

Federal Communications Commission

FCC 99-14

Before the
Federal Communications Commission
Washington, D.C. 20554

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In the Matter of:)
)
Satellite Delivery of Network Signals)
to Unserved Households for)
Purposes of the Satellite Home)
Viewer Act)
)
Part 73 Definition and Measurement)
of Signals of Grade B Intensity)

CS Docket No. 98-201
RM No. 9335
RM No. 9345

REPORT AND ORDER

Adopted: February 1, 1999

Released: February 2, 1999

By the Commission: Chairman Kennard and Commissioner Ness issuing a joint statement; and
Commissioner Furchtgott-Roth dissenting in part and issuing a statement.

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I. INTRODUCTION

1. In this proceeding, we address an issue involving the television broadcast industry, the direct-to-home satellite industry, and consumers who subscribe to satellite carriers for their video programming. Over nine million households subscribe to satellite carriers, and roughly one third of these subscribers pay an additional subscription fee to receive broadcast network programming via satellite.¹ Broadcasters contend that many of these broadcast network subscribers, as well as many potential subscribers, are not eligible under the 1988 Satellite Home Viewer Act ("SHVA") to receive such programming using their home satellite service.

2. The broadcast television industry has the right, through the Copyright Act and private contracts, to control the distribution of the national and local programming that it transmits. In 1988, Congress adopted the SHVA as an amendment to the Copyright Act in order to protect the broadcasters' interests while simultaneously enabling satellite carriers to provide broadcast programming to those satellite subscribers who are unable to obtain broadcast network programming over-the-air.² Congress considered these subscribers to be "unserved" by their local stations.³ A Miami federal district court has recently acted to enforce this law by issuing two nationwide injunctions requiring the satellite carriers to terminate network service to as many as 1 million subscribers by February 28, 1999 and to more than 1 million additional subscribers by April 30, 1999.⁴ Many satellite subscribers have contacted the Commission to express concern over this imminent termination of service and have asked for the Commission's assistance to reduce the impact of the court's injunctions. The broadcast industry has urged the Commission not to take any action that will undermine the court's decision or harm broadcasters and, consequently, the viewers who rely on local broadcast stations. Two satellite carriers, the National Rural Telecommunications Cooperative ("NRTC") and EchoStar Communications Corporation ("EchoStar"), filed petitions for rulemaking with the Commission asking us to amend our rules to help those subscribers who face termination.⁵

3. In response, the Commission issued a *Notice of Proposed Rule Making* ("NPRM") on November 17, 1998, and announced that it expected to complete this rulemaking before the first wave of satellite subscribers have their network programming via satellite terminated at the end of February, 1999.⁶ As we stated in the *NPRM*, the Commission's statutory authority under the SHVA is limited so that, regardless of action by the Commission, most of the satellite subscribers affected by the injunction are

¹The other six million satellite subscribers obtain broadcast network programming via over-the-air antennas or via cable or do without broadcast network programming.

²17 U.S.C. § 119 (1998). The SHVA is part of a copyright law.

³To be considered "unserved," the SHVA also requires that the household not have subscribed to cable in the previous 90 days. *See, infra*, n. 12.

⁴*See* discussion of PrimeTime 24 lawsuits, *infra*.

⁵The NRTC petition was filed July 8, 1998 and placed on public notice on August 5, 1998. Federal Communications Commission Public Notice, Report No. 2290, RM 98-9335 (August 5, 1998). The EchoStar petition was filed August 18, 1998 and placed on public notice on August 26, 1998. Federal Communications Commission Public Notice, DA 98-1710, RM 98-9345 (August 26, 1998).

⁶*Satellite Delivery of Network Signals to Unserved Households for Purposes of the Satellite Home Viewer Act*, Notice of Proposed Rulemaking, CS Docket No. 98-201, FCC 98-302 (November 17, 1998). Commenters are listed in Appendix C. *See also* Federal Communications Commission News, Report No. 98-16 (November 17, 1998).

likely to have their satellite-delivered network programming discontinued. The court has determined that the vast majority of subscribers are not within the scope of Congress' copyright authorization because they are able to receive broadcast network programming over-the-air.

