 60 or more points. Thus, in conjunction, these proposals would reduce significantly the time and expense required to obtain proof measurements. By not requiring points beyond 15 km, we would also obtain more representative field strength measurements by eliminating those measurements most subject to seasonal variations.

17. We agree with IBC that we should not modify the present measurement requirements for close-in measurements (within 3 km of the transmitter site). Although these measurement locations may sometimes be difficult to access, these close-in measurements are the most critical in determining the nondirectional inverse distance field strengths. Without an accurate assessment of the nondirectional inverse distance field, the analysis of the directional measurements becomes much less reliable. We seek comment on each aspect of this proposal.

18. For each measurement point, we propose that the applicant provide several pieces of data. These include, the date(s) of the measurements, the azimuth of the radial, the distance from the center of the array to the measurement point, the pattern being measured (day / night / critical hours), the time of the measurement, and the measured field strength value at that point. For a set of measured points along a given radial, most applicants sort this data into a table that is submitted with the application. We propose to adopt a standardized format for the submission of the data in order to facilitate electronic filing and processing. A standard electronic data format would reduce application preparation costs and, at the Commission, minimize data entry. Electronic storage of this data could also allow it to be easily retrieved by any interested party for future use, reducing trips to the Commission's Public Reference Room to view the relevant paper documents. We seek comment on the format that should be used for the compilation and submission of this data. We also request comment on whether the time of each measurement should continue to be required with these submissions.

#### **B. Partial Proof of Performance**

19. A partial proof consists of measurement data taken at selected locations used in the last full proof of performance. Although fewer measurement points are used, the field strength values measured at each point are mathematically compared to values obtained in the last full proof to yield the

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<sup>12</sup> The proposed new rule is not intended to discourage the taking of additional measurements as necessary or desired. This may be especially desirable in areas where access to measurement points at the specified intervals cannot be obtained in order to ensure that the minimum number of valid measurements is achieved.

current value of radiation along each examined azimuth. Partial proofs of performance are required after the installation of new equipment on an AM tower or where changes in the electrical environment, such as erection of a new tower nearby, could affect the radiation pattern.<sup>13</sup> These proofs are conducted to verify that the array remains properly adjusted.<sup>14</sup>

### 1. Number of Points Required

20. Presently, 47 C.F.R. § 73.154 requires that permittees make at least 10 field strength measurements within 3 to 16 kilometers from the array at radial locations used in the last complete proof of performance. If a radial contains a monitoring point,<sup>15</sup> that point must be included in the measurements.

21. *Proposal.* We propose to reduce to 8 the required minimum number of points per radial. The proof must include any monitoring point locations, and must use radial measurement point locations established in the last full proof of performance, as is the case under the current rule. This proposal would reduce the required number of partial proof measurement points by at least 16 for simple arrays and by at least 20 or more for more complicated arrays. We believe that reducing the number of points would reduce the financial burden on AM directional licensees conducting partial proofs while still providing sufficient data to confidently verify directional array performance.

### 2. When Required

22. The need to conduct a partial proof of performance is triggered by an indication that the antenna system is not operating properly. *See* 47 C.F.R. § 73.61. Indicators include monitoring point readings exceeding the limits specified on the station's license and antenna monitor readings exceeding the tolerances specified in the rules.<sup>16</sup> Partial proofs are also required following replacement or modification of sampling system components mounted on the tower. *See* 47 C.F.R. § 73.68.

23. *Proposal.* We propose to eliminate the requirement to conduct a partial proof of performance following replacement or modification of sampling system components mounted on the tower *provided* the new components are mounted in the exact location of the old components and: (1) measurements made at the monitoring points before and after installation establish that the substitution had no effect; and (2) antenna monitor values remain within the tolerances specified in the rules or on the station's authorization. If the monitoring point readings or antenna monitor values exceed authorized

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<sup>13</sup> *See, e.g.,* 47 C.F.R. § 73.1692 for broadcast towers covered under Parts 73 and 74 of the Commission's Rules, *see also* the Public Notice entitled *Republication of Standard Broadcast Reradiation and Tower Construction Authorized Under Part 22 of the Rules*, 66 Rad. Reg. 2d 1777, released November 14, 1989. This Public Notice is available through the Internet at <http://www.fcc.gov/mmb/asd/decdoc/letter/1989--11--14--tower.html>.

<sup>14</sup> If the *partial* proof of performance demonstrates that the radiation pattern exceeds the authorized standard pattern in one or more directions and the array cannot be brought back into adjustment, the licensee may submit an application to augment the standard radiation pattern pursuant to 47 C.F.R. § 73.152(c).

<sup>15</sup> *See* paragraph 24 for definition of "monitoring point."

