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

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

To: The Commission

Comments of Hammett & Edison, Inc., Consulting Engineers

We respectfully submit these comments in the above-captioned proceeding relating to the Commission's policies and rules regarding AM Radio Service directional antenna performance verification. Hammett & Edison, Inc. is a professional service organization that provides consultation to commercial and governmental clients on communications, radio, television, and related engineering matters.

I. Qualifications

Hammett & Edison, Inc. is well qualified to make comments on this matter regarding AM antenna arrays. Hammett & Edison was established in 1952, and since that time, has designed, adjusted, and performed field verification of hundreds of AM directional arrays. Engineers at Hammett & Edison have also authored two chapters on AM arrays in the NAB Engineering Handbook. Hammett & Edison was also the first firm in the United States to diplex two 50 kW AM directional facilities into the same array. Hammett & Edison has also continually upgraded its computational capabilities to model, as accurately as possible, the operation of AM arrays and the effects of external environmental factors.

II. General Comments

The Commission is to be commended for this excellent proposal. AM broadcasters have long been saddled with the financial burden of extensive proof-of-performance requirements that are not required for any other service. We believe that the Commission's proposal strikes a good compromise of reducing the burden on the AM broadcaster while still requiring pattern verification to ensure the integrity of the FCC's allocations structure.

We also concur with the Commission's reluctance to regulate the antenna system adjustment process by requiring certain procedures. Engineering and advancement of the radio art can only be stifled if the design process is rigidly defined. The Commission is correct in focusing its efforts on the verification of results, regardless of the process utilized to achieve the desired results.

III. Directional Antenna Proofs of Performance

We concur with the Commission's reduction in the minimum number of required radials from 8 to 6 and the required distribution. The generally required maximum of 12 radials is also a reasonable number. We have concerns, however, regarding the use of "pattern symmetry" to account for additional minor lobes and minima. If there were no environmental concerns to cause pattern asymmetry, then we could, in most cases eliminate the need to measure most arrays in detail. We suggest that pattern symmetry be allowed to be assumed only in directions where there are no significant protection requirements.

We agree with the Commission's reduction in the number of required measurement points and the suggested spacings. Elimination of the points beyond 15 kilometers eliminates those most affected by seasonal conductivity changes and substantially reduces the amount of travel time required to conduct a proof-of-performance without affecting the accuracy of the results.

We believe that the information required for each measurement point, *i.e.*, date, time, azimuth, distance, pattern, and field strength, is not a significant burden and should be recorded as a matter of good engineering practice. We believe the adoption of a standard format is also a good idea and the electronic retrieval of data is an excellent idea. However, one of the most common reasons for requesting previous proof-of-performance data is to obtain the conductivity data from the analysis of the measured data. While having the actual measured data available electronically would be useful for performing subsequent partial proofs-of-performance, it would not provide the conductivity data for use in an application. While the data could be analyzed again, it is unlikely that the result would match that of the original engineer's analysis. Rather, the analyzed soil conductivity data could also be summarized in tabular form for inclusion with the field strength measurements. This would allow all of the necessary data to be retrieved electronically without the requirement to actually digitally store the graphical analysis.

We concur with the Commission's proposal for partial proofs-of-performance and when they are to be required. The substitution of a portion of a sampling system should not normally affect array performance, although antenna monitor readings may change. We concur that no partial proof should normally be required in this case.

We concur with the Commission's suggestion regarding changing the location of a monitoring point. The use of the original proof measurement at a particular point for a reference seems reasonable. We suggest, however, that a partial proof on the monitoring point radial in question be allowed, and be used to provide a new reference, if necessary, due to environmental changes on the radial or if an entirely new point must be used because of local construction or other constraints.

We disagree that monitoring points should be allowed to be specified only on the basis of GPS determined coordinates, but we support the elimination of the requirement for directions and maps. The Commission is correct in noting that a differential GPS system must be employed if GPS coordinates are to be used. Our hesitation with a coordinates-only approach stems from the fact that we have often noted, during the implementation of the FCC's tower registration program, towers with incorrect GPS-determined coordinates and coordinates specified in inconsistent datums. Such an error could be very significant for a monitoring point. Also, there is the problem that one can not drive to a set of coordinates without first plotting that location on a map. We believe that the monitoring points should be specified as a description, for example, "Southwest corner of Third Street and West Spain Street, near the stop sign." With any street map, one can find this point with no plotting and more accurately than with a differential GPS unit. We have no objection to specifying the locations with GPS coordinates, as long as a description is also included. Using a description still eliminates the requirement for driving directions and maps, but allows anyone to find the point without introducing potential plotting errors.

IV. AM Station Equipment & Measurements

We concur with the proposal to eliminate the requirement for base current meters. In most cases, the meters essentially duplicate the readings of the antenna monitor but are less reliable because of the location. While base current measurements can be useful to the station and the station's consulting engineer, they provide no useful information to the Commission if an approved sampling system is installed.

We support the Commission's proposal to delete the requirement to measure impedance across a band of frequencies.

V. Antenna System Efficiency

We recommend that the issue of antenna circuitry efficiency be considered, as a natural outgrowth of the FCC's proposed rulemaking in this Docket. Sections 73.51(b)(1) and (2) of the FCC Rules specify the input power to a directional array to be 8% above the nominal power for stations operating with 5 kW and below and 5.3% above the nominal power for stations operating above 5 kW. This factor is to account for power divider and matching system losses. It is noted that FM and TV stations are allowed to take into account the *actual* system losses, so that the input power to the antenna is appropriate to achieve the authorized effective radiated power. With increased land values, it is becoming common to diplex two or more AM facilities onto the same set of towers. If there are several towers and if some of the frequencies are close to each other, system losses can quickly add up. We believe that there is merit in allowing a station to measure the operating impedance of its individual towers, measure the current at the base of each tower, and then calculate the actual input power to the array (and conversely the loss in the system). The input power at the common point would then be based on the measured loss so that the actual input to the towers was equal to the nominal power. Since this procedure requires additional effort, we suggest that a station be allowed to use either the existing percentages in the Rules or this alternate method. This would bring the AM service in line with the other broadcast services and prevent system losses in complex diplexed arrays from appearing to be a problem with radiation efficiency.

Conclusion

The proposals put forth by the Commission in this NPRM achieve a good balance between easing the burdens of AM directional stations while also protecting the integrity of the allocations system. With only minor exceptions stated above, we believe that the FCC Rule changes proposals should be adopted as proposed.

Respectfully submitted,

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