

Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of)

An Inquiry Into The Commission's)

Policies and Rules Regarding AM)

Radio Service Directional Antenna)

Performance Verification)

MM Docket No. 93-177

REPLY COMMENTS

The following are Reply Comments in MM Docket No. 93-177 to the Federal Communications Commission (ACommission) by Donald G. Everist. His qualifications are as follows:

Everist is a graduate electrical engineer, a registered professional engineer in the District of Columbia (Registration Number 5714), and has practiced in that capacity for over thirty years. He is a member of the Institute of Electrical and Electronic Engineers, National Society of Professional Engineers, Illinois Society of Professional Engineers, and a member and past president of the Association of Federal Communications Consulting Engineers.

He was the Chairman of the AM Broadcasting Service Working Group preparatory to the 1979 World Administrative Radio Conference and industrial delegate for the United States to the International Telecommunications Union Regional Administrative Medium Frequency Broadcasting Conference in Buenos Aires, Argentina. He was the Chairman of TF:F Planning Methods; was a U.S. delegate on the Fourth Panel of Experts meeting in Geneva, Switzerland; was Chairman of the Working Group on Inventories, Incompatibilities, Negotiations and Strategy to the Advisory Committee, all preparatory to the Second Session of the Regional Administrative MF Broadcasting Conference for Region 2 (Western Hemisphere) held in Rio de Janeiro, Brazil. He was an industrial delegate for the United States to the Regional Administrative Radio-Conference (BC-R2 1) sponsored by the International Telecommunications Union in Geneva, Switzerland. He was an industrial delegate for the United States for the CCIR Joint Interim Working Party 8-10/1 Meeting in Helsinki, Finland.

He has been making radiofrequency measurements since 1952 and joined the predecessor to Cohen, Dippell and Everist, P.C. in 1961. His first field assignment as a consulting engineer was in connection with commissioning a new 4-tower daytime and 6-tower nighttime AM array.

Computer Modeling - Support is given to Greater Media Inc.=s (AGreater Media≡) comments regarding computer modeling.

Based upon my knowledge of modeling using NEC3 has not been universally constructive. The firm of Cohen, Dippell and Everist, P.C. in the MM Docket 93-177, RM 7594, Notice of Inquiry provided the following observation.

Array Adjustment to Theoretical Parameters - CDE experience including hundreds of antenna arrays is that greater than 90% of the systems adjusted to theoretical parameters¹ do not meet FCC proof-of-performance requirements. The required azimuths of the pattern nulls radiated and/or the depths of the nulls from a theoretically computed pattern require subsequent system adjustments, usually by stationing technical staff with calibrated field strength meters utilizing 2-way radio at various reference locations.≡

The computer assisted modeling experience over the past five years has been with a variety of directional antennas including shortwave, grounded base antennas, electrically significant height towers immediately adjacent to a conventional array and a significantly sized buildings in close proximity of antenna system. However, based on this experience, there may be a classification or family of directional arrays that can be faithfully modeled with appropriate supporting field measurements. Further, appropriate computer modeling may reap other potential benefits.^{2,3} Therefore, before further Commission time and effort in a further proceeding is initiated, it is urged that the industry further explore whether this approach has merit. If the industry finds merit, then a recommendation can be made to the Commission and a separate

¹With appropriate compensation for sample system variations.

²Edward C. Jordan/Keith G. Balmain, *Electromagnetic Waves and Radiating Systems*, Second Edition, pp. 640-644

³IEEE Antennas and Propagation Society Newsletter, December 1986 Article, *Electromagnetic Surface Waves*, by Ronold W.P. King, Gordon McKay Laboratory, Harvard University, Cambridge, MA 02138

formal proceeding initiated at a later date. If conditional industry support is made to develop a separate Notice of Proposed Rule Making then an adequate public record can be developed to ascertain whether or not appropriate computer assisted modeling methods with verifiable measurements can be constructed sufficient to meet the Commission's regulatory obligations.

Proof and Partial Proof Requirements - Support is given to the Potomac Instruments, Inc. (APotomac Instruments) comments regarding proof and partial proof requirements with the provision that at least one radial be conducted in the major lobe. There are several reasons that a radial in the major lobe is warranted. First, in most nighttime arrays, the major lobe contains upwards to 98% of the energy in the pattern. If the energy is verified by measurements as being along the major lobe radial, then confirmation that the radiofrequency energy is not being misdirected such that unintended interference concerns can arise. Second, the major lobe radial is needed in those circumstances to verify that an antenna system does not develop the required RMS⁴; then under the FCC Rules, it can apply to increase its transmitter power. In addition, it is suggested that directional stations who were licensed based upon measurements and radials less than that adopted from this proceeding should be grandfathered.

Furthermore, the concept of making changes on a tower of a directional array above the base insulator including the addition of communication antennas is supported. That support is conditioned upon an appropriate showing being provided to the Commission that Abefore and Aafter measurements similar to Section 73.69(d) of the FCC Rules are made.

Potomac Instruments has outlined a very thoughtful and concise format for measurement documentation and recommends that the data collection should accommodate direct importation of certain National Maritime Electronics Association GS data. Support is given to this common sense concept.

Monitoring Points - Concurrence with Potomac Instruments' comments regarding monitoring point identification is made with one provision. Accurate up-to-date monitoring point photos are a necessity. It is urged that the Commission consider with the advent of digital camera technology that the monitor point photo be filed in an electronic format and maintained in a

⁴Public Notice dated October 11, 1985 entitled, AThe Application Process and the Use of Non-Discrete Power Levels for AM Stations.

Commission computer file that can be downloaded by any interested party. Also not specifically noted, the Commission is encouraged to consider permitting ratio (DA/ND) for monitor point⁵ license limits.

⁵It is requested that the Commission revisit and, if necessary, revise the policy statement contained in the letter to AFCCE dated December 6, 1979.

Agreement with the Potomac Instruments= comments regarding retention of antenna base current meters as a viable diagnostic tool is made; however, on a permissive basis. It is believed that base current data in concert with monitoring point readings are necessary in confirming antenna pattern performance when an antenna monitor malfunction has occurred. The use of an FCC electronic data base could be utilized. In those stations using the permissive antenna base meter concept, would be entitled, to additional time in which to repair an antenna monitor system⁶ or antenna monitor.

Antenna Monitors - Potomac Instruments provides a very comprehensive and thoughtful outline on minimum antenna monitor requirements, and on voltage measurements. It is recommended that the Commission take these comments into careful consideration.

Critical Arrays - The Commission should consider eliminating critical arrays as a regulatory procedure and consider based upon some minimum requirement permit these stations to certify stability and be able to operate with parameters in accordance with Section 73.62 of the FCC Rules.

Summary - As noted, support is given to the very constructive comments in this proceeding by Greater Media, Inc. and Potomac Instruments, Inc. In addition, it is urged that as computer technology permits that the Commission permit the maintenance of electronic data files hosted by the Commission for each station. That computer information would be accessible to the public and could contain information regarding monitor point photos, proof data, antenna monitor system information, etc. Constructive use of Commission hosted electronic files could be a valuable asset in the Commission=s effort for efficient management of the AM spectrum.

Respectfully Submitted,

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⁶It is also assumed that the provisions in MM Docket 85-90 regarding sample system apply and will be retained.