<sup>16</sup> Other indications which would trigger the need for a partial proof of performance would include alterations on or about the antenna system such as adding transmission lines, isocouplers or antennas to accommodate other services (*e.g.*, FM, land mobile, microwave, cellular, personal communications services (PCS), etc.); replacing guy wires; or changing isolation chokes for tower obstruction lighting. A partial proof is also required to verify proper adjustment of an antenna system when operation is resumed following a period of silence exceeding 6 months.

limits, then a partial proof would be required. We anticipate that this proposal in many instances would eliminate the need to conduct a proof of performance and file a Form 302-AM license application.

### C. Monitoring Points

24. Monitoring points are specific locations on selected proof radials where licensees regularly take field strength measurements to verify that a directional array remains within the radiation limits specified in the station's authorization. They are established at the time a station's full proof of performance is conducted. A field strength limit is set for each monitoring point based upon the tolerance available between the radiation along the monitoring point radial as determined by the proof of performance and the radiation permitted by the authorized standard (or augmented) radiation pattern. In many cases radiation values above these limits would result in interference to other AM stations.

25. Some commenters suggest that monitoring point requirements should be eliminated, arguing that seasonal variations in ground conductivity affect the signal strengths measured at many monitoring points. However, since 1979 the Commission has permitted the measurement of the *ratio* of the directional field strength as compared to the nondirectional field strength at the monitoring points. This practice effectively negates variations caused by seasonal effects or varying weather conditions, because both readings would be equally affected by conductivity changes related to weather. We concur with the several commenters who argue that monitoring point measurements remain a fundamental tool in verifying the performance of AM directional arrays independent of antenna monitor and antenna sampling system readings. As IBC points out, monitoring points give "Commission field inspectors and engineers from other stations instant access" to an array's performance without reference to the station's transmission facilities. For these reasons, we also decline T.Z.Sawyer Technical Consultants' suggestion to delete monitoring point measurements in exchange for yearly skeleton proofs taken on formerly monitored radials. Skeleton proofs were abolished in 1985 because of their limited value in showing actual antenna performance.<sup>17</sup> We seek comment on these tentative conclusions.

26. Over time, it often becomes necessary to abandon a monitoring point and establish a new one. The original location may have become inaccessible due to construction or unsuitable due to changes in the local electromagnetic environment that affect the field strength at that point. Under the current rules, an informal application to change a monitoring point must include the results of a partial proof of performance taken on the radial containing the monitoring point to be changed.<sup>18</sup> See 47 C.F.R. § 73.158.

27. *Proposal.* We propose to eliminate the requirement to conduct a partial proof of performance along the radial containing the monitoring point to be changed. Instead, the applicant may simply reference the measurements taken along that radial in the last full proof of performance submitted to the Commission. The staff would assign a radiation limit for the new monitoring point using the same procedure as described above.<sup>19</sup>

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<sup>17</sup> *AM Broadcast Directional Sampling Systems and Proof of Performance Field Strength Measurements*, MM Docket 85-90, 59 Rad. Reg. 2d 185 (1985), *recon. denied*, 1 FCC Rcd 172 (1986).

<sup>18</sup> The application must also include a description of the routing to the new point, a map showing its location and a photograph showing its location in relation to nearby permanent landmarks.

<sup>19</sup> The field strength limit would be assigned based upon the tolerance available between the radiation along the monitoring point radial as determined by the proof of performance and the radiation permitted by the authorized standard (or augmented) radiation pattern.

28. We also propose to eliminate the requirement for maps and directions indicating how to reach monitoring points for applicants using GPS-determined coordinates to identify monitoring point locations.<sup>20</sup> See C.F.R. §§ 73.151(a)(3) and 73.158(a)(2)-(3). Radiotechniques Engineering Corp suggested this proposal. In order to achieve sufficient accuracy, a differential GPS receiver would be required.<sup>21</sup> We would specify monitoring point coordinates submitted in this manner on the station's license.<sup>22</sup> Parties interested in locating these monitoring points could plot the specified coordinates onto topographical or other maps to determine the best route. We ask for comment on these proposals.

#### IV. AM Station Equipment & Measurements

##### A. Base Current Ammeters

29. Licensees are currently required to install base current ammeters or toroidal transformers (current registering devices) at the power feed point of each tower, typically at the base of the tower. See 47 C.F.R. § 73.58(b). The ratio of the individual tower currents is an important parameter in the proper operation of a direction array. However, over the years antenna monitor and antenna sampling system design improvements have lessened stations' reliance on base current ammeters as a means of maintaining proper array adjustment. Some commenters have questioned the reliability of base ammeters. They are susceptible to damage from lightning. In some circumstances, these meters may also register current changes more reflective of local environmental effects than improper array performance. As a result, most commenters have urged the Commission to modify the requirement that licensees use base current ammeters to maintain proper array adjustment.

30. *Proposal.* We propose to delete the requirement for base current ammeters or toroidal transformers for those directional stations employing *approved* antenna sampling systems.<sup>23</sup> Stations not using approved sampling systems have no reliable alternate on-site means of assessing antenna performance and therefore, our rules would continue to require the installation and use of base current ammeters if the Commission has not approved an alternative system.<sup>24</sup> Deletion of this requirement would not, of course, prevent stations from continuing to install and monitor base current ammeters as a backup in the event of failure of their sampling system or antenna monitor. We seek comment on this proposal.