4. The Commission's role in this matter originates in a provision in the SHVA that links the definition of "unserved households" to a Commission definition of television signal strength known as "Grade B intensity." The critical question under the SHVA and in this rulemaking is whether a household is able to receive a television signal of this strength.

5. Our goal in this rulemaking is to identify more accurately, and consistent with the SHVA, those consumers who can and cannot receive their local broadcast network stations over-the-air. As noted above, we believe that our actions advance this goal, but cannot satisfy every consumer who wants to receive broadcast network stations via satellite. Congress has granted the Commission only limited authority to act in this area. We have also sought to promote competition among multichannel video programming distributors, to the extent possible under the SHVA, and we have considered the role that local broadcasters play in their communities. Increasing competition among MVPDs was not an express goal of Congress in enacting the SHVA however. Several members of Congress, however, have recently suggested that changes to the statute could help open markets and provide consumers with more choices.⁷ Through hundreds of e-mails, letters, and phone calls, consumers have expressed frustration at being unable to choose a satellite service that provides broadcast network stations, although it is unclear how many of these consumers do receive terrestrially delivered broadcast signals of Grade B intensity.

6. To give the satellite industry, broadcast industry, and consumers a uniform method for determining the signal strength a household actually receives, the Commission in this *Order* adopts a method for measuring Grade B signal strength at individual households. The measurement rule will become effective upon publication in the Federal Register.⁸ We expect that this rule will provide the

⁷A number of members of Congress have spoken of the importance of competition in relation to the SHVA, and specifically in relation to this rulemaking. Senator Leahy, chief Senate sponsor and floor manager of the SHVA in 1988, comments in this proceeding that competition is an important goal for the FCC. Leahy Comments at 1; see also Pegasus Reply at 6. The Senator's comments are consistent with statements he made during the floor debate over the 1994 amendments to the SHVA, in which he voiced his goal of increasing "accessibility for viewers," "development of alternative technologies", and creation of "competitive situations." *Id.* On July 8, 1998, Senator McCain, Chairman of the Senate Commerce Committee, and Representative Bliley, Chairman of the House Commerce Committee, wrote the Commission, indicating that the Miami injunction "threatens to undermine the progress the Congress has made in promoting competition." Letter to William E. Kennard from Senator John McCain and Representative Tom Bliley (July 8, 1998). On August 7, 1998, Representative Boucher and 22 other members of Congress stated in a letter to the Commission that the court's preliminary injunction "raises serious consumer and competitive issues that require immediate review and action by the Commission." Letter to William E. Kennard from Representative Rick Boucher, *et al.* (August 7, 1998). Representative Boucher repeated his concerns in a January 19, 1999 letter to Chairman Kennard, mentioning the "pro-consumer and pro-competition intent behind the SHVA." Letter to William E. Kennard from Representative Rick Boucher (January 19, 1999).

⁸The expedited effective date for this rule is warranted in light of the permanent injunction scheduled to take effect on February 28, 1999, which will affect 700,000-1,000,000 satellite subscribers. To the extent parties may seek the court's permission to use the new measurement methodology promulgated in this *Order*, as well as the prediction model endorsed by the Commission, we believe the expedited effective date will facilitate the court's review of such requests. The Commission has requested permission from the Office of Management and Budget for expedited clearance for the Paperwork Reduction Act.

uniformity and certainty needed to eliminate many of the controversies that currently surround compliance with the SHVA. We believe, consistent with what commenters on all sides of this issue have requested, that the measurement methodology is practical, reasonably accurate, and relatively inexpensive.

