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

Federal Communications Commission  
Office of the Secretary

In Re: )  
 )  
ALTERNATIVE VHF and UHF ) RM-\_\_\_\_\_  
RADIOWAVE PROPAGATION MODELS ) Gen. Docket No. 91-\_\_\_\_\_  
 )  
To: The Commission )

PETITION FOR RULEMAKING

Communications Engineering Services, P.C. herewith petitions the Commission to institute a rulemaking proceeding to adopt rules or policies regarding alternative VHF and UHF radiowave propagation models. In support, the following is shown:

1. Communications Engineering Services, P.C. ("C.E.S.") is an engineering consulting firm, which represents clients before the F.C.C. C.E.S. has extensive experience in the area of radiowave propagation.

2. The Federal Communications Commission's Rules and Regulations require showings of signal coverage that are based on graphical procedures that the Rules set forth. The rules also permit the use of alternative coverage prediction methods. However, in the experience of C.E.S., the Rules provide little guidance with respect to how alternative predictions should be prepared or presented. This petition addresses the need for a standardized approach to radiowave propagation predictions, and C.E.S. suggests, in broad outline, some subjects that should be considered in the course of the rulemaking process.

3. The attached Engineering Statement prepared by C.E.S. sets forth the public interest basis for instituting a rulemaking proceeding.

WHEREFORE, Communications Engineering Services, P.C. requests the Commission to institute a rulemaking proceeding.

COMMUNICATIONS ENGINEERING  
SERVICES, P.C.

By: \_\_\_\_\_  
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Its Attorney

September 13, 1991

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95000 PETRM:155

Engineering Statement in Re:  
Request for Proposed Rule-Making Regarding the Use of  
Alternative VHF and UHF Radiowave Propagation Models

Overview

The Federal Communications Commission Rules and Regulations ("the FCC Rules") permit the use of alternative coverage prediction methods, in addition to required showings that must use procedures described in the Rules. However, little guidance is provided with respect to how alternative predictions should be prepared or presented. The instant Request for Proposed Rule Making addresses the urgent need for a standardized approach to alternative radiowave propagation predictions ("models") that are to be presented for FCC consideration, and suggests, in broad outline, some subjects that should be considered in the course of the rule-making process.

Urgency of Need for Action

The FCC has developed radiowave propagation models for use in the various VHF and UHF services, including FM and Television Broadcasting, and the various land-mobile services. The FCC models are intended for use primarily as spectrum administration tools, and are too general in nature to precisely predict every radio propagation situation that might arise.

However, demands upon the available electromagnetic spectrum are enormous and seem destined to increase in the future. It is inevitable that apparent failures of the FCC models to provide acceptable predictions will become more and more frequent as administrators attempt to respond to these increased demands. For example:

- The transition from NTSC television transmission standards to High Definition Television ("HDTV") will require the assignment of an additional "simulcast" channel to each of the more than one thousand authorized broadcast stations in the United States. By Commission mandate, the width of the simulcast channels will be six (6) MHz. Thus, there is the immediate need for more than six (6) GigaHertz of "new" spectrum space. The creation of so many new wide-band channel allotments will require significant increases in the density of assignments within the existent television band(s), which, in turn, raises the specter of unacceptable levels of interference in the terrestrial television broadcast industry.

- Recent changes to the Commercial FM Broadcast Rules allow for the operation of stations with distances to other stations that are less than the FCC's standard requirements. The orderly processing of requests for construction authorization of "short-spaced" facilities is being severely impeded by questions regarding the coverage and interference characteristics of these proposals.

• Planners and administrators in the mobile radio services are being faced with problems regarding coverage and interference control that have become nearly impossible to resolve, due largely to the lack of proven prediction procedures.

Each of these areas of concern will only become more urgent with time. There is a clear and immediate need for action on the part of the Commission.

