

**Before The
Federal Communications Commission
Washington, DC 20554**

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

**Comments concerning Further Notice of Proposed Rulemaking on the Use of
Computer Modeling to Predict Antenna Performance**

In the above-identified matter, the Commission requested further comments regarding “Joint Written Ex Parte Filing – Supplemental Comments Of Broadcasters, Broadcast Engineering Consultants, and Equipment Manufacturers” (“NAB”) as filed with the Commission on August 2, 2000. In addition to the overall filing by NAB, the Commission asked specifically for comments on several questions concerning related matters.

First, the NAB is to be commended for its work in preparing the above-identified filing. It obviously represents a significant amount of thought and discussion by the participating parties and certainly establishes a baseline for computer modeling of antenna systems. However, it does leave a number of issues to be addressed as recognized by the Commission in the questions it raised.

Perhaps the area of most concern to the industry should be the proof that the values calculated by the moment methods truly result in a pattern that provides the

needed protections. It does not appear that such work has been conclusively submitted to the Commission at this point. One way in which this could be done would be to use both computer modeling and a measured proof-of-performance for a period of time to establish the veracity of the newer method. Such an approach would determine the final techniques to be accepted for computer modeling while insuring that no interference would be caused to existing broadcasters. A trial period of four or five years should provide the necessary information.

Another area of concern is determining a method by which a station can determine if factors outside of the array have caused the antenna pattern to become distorted from the original adjustment. The sampling system and instrumentation would permit the station to determine any changes that might occur within the antenna itself. That system would not necessarily respond to external changes, especially if at some distance from the array. It would appear that it would still be necessary to establish measured monitor points to be used to confirm that no changes actually occur to the antenna pattern. Such monitor points would logically be along radials in the pattern minima. The requirement for monitor points would obviously extend beyond any trial period of the computer modeling method. Without some type of monitor point, established by measurement, there is no way for either the licensee of a station or the licensee of a station that might experience interference from a changed array to determine if changes in the antenna pattern had occurred.

While the NAB method describes methods for identifying reradiating structures, it is conceivable that structures considered to not be a problem might still, in practice, be a problem. That such a problem exists could be determined by non-directional and directional measurements in the pattern minima. By detuning such structures, if possible, their effect on the antenna pattern can be minimized or eliminated. However, without establishing monitor points, the licensee has no way of determining that the detuning circuits remain sufficiently effective.

A major area of concern regards the actual performance of the computer modeling. NAB, in attempting to delineate those criteria to be used in permitting computer modeling, appears to accept that there may be an opportunity to perform imaginative engineering. A would be engineer who does not necessarily subscribe to the rigid ethical values we would desire, might be tempted to tune the array from the privacy and convenience of his motel room. In the alternative, a well-meaning individual may simply not be competent to perform the modeling, regardless of the seriousness of his intent. To this regard, the Commission should consider establishing minimum criteria for those engineers that wish to submit computer modeling data. That work may be considered to be more technically demanding than measured proof-of-performance data, especially since this constitutes a totally new area of work for many engineers.

The Commission has recognized the need for such qualifications in other areas. For example, the azimuth of directional FM antennas must be confirmed by a Registered Land Surveyor, establishing a position by the Commission that unlicensed persons cannot

submit data that, if in error, might cause interference to other stations. Perhaps this would be the proper time to establish that computer modeling data must be prepared by an engineer that has established his or her credentials through appropriate licensing. It is respectfully submitted that the Commission should require those who submit such data to be Registered Professional Engineers in the state where they practice. Such a requirement would conform to the Commission's requirements for Surveyors in that incorrect data could result in interference to protected stations.

Finally, the proof of any scientific method is in its repeatability. That is, the data submitted to the Commission for the computer modeling of an antenna system must be sufficiently complete that another engineer, using the same methods, will reach the same results. Some method must be established whereby all possible reradiating structures, as identified by either the NAB method or by measurement, are identified in the data submitted to the Commission. Otherwise, it would be far too easy to simply ignore structures that would appear to be a problem. It would also appear necessary for a periodic review of the area surrounding a station to identify new structures that might have an impact on the antenna pattern. If such structures come into existence, their impact must be included in a new computer modeling study to determine if they have an adverse impact on the array and the protections it provides.

In summary, the use of computer modeling may well prove to lessen the time and expense involved in adjusting a directional array for proper operation. However, that convenience should not be obtained at the cost of eliminating the assurance to other

stations that no interference will be caused to their facilities. It is understood that certain physical limitations exist with regard to the current method of measurements. The new method must be at least as accurate as that which has successfully been used for many years.

The preceding statements have been prepared by me or under my direction and are true and correct to the best of my knowledge and belief.

/s/ Donald L. Markley

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