7. In this *Order* the Commission also endorses a computer model to predict whether a household is likely to be able to receive a signal of the required strength. Although the Commission does not have the authority to mandate use of this model in connection with the SHVA, we believe our recommendation will give the industries and consumers a means of determining eligibility for satellite-delivered network service that minimizes the need for on-site testing. The predictive model is familiar to the broadcast and satellite industries and is publicly available for use at this time. It should provide a degree of dependability and assurance that will alleviate some of the confusion and cost that has contributed to consumer dissatisfaction.

8. This *Order*, therefore, addresses three major issues. First, we consider whether we can and should change the definition of a signal of Grade B intensity. We decline to do so in this proceeding. Second, we consider and adopt a standardized method for measuring the strength of television signals at individual locations. Third, we consider endorsing a method for predicting the strength of television signals at individual locations that could be used in place of actually taking measurements. The prediction method that we endorse could be used to create an accurate evidentiary presumption of acceptable television service or lack of service. Importantly, the effect of this *Order* is not to increase the number of unserved households that already exist, nor to reduce the size of local stations' markets by subtracting viewers who are able to receive their signal. Rather, we have developed measurement and prediction tools that more accurately identify those households that are truly unserved within the meaning of the SHVA.

A. The Satellite Home Viewer Act

9. In the SHVA, Congress created a limited exception to the exclusive programming copyrights enjoyed by television networks and their affiliates because it recognized that some households were unable to receive network station signals directly over the air.⁹ The exception is a narrow compulsory copyright license that direct-to-home (DTH) satellite video carriers¹⁰ may use to provide certain television network stations¹¹ to subscribers who live in "unserved households."¹² The SHVA was

⁹H.R. Rep. No. 103-703, at 5 (1994); S. Rep. No. 103-407, at 5 n.2 (1994); H.R. Rep. No. 100-187(I), at 14-15, 18, 26, *reprinted in* 1988 U.S.C.C.A.N. 5638 (1988).

¹⁰ More specifically, the license is available to satellite carriers defined as follows:

The term "satellite carrier" means an entity that uses the facilities of a satellite or satellite service licensed by the Federal Communications Commission and operates in the Fixed-Satellite Service under part 25 of title 47 of the Code of Federal Regulations or the Direct Broadcast Satellite Service under part 100 of title 47 of the Code of Federal Regulations, to establish and operate a channel of communications for point-to-multipoint distribution of television station signals, and that owns or leases a capacity or service on a satellite in order to provide such point-to-multipoint distribution, except to the extent that such entity provides such distribution pursuant to tariff under the Communications Act of 1934, other than for private home viewing.

¹¹Under 17 U.S.C. § 119(d)(2), the term "network station" means:

(A) a television broadcast station, including any translator station or terrestrial satellite station that rebroadcasts all or substantially all of the programming broadcast by a network station, that is owned or operated by, or affiliated with, one or more of the television networks in the United

originally adopted in 1988 to cover satellite service via C-Band before "direct broadcast satellite" ("DBS") existed.¹³ Congress amended the SHVA in 1994 when DBS was just reaching the market. After DBS was introduced in mid-1994, it gained 6.5 million subscribers in the first 32 months.¹⁴ Currently, direct-to-home ("DTH") satellite services, which include C-Band, DBS, and medium power Ku-band services, have more than nine million subscribers.¹⁵ The success of the DBS industry benefits consumers by providing greater choice among multi-channel video programming distributors ("MVPD"). However, as the number of satellite subscribers has increased, so has the tension that is inherent in the SHVA regarding those who are eligible to receive network programming via satellite and those who are not.