#### Excerpts from FCC Rules

Section 73.313(e) of the Rules enables alternative propagation predictions in the non-reserved ("Commercial") FM broadcast service, as follows:

In cases where the terrain in one or more directions from the antenna site departs widely from the average elevation of the 3 to 16 kilometer sector, the prediction method may indicate contour distances that are different from what may be expected in practice. For example, a mountain ridge may indicate the practical limit of service although the prediction method may indicate otherwise. In such cases, the prediction method should be followed, but a supplemental showing may be made concerning the contour distances as determined by other means. Such supplemental showings should describe the procedure used and should include sample calculations. Maps of predicted coverage should include both the coverage as predicted by the regular method and as predicted by a supplemental method. When measurements of area are required, these should include the area obtained by the regular prediction method and the area obtained by the supplemental method. In directions where the terrain is such that antenna heights of less than 30 meters for the 3 to 16 kilometer sector are obtained, an assumed height of 30 meters must be used for the prediction of coverage. However, where the actual contour distances are critical factors, a supplemental showing of expected coverage must be included together with a description of the method used in predicting such coverage. In special cases, the FCC may require additional information as to terrain and coverage.

§73.684(f) makes identical provisions for the Television Broadcast service except for minor wording differences that have to do with the precision with which distances and antenna heights are commonly stated in the two services.

The Non-reserved (Noncommercial-Educational or "NCE") FM Broadcast service rules do not appear to permit alternative predictions under any circumstances.

The FCC Rules for the Cellular Radiotelephone service also permit alternative propagation studies. §22.903(c) of the FCC Rules states:

For the purpose of establishing the reliable service area of a station and performing interference studies, an applicant must use procedures consistent with §22.504 and FCC Report No. R-6406, "Technical Factors Affecting The Assignment of Facilities In The Public Mobile Service," by Roger B. Carey. Standards and procedures presently applied to stations in the 450-460 MHz band should be used. Any other interference studies using other procedures, which the applicant believes the Commission should consider, in addition to the above required study, may also be submitted and will be considered in accordance with Public Notice, May 2, 1980, Mimeo 30893, 45 FR 30202 (47 FR 2d 666 (1980)). Furthermore, in cases where the applicant believes that Report No. R-6406 does not accurately depict the realistic 39 dBu service contour(s) of the base station(s) proposed, the applicant may submit for Commission's consideration alternative propagation studies in addition to the above required studies. All supporting data and conclusions must be included with the results of the studies.

#### Need for Standardized Procedures

The Rules offer little guidance as to the circumstances under which an alternative radiowave propagation prediction method should (or may) be used and no requirements are set forth in the Rules regarding the performance characteristics of alternative propagation models.

Thus, there is an apparent need for either FCC Rules or Policies that:

- 1) Identify a "utility" prediction model that is either in the public domain or that can be placed in the public domain and which can be shown to provide more reliable predictions of signal strength than do the corresponding FCC procedures; and
- 2) Set forth a testing procedure for the identification of those particular circumstances that merit the use of an alternative radiowave propagation prediction model; and
- 3) Identify and make publicly available signal strength data, to be used in testing the performance of the "utility" model and candidate alternative prediction models; and
- 4) Outline a standard test procedure through which the performance of a candidate model can be demonstrated, based on its performance in predicting the signal strength values contained in

an appropriate set of measurement test data (see item 3, above);  
and

5) Define signal strength measurement procedures so that interested parties can provide additional data with which to further test the performance of models.

No Adverse Impact On Existing FCC Rules and Policies

Implementation of these suggestions would not involve the FCC's anointing the model as the "standard". The effect would be only to identify one or more universally available "utility" prediction model(s) that FCC agrees to accept as a basis of coverage and interference showings, in addition to the standard FCC model.

Suggestion Regarding "Utility" Alternative Prediction Model

A good candidate for the role of "utility" prediction model is the implementation of the ITS Rough Terrain Model ("the Longley-Rice Model"), published in "A Guide to the Use of the ITS Irregular Terrain Model in the Area Prediction Mode", NTIA Report 82-100, U.S. Department of Commerce, April 1982.

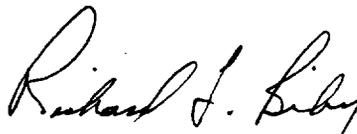
Procedures for extending the ITS Model to account for the effects of urban clutter and vegetation are discussed in "Radio Propagation in Urban Areas, OT Report 78-144", U.S. Department of Commerce, Office of Telecommunications, 1977).

Additional Remarks

It should be permissible to use an "improved" model, provided that an adequate demonstration is made that it works better with the standard set of test data (and pertinent additional test data) than does the "utility" model.

Any such "improved" models should be totally and fully revealed to the Commission, with the understanding that normal copyright law protection would hold.

All such presentations to the FCC should be accompanied by a Certification of the methodology used and the qualifications of the attester.



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