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<sup>20</sup> A description of the monitoring point as well as a photograph would still be required to verify that the location is free of obstructions such as overhead power lines, see 47 C.F.R. §§ 73.151(a)(3) and 73.158(a)(4), to identify the precise location of the monitoring point with respect to nearby landmarks, and to identify the exact placement of measurement equipment.

<sup>21</sup> Differential GPS uses a reference signal from a ground beacon in addition to the satellite signals to reduce the coordinate error. Differential GPS has an accuracy better than  $\pm 2$  meters, while for non-differential GPS the possible error is approximately  $\pm 100$  meters. USGS topographic maps have an accuracy of about  $\pm 12$  meters. Some additional information about GPS may be found on the Internet at <http://www.fcc.gov/mmb/asd/welcomeALT.html#GPS>.

<sup>22</sup> Licenses are accessible via computer at the Commission's Public Reference Room using the Mass Media Bureau's Broadcast Application Processing System (BAPS).

<sup>23</sup> *Design and Installation of Sampling Systems for Antenna Monitors In Standard Broadcast Stations With Directional Antennas*, 57 FCC 2d 1085 (1976).

<sup>24</sup> Most AM *directional* stations operate with approved antenna sampling systems, so that the requirement to maintain base current ammeters would apply only to a small number of stations.

## B. Antenna Monitors

31. All AM directional stations are required to use an antenna monitor verified for compliance with the technical requirements in 47 C.F.R. § 73.53 as a means of verifying directional array performance.<sup>25</sup> This section of the rules also specifies detailed specifications that antenna monitors are required to meet. We adopted most of these specifications in 1973 and have not undertaken any updating since that time.<sup>26</sup> Potomac Instruments, a manufacturer of antenna monitor systems, claims that the present specifications in 47 C.F.R. § 73.53 impede the development of antenna monitor systems using advanced technology and that elimination of these requirements would result in a new generation of monitor equipment.

32. *Proposal.* We propose to delete most of the antenna monitor construction and operational requirements of 47 C.F.R. § 73.53, with the exception of a few provisions that would be shifted to other existing rule sections.<sup>27</sup> We note that the Commission in recent years has eliminated detailed construction and operational requirements for other types of broadcast equipment, such as transmitters and metering equipment and tentatively conclude that antenna monitor rules can be relaxed in a similar manner. We believe that the elimination of these unneeded requirements will encourage the development of more dependable, less expensive, antenna monitor units.<sup>28</sup> We seek comment on this proposal.

33. Greater Media, Inc.; duTreil, Lundin & Rackley; John Furr & Associates, Inc.; and Hammett & Edison request that we change our technical rule to permit licensees to use *voltage* sampling devices to feed antenna monitors in lieu of current sampling devices such as sampling transformers and pick-up loops. See 47 C.F.R. § 73.68. We ask for comments as to the accuracy and reliability of voltage sampling devices; whether they are appropriate as sampling devices for assessing array performance; and whether we should modify the rules to permit their use.<sup>29</sup>

## C. Impedance Measurements Across a Range of Frequencies

34. Directional and nondirectional AM stations are required to take measurements of impedance across a range of frequencies. See 47 C.F.R. § 73.54(c)(1) and (2). Specifically, a licensee is required to take measurements of resistance and reactance (collectively *impedance*) at 5 kHz intervals

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<sup>25</sup> See also *Public Notice to Licensees of All Standard Broadcast Stations Employing Directional Antennas*, 45 FCC 2d 1062 (1974).

<sup>26</sup> *Type Approval of Antenna Monitors*, 38 FCC 2d 1172 (1973).

<sup>27</sup> The present requirement in 47 C.F.R. § 73.53(a) that the antenna monitor be verified for compliance with the Commission's technical requirements would be moved to 47 C.F.R. § 73.69, which deals with antenna monitors. Antenna monitor requirements for critical arrays would also be moved from 47 C.F.R. § 73.53(c) to 47 C.F.R. § 73.69. Minimum readout levels in 47 C.F.R. § 73.53(b)(4) and (5) would be moved to 47 C.F.R. § 73.1215 (Specifications for Indicating Instruments).

<sup>28</sup> See paragraph 44 for additional proposals regarding specifications for antenna monitors used for critical arrays.

<sup>29</sup> Generally, we expect that voltage sampling devices would be most effective for towers with electrical lengths of 130 degrees or less. See *Phase Tolerances & Toroidal Transformers for AM Directional Stations*, BC Docket 78-28 and MM Docket 83-16, 95 FCC 2d 1062, 1070-72 (1983).

out to 25 kHz above and below the carrier frequency. These rules are intended ensure adequate audio quality at all audio frequencies. Several commenters suggested that this requirement should be deleted as unnecessary.