10. The term "unserved household," as relevant here, is defined by SHVA as a household that:

119(d)(10)(A) cannot receive, through the use of a conventional outdoor rooftop receiving antenna, an over-the-air signal of grade B intensity (as defined by the Federal Communications Commission) of a primary network station affiliated with that network.¹⁶

As the law currently stands, satellite carriers may not generally deliver broadcast network signals to their subscribers via satellite. The SHVA is enforced through private actions filed with the federal court system. In such actions, the satellite carrier has the burden of proving "that its secondary transmission of a primary transmission by a network station is for private home viewing to an unserved household."¹⁷

States which offer an interconnected program service on a regular basis for 15 or more hours per week to at least 25 of its affiliated television licensees in 10 or more States; or

(B) a noncommercial educational broadcast station (as defined in section 397 of the Communications Act of 1934).

¹²The SHVA also contains a "superstation" compulsory copyright license with no geographic restrictions. 17 U.S.C. §§ 119(a)(1) and (d)(9).

¹³There were approximately two million C-Band units in use in 1988. See Commission's 1990 cable report to Congress, *Competition, Rate Deregulation and the Commission's Policies Relating to the Provision of Cable Television Service*, 5 FCC Rcd 5016, at ¶ 103, n. 148 (1990).

¹⁴SkyTRENDS Annual Report 1997-98 at 10.

¹⁵*Id.* at 16. See also discussion of DTH in *Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming, Fifth Annual Report*, ("Competition Report") FCC 98-335 (Released December 23, 1997) at ¶¶ 61-80; and SkyREPORT.Com or http://www.skyreport.com/dth_us.htm.

¹⁶17 U.S.C. § 119(d)(10)(A). A second requirement for a household to be regarded as "unserved," which is not directly relevant here, is that the household:

has not, within 90 days before the date on which that household subscribes, either initially or on renewal, to receive secondary transmissions by a satellite carrier of a network station affiliated with that network, subscribed to a cable system that provides the signal of a primary network station affiliated with that network. § 119(d)(10)(B).

¹⁷17 U.S.C. § 119(a)(5)(D).

11. The Satellite Home Viewer Act limits the compulsory copyright license to "unserved" households, reflecting Congress' intent to protect the role of local broadcasters in providing free, over-the-air television to American families.¹⁸ Localism has been a central principle of broadcast policy since the Radio Act of 1927. Broadcasters must serve their communities by providing programming (e.g., news, weather, and public affairs) to meet the needs and interests of those communities.¹⁹ Congress was concerned that without some copyright protection, the economic viability of those local stations affiliated with national networks might be jeopardized, thus undermining one source of local information.²⁰

12. The SHVA has two purposes: (1) to make broadcast network programming via satellite available to those households beyond the reach of a local affiliate, and (2) to protect the integrity of the copyrights that make possible the existing free, over-the-air national network/local affiliate broadcast distribution system.²¹ This *Order* addresses, within the boundaries of the Commission's authority, the conflicts that arise between these dual purposes.

B. Grade B Contours and Signal Intensity

13. The Grade B signal intensity standard, which is the key to the SHVA's definition of "unserved households" in Section 119(d)(10)(A), is a Commission-defined measure of the strength of a given television station's over-the-air signal.²² This standard was developed in the early days of television as a key component of the Commission's channel allotment protocol.²³ Generally, if a household receives a television signal of Grade B intensity, it should receive an acceptable television picture at least 90% of the time.²⁴ More specifically, Grade B represents a field strength that is strong enough, in the absence of man-made noise or interference from other stations, to provide a television picture that the median

¹⁸See H.R. Rep. 100-887(I) at 19-20; H.R. Rep. 100-887(II) at 26-28 (1988), reprinted in 1988 U.S.C.C.A.N. 5577.

¹⁹See Radio Act of 1927, § 9, Pub. L. No. 632, (current version at 47 U.S.C. § 307(b) (1997)).

²⁰For a comprehensive discussion of issues raised by the compulsory copyright licensing process in general and the Satellite Home Viewer Act in particular, see Report of the Register of Copyrights, "A Review of the Copyright Licensing Regimes Covering Retransmission of Broadcast Signals" (August 1, 1997).

²¹H.R. Rep. No. 100-887(II) at 20.