35. *Proposal.* We propose to delete the requirement to measure impedance across a range of frequencies. In 1984, the Commission deleted many of the audio quality requirements for FM stations, picture and video quality requirements for TV stations, and some audio quality requirements for AM stations, concluding that, with limited exceptions, competition serves as a sufficient incentive to maintain quality operations.<sup>30</sup> Fifteen years later, we have no reason to believe that audio and video quality of broadcast stations has been lessened by deletion of those requirements. We tentatively conclude that retention of 47 C.F.R. § 73.54(c) is not necessary because competition will serve as a sufficient incentive to maintain quality operations. We seek comment on this proposal.

#### **D. Common Point Impedance Measurements**

36. AM directional stations must take impedance (resistance and reactance) measurements at the common radiofrequency input location. See 47 C.F.R. § 73.54(b). The reactance at this point is adjusted by the antenna matching network to a value of zero ohms. This enables maximum power to be transferred from the transmitter to the antenna system without reflecting power back to the transmitter. Most transmitters are manufactured to feed a 50 ohm resistive load without a reactive component, and most transmission lines used by broadcasters are also 50 ohm line. Radiotechniques Engineering Corp., and Greater Media, Inc., assert that many transmitters operate best into a load with a small reactive component, and that adding a small reactive component also allows adjustment of the array impedance to equal that of the station's dummy load.<sup>31</sup>

37. *Proposal.* Based on these practical considerations, we propose to delete the requirement that the common point reactance be adjusted to zero ohms. We seek comment as to whether a limit should be set for the maximum amount of reactance permitted.

### **V. Critical Arrays**

#### **A. Antenna Monitors for Critical Arrays**

38. AM directional arrays have two radiation patterns: a theoretical pattern and a standard pattern, both calculated in accordance with the formulas set forth in 47 C.F.R. §§ 73.150, 73.152 and 73.160. The standard pattern, which always completely encompasses the theoretical pattern, represents an upper limit of radiation that a station should not exceed under normal operating tolerances. Section 73.62(a) of the rules sets forth the normal operating tolerances for directional antennas. A licensee must hold relative amplitudes of the antenna base currents and antenna monitor currents to within 5 percent of the values shown on the license, and the relative phases to within 3 degrees of those specified on the license. Critical arrays are directional antennas which are unusually sensitive to slight variations in internal operating parameters, thus, they would be predicted to exceed their standard radiation pattern at normal operating tolerances and pose a greater potential for causing interference.

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<sup>30</sup> *A Re-Examination of Technical Regulations*, MM Docket 93-114, 99 FCC 2d 903, 49 Fed. Reg. 48305 (1984).

<sup>31</sup> A dummy load is used to test transmitter operation without the antenna array being connected to the transmitter.

Thus, licenses of stations with critical arrays specify tighter operating tolerances.

39. To monitor these tighter tolerances, 47 C.F.R. § 73.69 requires stations with critical arrays to install special precision monitors. Potomac Instruments requests deletion of the requirement, and argues that the present generation of antenna monitors allows reliable operation to tolerances within that specified for many critical arrays. Potomac Instruments also notes that the very low production volume of its PM-19 precision monitor (30 in 28 years) does not justify investment in and application of newer technology in the design and construction of these monitors.

40. *Proposal.* We propose to discontinue specifying the use of expensive specially designed precision antenna monitors for critical arrays. Instead, we propose to simply require that the monitor installed have a digital readout graduated in increments no larger than 1/2 of the critical parameter specified in the authorization. We tentatively conclude that the rule can be relaxed to permit the use of off-the-shelf equipment without adverse impact on stations that are protected by critical arrays. We seek comment on this proposal.

#### **B. Designation of Critical Arrays**

41. Several commenters suggest that staff has unevenly applied critical array classifications, and therefore, that this classification system should be discontinued. We do not believe that this is a feasible solution. There is no dispute that some directional antenna systems are inherently more unstable than others and are therefore more likely to cause objectionable interference to other AM stations, particularly during nighttime hours when skywave propagation occurs. Authorizations for such stations are conditioned to require more stringent monitoring. We acknowledge that the staff has generally investigated an array for stability only if a petition or objection is filed against the application proposing the array. As a result, the staff has not identified and designated as critical arrays all unstable arrays. We intend to change this practice by discontinuing reliance on petitions or objections as the primary method of identifying unstable arrays. Instead, we propose to apply a uniform screening process to all applications for directional facilities.

42. The staff has employed computer studies to assess array stability. The relative current amplitude and phase of each array element (tower) can be varied systematically to determine the variations that could be tolerated before the standard pattern radiation limits are exceeded in any direction. We have analyzed all licensed AM directional antennas utilizing our stability criteria and have tentatively concluded that the current criteria are too stringent and that modifications are necessary to tag only those arrays that have the highest probability of causing "real world" interference under normal operating tolerances.

43. *Proposal.* We propose to relax our stability criteria in two ways. First, we propose to restrict our tests for array stability to radiation pattern minima (nulls) and maxima of standard patterns in the horizontal plane only instead of testing at all azimuths and elevations. Nulls are important because they are generally located in directions where interference protection is required. Minor lobe maxima are also important, particularly with respect to nighttime skywave protection. Controlling the radiation in the directions of nulls and lobes generally assures that the radiation in all other directions will also remain under control. Also, restricting our criteria to nulls and maximas will eliminate classifying arrays as critical based on instances of theoretically excessive radiation in inconsequential directions. The studies would be restricted to the horizontal plane radiation pattern because only the horizontal plane pattern can be directly observed by means of field measurements.

44. Secondly, we propose classify an array as critical only if the standard pattern is exceeded at 10% or more of the possible parameter variation combinations. For example, a four tower array has 512 possible combinations of 1 percent current amplitude and 1 degree phase variations.<sup>32</sup> The array would be designated as critical if at least 51 of these combinations would cause excessive radiation. The current test requires only one instance of excessive radiation. We believe that the proposed 10% standard will more realistically predict the likelihood of excessive radiation. We seek comments on both relaxations to the current stability test criteria.<sup>33</sup>

45. Finally, based on the results of studies we have performed on the licensed AM directional patterns in our AM engineering database, we propose to exclude all two and three tower arrays from designation as critical arrays. Furthermore, we propose to categorically exclude all daytime arrays considering that objections have never been filed based on daytime interference issues related to array instability. Thus, we propose to screen only nighttime and critical-hours directional proposals. We also propose to permit licensees with facilities currently classified as critical to request staff review of their designation based on the revised criteria; however, we do not propose to review the directional facilities of any station not currently classified as critical. We seek comment on each aspect of this proposal.

## VI. Conclusion

46. In this *Notice*, we propose substantial reductions in our proof of performance requirements for AM directional antenna systems. For full proofs of performance, we propose reducing the number of measurement radials required, cutting in half the minimum number of measurement points required per radial, and shortening the length of measured radials thereby reducing by at least thirty the total number of required measurement points. We propose similar relaxation of partial proof requirements, reducing the minimum number measurement points by at least sixteen. We believe these proposals will substantially reduce the time and cost burdens associated with verifying proper operation of AM directional arrays. Additionally, we propose to delete the required use of base current ammeters and we propose to substantially reduce required technical specifications for antenna monitors. We propose to discontinue reliance on petitions and objections as a means of identifying critical arrays and propose to categorically exclude two and three tower antenna systems, as well as daytime systems, from being classified as critical arrays. Additionally, we propose to substantially relax the criteria used in classifying antenna systems as critical arrays. We also propose to discontinue requiring specially built expensive precision monitors for critical antenna systems. Comments are sought concerning these proposals and others. Although these proposals are designed to provide substantial savings for licensees of directional AM antennas, it is our tentative view that none of the proposals jeopardize the technical integrity of the AM broadcast service.

## VII. Administrative Matters

47. *Filing of Comments and Reply Comments.* Pursuant to Sections 1.415 and 1.419 of the

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<sup>32</sup> The formula used to compute the number of variations is  $8^{(\text{Number of towers} - 1)}$ . Testing will also be conducted for 0.5%/0.5 degrees variations if the array fails testing at 1%/1 degree. If the array fails testing at 0.5%/0.5 degrees, then testing will be conducted at 0.1%/0.1 degrees. Arrays that fail testing at 0.1%/0.1 degrees will not be authorized.

<sup>33</sup> The Commission's computer code for the stability program will be posted on the Audio Services Division's Internet Web site at <http://www.fcc.gov/mmb/asd>.

Commission's Rules, 47 C.F.R. §§ 1.415 and 1.419, interested parties may file comments within forty-five (45) days of the date of publication of this Notice in the Federal Register and reply comments within sixty (60) days of the date of publication of this Notice in the Federal Register. Comments filed through the ECFS can be sent as an electronic file via the Internet to <<http://www.fcc.gov/e-file/ecfs.html>>. In completing the transmittal screen, commenters should include their full name, postal service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to [ecfs@fcc.gov](mailto:ecfs@fcc.gov), and should include the following words in the body of the message, "get form <your e-mail address.>" A sample form and directions will be sent in reply. Parties who choose to file by paper must file an original and four copies of each filing. If you want each Commissioner to receive a personal copy of your comments, you must file an original plus eleven copies. All filings must be sent to the Commission's Secretary, Magalie Roman Salas, Office of the Secretary, TW-A306, Federal Communications Commission, 445 12th Street, S.W., Washington, D.C. 20554. The Mass Media Bureau contacts for this proceeding are Dennis Williams, Son Nguyen, Dale Bickel or William Ball at (202) 418-2660 or [dwillia@fcc.gov](mailto:dwillia@fcc.gov), [snguyen@fcc.gov](mailto:snguyen@fcc.gov), [dbickel@fcc.gov](mailto:dbickel@fcc.gov) or [wball@fcc.gov](mailto:wball@fcc.gov).