²²17 U.S.C. § 119(d)(10)(A); 47 C.F.R. § 76.683.

²³ See Television Broadcast Service, *Third Notice of Further Proposed Rule Making*, Appendix B, 16 FR 3072, 3080 (April 7, 1951) ("TV Allocations *Third Notice*"), adopted by Amendment of Section 3.606 of the Commission's Rules and Regulations, Amendment of the Commission's Rule, Regulations and Engineering Standards Concerning the Television Broadcast Service, Utilization of Frequencies in the Band 470 to 890 mcs for Television Broadcasting, *Sixth Report and Order*, 41 FCC 148, FCC 52-294 (1952) ("TV Allocations *Sixth Report and Order*").

²⁴See O'Connor, Robert A., "Understanding Television's Grade A and Grade B Service Contours," IEEE Transactions on Broadcasting at 139 (December 1968) ("O'Connor, *Understanding Television's Grade A and Grade B Service Contours*").

observer would classify as "acceptable" using a receiving installation (antenna, transmission line, and receiver) typical of outlying or near-fringe areas.²⁵

14. The Grade B values (which represent the required field strength in dB above one micro-volt per meter) are defined for each over-the-air television channel in Section 73.683 of the Commission's rules.²⁶

Channels 2-6	47 dBu
Channels 7-13	56 dBu
Channels 14-69	64 dBu

The Grade B values assume that the antenna used to receive the signal has a 6 db gain for channels 2-13 and an antenna with a 13 db gain for channels 14-83.²⁷ Section 73.684 contains the Commission's "traditional" methodology for predicting station service coverage, and Section 73.686 describes a procedure for making field strength measurements to determine the likelihood that a signal is available in an area or community. Section 73.622(e) describes different values for evaluating field strength in connection with digital television (DTV) service.

15. The Commission developed the Grade B standard in the 1950s and has used it in a variety of contexts, many of which were not envisioned at the time it was created.²⁸ The primary purpose for

²⁵The "median observer" is not the "average" observer; rather, it is the observer who provides the middle value of data when all values of data from all observers are ranked in order. In other words, 50% of the observers recorded values equal to or higher in value and 50% of the observers recorded values equal to or lower in value than the median observer. See TV Allocations *Third Notice*, 16 FR 3072, 3080 and TV Allocations *Sixth Report and Order*, 41 FCC 148. See also NAB Comments Attachment C, Jules Cohen Statement, at 2 and Network Affiliate Associations Comments at 3 and n. 110.

²⁶There are also Grade A and "city grade" field strength values, which represent stronger signals. Because they are stronger, Grade A contour and city grade service are generally found closer to a station's transmitter. See 47 C.F.R. §§ 73.683 and 73.685.

	<u>Grade A</u>	<u>City Grade</u>
Channels 2-6	68 dBu	74 dBu
Channels 7-13	71 dBu	77 dBu
Channels 14-69	74 dBu	80 dBu

²⁷See TV Allocations *Third Notice*, 16 FR at 3080, adopted by TV Allocations *Sixth Report and Order*. See also NAB Comments, Attachment C, Jules Cohen Statement at 2; Network Affiliate Assn Comments at 3 and n. 110.

²⁸For example, qualified local noncommercial educational television stations are defined for must carry purposes as those stations whose Grade B service contour encompasses the cable system's principal headend, as defined in Section 73.683(a), as in effect on March 29, 1990 or any successor regulations. 47 U.S.C. § 535(1)(2)(B). See also, 47 U.S.C. § 522(11) (defining Grade B contour in connection with cable regulations as computed in accordance with regulations promulgated by the Commission); 15 C.F.R. § 2301.4(b)(3)(ii) (in connection with National Telecommunications and Information Agency, or NTIA, broadcast applications, source of public telecommunications signal is distant when beyond the grade B contour of origination facility); 47 C.F.R. §§ 22.657(d)-(g) (in connection with distance separation requirements for public mobile operations to reduce interference with television stations at the grade B contour, which is defined for this purpose as a circle with a 55 mile radius, centered on the protected television station location and along which the median television field strength is 64 dBu).