48. Parties who choose to file by paper should also submit their comments on diskette. These diskettes should be submitted to: Dennis Williams, Federal Communications Commission, 445 12th Street, S.W., Room 2-A330, Washington, DC 20554. Such a submission should be on a 3.5 inch diskette formatted in an IBM compatible format using WordPerfect 5.1 for Windows or compatible software. The diskette should be accompanied by a cover letter and should be submitted in "read only" mode. The diskette should be clearly labeled with the commenter's name, proceeding (including the docket number in this case -- MM Docket No. 93-177), type of pleading (comment or reply comment), date of submission, and the name of the electronic file on the diskette. The label should also include the following phrase "Disk Copy - Not an Original." Each diskette should contain only one party's pleadings, preferably in a single electronic file. In addition, commenters must send diskette copies to the Commission's copy contractor, International Transcription Service, Inc., 1231 20th Street, N.W., Washington, D.C. 20036.

49. Comments and reply comments will be available for public inspection during regular business hours in the FCC Reference Center (Room 239), 1919 M Street, N.W., Washington, D.C. 20554. It is anticipated that the Reference Center will be relocated to the Commission's Portals Building during the late spring or early summer of 1999. Accordingly, and especially after March 1, 1999, interested parties are advised to contact the FCC Reference Center at (202) 418-0270 to determine its location. Written comments by the public on the proposed and/or modified information collections are due on or before 45 days of the date of publication of this Notice in the Federal Register. Written comments must be submitted by the Office of Management and Budget (OMB) on the proposed and/or modified information collections on or before 60 days of the date of publication of this Notice in the Federal Register. In addition to filing comments with the Secretary, a copy of any comments on the information collections contained herein should be submitted to Judy Boley, Federal Communications Commission, Room C-1804, 445 12th Street, SW, Washington, DC 20554, or via the Internet to [jboley@fcc.gov](mailto:jboley@fcc.gov) and to Timothy Fain, OMB Desk Officer, 10236 NEOB, 725 - 17th Street, N.W., Washington, DC 20503 or via the Internet to [fain\\_t@al.eop.gov](mailto:fain_t@al.eop.gov).

50. *Initial Paperwork Reduction Act of 1995 Analysis.* This Notice proposes rule and procedural revisions that may contain information collection requirements. As part of our continuing effort to reduce paperwork burdens, we invite the general public and OMB to take this opportunity to comment on the information collection contained in this Notice, as required by the Paperwork Reduction Act of 1995, Pub. L. No. 104-13. Public and agency comments are due at the same time as other

comments in this *Notice* (on or before 45 days of the date of publication of this *Notice* in the Federal Register). OMB comments are due 60 days from the date of publication of this *Notice* in the Federal Register. Comments should address: (a) whether the proposed collection of data is necessary for the proper performance of the functions of the Commission, including whether the information shall have practical utility; (b) the accuracy of the Commission's burden estimates; (c) ways to enhance the quality, utility and clarity of the information collected; and (d) ways to minimize the burden of the collection of information on the respondents, including the use of automated collection techniques or other forms of information technology. In addition to filing comments with the Secretary, a copy of any comments on the information collections contained herein should be submitted to Judy Boley, Federal Communications Commission, Room C-1804, 445 12th Street, SW, Washington, DC 20554, or via the Internet to [jboley@fcc.gov](mailto:jboley@fcc.gov) and to Timothy Fain, OMB Desk Officer, 10236 NEOB, 725 17th Street, N.W., Washington, DC 20503 or via the Internet to [fain\\_t@al.eop.gov](mailto:fain_t@al.eop.gov).

51. *Ex Parte Rules.* This proceeding will be treated as a "permit-but-disclose" proceeding subject to the "permit-but-disclose" requirements under 47 C.F.R. § 1.1206(b). 47 C.F.R. § 1.1206(b), as revised. *Ex parte* presentations are permissible if disclosed in accordance with Commission rules, except during the Sunshine Agenda period when presentations, *ex parte* or otherwise, are generally prohibited. Persons making oral *ex parte* presentations are reminded that a memorandum summarizing a presentation must contain a summary of the substance of the presentation and not merely a listing of the subjects discussed. More than a one- or two-sentence description of the views and arguments presented is generally required. See 47 C.F.R. § 1.1206(b)(2), as revised. Additional rules pertaining to oral and written presentations are set forth in 47 C.F.R. § 1.1206(b).

52. *Initial Regulatory Flexibility Analysis.* With respect to this Notice, an Initial Regulatory Flexibility Analysis ("IRFA") is contained in Appendix B. As required by the Regulatory Flexibility Act,<sup>34</sup> the Commission has prepared an IRFA of the expected significant economic impact on small entities by the policies and rules proposed in this Notice. Written public comments are requested on the IRFA. We ask a number of questions in our IRFA regarding the prevalence of small businesses in the industries covered by this Notice. Comments on the IRFA must be filed in accordance with the same filing deadlines as comments on the Notice and must have a distinct heading designating them as responses to the IRFA.