creating the Grade B standard was to estimate the extent of a television station's coverage area.²⁹ Grade B service areas, or contours, are still used for this purpose and predict that the best 50% of locations along the outer edge of a contour should get an acceptable television picture at least 90% of the time.³⁰ The use of the Grade B construct for determining whether an individual household is unserved under the SHVA was not at issue when the standard was created, although it is the primary issue in this rulemaking and related lawsuits.

C. The PrimeTime 24 Lawsuits

16. The most far-reaching lawsuit between satellite carriers and broadcasters over the unserved households definition is in the United States District Court for the Southern District of Florida.³¹ In that litigation, *CBS, Inc. et al. v. PrimeTime 24 Joint Venture*, the plaintiff television networks (CBS and Fox) and several affiliates brought a copyright infringement action against PrimeTime 24, a satellite carrier, for retransmitting distant network programming to satellite dish owners in violation of the SHVA. The plaintiffs alleged that PrimeTime 24 distributed the signals of distant network-affiliated television broadcast stations by satellite to subscribers that were not "unserved households" within the meaning of the SHVA.

²⁹See *Television Broadcast Service, Notice of Further Proposed Rule Making*, Appendix A, 14 FR 4483, 4485 (1949); and *Third Notice of Further Proposed Rule Making*, Appendix A, 16 FR 3072, 3075 (1951).

³⁰The "time variability" planning factor used in the Grade B construct may create some confusion. This arises from the difference between receiving a signal of Grade B intensity (considered a television signal that produces an acceptable picture) and receiving adequate television service. Adequate television service has been defined as receiving an acceptable television picture 90% of the time. In some cases, for example, 50% of the locations along a Grade B contour are said to receive a signal of Grade B intensity at least 50% of the time. In other cases, 50% of the locations along a Grade B contour are said to receive an acceptable television picture 90% of the time. In fact, there is no real difference, which is explainable in two complementary ways. First, when a particular location receives a signal of Grade B intensity 50% of the time, it is, in fact, receiving a signal strong enough to provide an acceptable television picture 90% of the time. Put another way, a signal of Grade B intensity is stronger than what is required to provide an acceptable picture on an average television receiver. The apparent inconsistency arises from an adjustment the Commission adopted for the Grade B signal strength values when it originally established them. For example, on channels 2-6, a signal strength of 41 dBu is needed for an acceptable picture. In order for this signal strength to be available 90% of the time, the median or F(50,50) field strength is raised by 6 dBu and set at 47 dBu. Likewise, for channels 7-13, the median field strength is raised 4 dBu and set at 56 dBu, and for channels 14-69, the median field strength is raised 5 dBu and set at 64 dBu. See, e.g., O'Connor, "Understanding Television's Grade A and Grade B Service Contours," at 139, 141; TV & Cable Factbook, TV Stations Volume (1998 edition page A-15); TV Allocations *Sixth Report and Order*, 41 FCC at 177; see also TV Allocations *Third Notice* 16 Fed. Reg. 3072 at Appendices A and B.

³¹*CBS, Inc. et al. v. PrimeTime 24 Joint Venture*, Order Affirming in Part and Reversing in Part Magistrate Judge Johnson's Report and Recommendations, 9 F.Supp.2d 1333 (S.D. FL., May 13, 1998) ("*CBS v. PrimeTime 24*, Order"); *CBS, Inc. et al. v. PrimeTime 24 Joint Venture*, Supplemental Order Granting Plaintiffs' Motion for Preliminary Injunction, Case No. 96-3650-CIV (S.D. FL., July 10, 1998) ("*CBS v. PrimeTime 24*, Supplemental Order"); *CBS, Inc. et al. v. PrimeTime 24 Joint Venture*, Findings of Fact and Conclusions of Law, Case No. 96-3650-CIV-NESBITT (S.D. FL., December 23, 1998) ("*CBS v. PrimeTime 24*, Final Ruling"); *CBS, Inc. et al. v. PrimeTime 24 Joint Venture*, Final Judgment and Permanent Injunction, Case No. 96-3650-CIV-NESBITT (S.D. FL., December 30, 1998) ("*CBS v. PrimeTime 24*, Permanent Injunction").