53. Accordingly, IT IS ORDERED, That pursuant to the authority contained in Sections 4(i), 4(j), 303, 308, 309 and 310 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 154(j), 303, 308, 309, 310, and 319 this Notice of Proposed Rule Making IS ADOPTED.

54. IT IS FURTHER ORDERED, That the Commission's Office of Public Affairs, Reference Operations Division, SHALL SEND a copy of this Notice, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration

55. Additional Information. For additional information on this proceeding, please contact Dennis Williams, Son Nguyen, Dale Bickel, or William Ball, Audio Services Division, Mass Media Bureau at (202) 418-2660.

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<sup>34</sup> Pub. L. No. 96-354, 94 Stat. 1164, 5 U.S.C. § 601 et seq. (1981), as amended.

FEDERAL COMMUNICATIONS COMMISSION



Magalie Roman Salas

Secretary

## Appendix A

## List of Commenters

**Initial Comments were received from:**

Al Germond  
Association of Federal Communications  
Commission Consulting Engineers (AFCCE)  
Capital Cities/ABC, Inc.  
Carl T. Jones Corporation  
Crawford Broadcasting Company  
CBS Inc.  
Cohen, Dippell and Everist, P.C.  
Communications Technologies, Inc.  
duTreil, Lundin & Rackley  
Hatfield & Dawson  
Independent Broadcast Consultants, Inc.  
John Furr & Associates, Inc.  
Jules Cohen & Associates, P.C.  
Kintronics Laboratories  
Lahm, Suffa & Cavell  
Moffitt, Larson & Johnson  
National Association of Broadcasters (NAB)  
Potomac Instruments, Inc.  
Radiotechniques Engineering Corp.  
R. Morgan Burrow, Jr.  
Silliman & Silliman  
Suffa & Cavell, Inc.  
T.Z. Sawyer Technical Consultants  
William G. Ball

**Reply comments were received from:**

Carl T. Jones Corporation  
Cohen, Dippell and Everist, P.C.  
Communications Technologies, Inc.  
Fisher Broadcasting Inc.  
Greater Media, Inc.  
Hammett & Edison  
Independent Broadcast Consultants, Inc.  
Miller Communications, Inc.  
Milstar Broadcasting Corporation  
Moffet, Larson & Johnson  
Mullaney Engineering, Inc.  
National Association of Broadcasters (NAB)  
Paxson Communications Corporation  
Robert A. Jones, P.E.  
Thomas G. Osenkowsky  
T.Z. Sawyer Technical Consultants

## Appendix B

**INITIAL REGULATORY FLEXIBILITY ANALYSIS**

1. As required by the Regulatory Flexibility Act ("RFA"),<sup>35</sup> the Commission has prepared this present Initial Flexibility Analysis ("IRFA") of the possible significant economic impact on small entities by the policies and rules proposed in this *Notice of Proposed Rule Making ("Notice")*. Written and electronically filed public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines for comments of the *Notice* provided above in ¶ 47. The Commission will send a copy of the *Notice*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration. See 5 U.S.C. § 603(a). In addition, the *Notice* and IRFA (or summaries thereof) will be published in the Federal Register. See *id.*

**I. Need For and Objectives of the Proposed Rules:**

2. This rulemaking proceeding is initiated to obtain comments concerning the Commission's proposals to eliminate some of its technical rules and relax others to materially reduce the regulatory and compliance burdens on AM broadcasters using directional antennas. This *Notice* seeks to reduce the Commission's regulatory requirements to the minimum necessary to achieve our policy objectives of controlling interference and assuring adequate community coverage.

**II. Legal Basis:**

3. Authority for the actions proposed in this *Notice* may be found in Sections 4(i), 4(j), 303, 308, 309, 310 and 319 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 154(j), 303, 308, 309, 310 and 319.

**III. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply:**

4. RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."<sup>36</sup> In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.<sup>37</sup> A small business concern is one which: (1) is independently owned and operated; (2) is not

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<sup>35</sup> See 5 U.S.C. § 603. The RFA, see 5 U.S.C. § 601 *et. seq.*, has been amended by the Contract with America Advancement Act of 1996, Pub. L. No. 104-12, 110 Stat. 848 (1996) ("CWAA"). Title II of the CWAA is the Small Business Regulatory Enforcement Fairness Act of 1996 ("SBREFA").

<sup>36</sup> *Id.* § 601(6).

<sup>37</sup> 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to the RFA, the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3). While we tentatively believe that the SBA's definition of "small business" greatly overstates the number of radio broadcast stations that are small businesses and is not suitable for purposes of determining the impact of the proposals on small radio stations, for purposes of this *Notice*, we utilize the SBA's definition in determining the number of small businesses to which the proposed rules would apply, but we reserve the right to adopt a more suitable definition of "small business" as

dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).<sup>38</sup> A small organization is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."<sup>39</sup> Nationwide, as of 1992, there were approximately 275,801 small organizations.<sup>40</sup> "Small governmental jurisdiction" generally means "governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000."<sup>41</sup> As of 1992, there were approximately 85,006 such jurisdictions in the United States.<sup>42</sup> This number includes 38,978 counties, cities, and towns; of these, 37,566, or 96 percent, have populations of fewer than 50,000.<sup>43</sup> The Census Bureau estimates that this ratio is approximately accurate for all governmental entities. Thus, of the 85,006 governmental entities, we estimate that 81,600 (91 percent) are small entities.

5. The proposed rules and policies will apply to certain AM radio broadcasting licensees and potential licensees. The Small Business Administration defines a radio broadcasting station that has no more than \$5 million in annual receipts as a small business.<sup>44</sup> A radio broadcasting station is an establishment primarily engaged in broadcasting aural programs by radio to the public.<sup>45</sup> Included in this industry are commercial religious, educational, and other radio stations.<sup>46</sup> Radio broadcasting stations which primarily are engaged in radio broadcasting and which produce radio program materials are similarly included.<sup>47</sup> However, radio stations which are separate establishments and are primarily engaged in producing radio program material are classified under another SIC number.<sup>48</sup> The 1992 Census indicates that 96 percent (5,861 of 6,127) radio station establishments produced less than \$5 million in revenue in 1992.<sup>49</sup> Official Commission records indicate that 11,334 individual radio stations were operating in 1992.<sup>50</sup> As of December 31, 1998, official Commission records indicate that 12,472 radio stations were operating,

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applied to radio broadcast stations subject to the proposed rules in this *Notice* and to consider further the issue of the number of small entities that are radio broadcasters or other small media entities in the future. See *Report and Order* in MM Docket No. 93-48 (*Children's Television Programming*), 11 FCC Rcd 10660, 10737-38 (1996), citing 5 U.S.C. § 601(3).

<sup>38</sup> Small Business Act, 15 U.S.C. § 632 (1996).

<sup>39</sup> 5 U.S.C. § 601(4).

<sup>40</sup> 1992 Economic Census, U.S. Bureau of the Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the U.S. Small Business Administration).

<sup>41</sup> 5 U.S.C. § 601(5).

<sup>42</sup> U.S. Dept. of Commerce, Bureau of the Census, "1992 Census of Governments."

<sup>43</sup> *Id.*

<sup>44</sup> 13 C.F.R. § 121.201, SIC 4832.

<sup>45</sup> Executive Office of the President, Office of Management and Budget, Standard Industrial Classification Manual (1987), SIC 4832.

<sup>46</sup> *Id.*

<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> The Census Bureau counts radio stations located at the same facility as one establishment. Therefore, each co-located AM/FM combination counts as one establishment.

<sup>50</sup> FCC News Release No. 31327, Jan. 13, 1993.

of which 4793 were AM stations.<sup>51</sup>

6. Thus, because only 40 percent of AM stations operate with directional antennas, the proposed rules will affect fewer than 1916 radio stations, 1839 of which are small businesses.<sup>52</sup> These estimates may overstate the number of small entities since the revenue figures on which they are based do not include or aggregate revenues from non-radio affiliated companies.

7. In addition to owners of operating radio stations, any entity that seeks or desires to obtain a radio broadcast license may be affected by the proposals contained in this item. The number of entities that may seek to obtain a radio broadcast license is unknown. We invite comment as to such number.

#### **IV. Description of Projected Recording, Recordkeeping, and Other Compliance Requirements:**

8. A number of measures proposed in this *Notice* would reduce the reporting requirements of prospective and current applicants and permittees and licensees. In order to control interference between stations and assure adequate community coverage, directional AM stations must undergo extensive "proofs of performance" when initially constructed, and from time to time thereafter, to verify conformance with authorized operating parameters. Among other things, this *Notice* proposes reducing the number of measurements radials required, cutting in half the minimum number of measurement points per radial, and shortening the length of measured radials. We also propose to delete the requirement for base current ammeters and substantially eliminate technical specifications for antenna monitors, and substantially relax the criteria used in classifying antenna systems as critical arrays. These measures are designed to reduce the overall administrative burdens of the Commission's rules on both regulatees and the Commission staff.

#### **V. Steps Taken to Minimize Significant Economic Impact on Small Entities and Significant Alternatives Considered:**

9. This *Notice* solicits comment on a variety of alternatives discussed herein. These alternatives are intended to enhance opportunities for improvement of technical facilities and service and eliminate unnecessary administrative burdens and delays associated with our radio broadcast licensing processes. Any significant alternatives presented in the comments will be considered.

#### **VI. Federal Rules that Overlap, Duplicate, or Conflict with the Proposed Rules:**

10. None.

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<sup>51</sup> FCC News Release No. 85488, "Broadcast Station Totals as of September 11, 1998."

<sup>52</sup> We use the 96% figure of radio station establishments with less than \$5 million revenue from the Census data and apply it to the 1916 radio stations using directional antennas to arrive at 1839 individual AM stations as small businesses.