17. Finding that PrimeTime 24 willfully violated the SHVA,³² the court issued a preliminary and, later, a permanent injunction ordering PrimeTime 24 not to deliver CBS or Fox television network programming to any customer that does not live in an unserved household. The court concluded that "the great majority" of PrimeTime 24's subscribers are capable of receiving at least a signal of Grade B intensity using a conventional outdoor rooftop antenna.³³ According to the court, PrimeTime 24 has "simply ignored" the objective Grade B signal standard in signing up "unserved" customers and had failed to meet its statutory burden of proving that its subscribers were eligible for network service via satellite.³⁴

18. The court outlined methods for predicting and measuring signal intensity for identifying unserved households and required PrimeTime 24 to use them.³⁵ Specifically, PrimeTime 24 was enjoined from providing CBS or Fox network programming

to any customer within an area shown on Longley-Rice propagation maps, created using Longley-Rice Version 1.2.2 in the manner specified by the Federal Communications Commission ("FCC") in OET Bulletin No. 69, as receiving a signal of at least grade B intensity of a CBS or Fox primary network station, without first either (i) obtaining the written consent of the affected station(s) ... or (ii) providing the affected station(s) with copies of signal intensity tests showing that the household cannot receive an over-the-air signal of grade B intensity as defined by the FCC from any station of the relevant network.³⁶

The court ruled that the signal intensity test requires at least 15 days advance notice to each affected station and outlined a specific procedure that the tester must follow at each household within a station's area, as predicted by the Longley-Rice map.³⁷ The court also imposed the SHVA's "loser pays" regime on the testing procedure, whereby the loser to a challenge of a subscriber's eligibility pays the costs of the test.³⁸

19. The preliminary injunction is scheduled to take effect on February 28, 1999, and the permanent injunction is scheduled for April 30, 1999. The preliminary injunction could result in the termination of network signals to the estimated 700,000 to one million subscribers nationwide who

³²*CBS v. PrimeTime 24*, Final Ruling at 34, 37.

³³*Id.* at 28.

³⁴*Id.* at 13-14, 19.

³⁵*Id.* at 48-50.

³⁶*CBS v. PrimeTime 24*, Permanent Injunction at 2. *See also CBS v. PrimeTime 24*, Preliminary Injunction at 2-3.

³⁷*CBS v. PrimeTime 24*, Permanent Injunction at 3-4. The test should be "conducted in accordance with the procedures outlined in the Expert Report of Jules Cohen and the Supplemental Expert Report of Jules Cohen."

³⁸*CBS v. PrimeTime 24*, Permanent Injunction at 4.

subscribed to PrimeTime 24 after the networks filed their lawsuit on March 11, 1997.³⁹ The permanent injunction, which applies to the PrimeTime 24 customers who subscribed before March 11, 1997, could affect an additional 1.5 million subscribers nationwide.⁴⁰ The total number of PrimeTime 24 subscribers affected could therefore reach 2.2 - 2.5 million.

20. In a similar lawsuit, a Raleigh, North Carolina, federal district court ruled against PrimeTime 24 and in favor of a local ABC affiliate.⁴¹ The court issued a permanent injunction on August 19, 1998 that applies to all subscribers living within the affiliate's predicted Grade B contour of the affiliate's transmitting tower.⁴² The court found that the SHVA defines unserved households and Grade B using objective standards, and stated,

PrimeTime's screening procedures have systematically substituted a subjective inquiry into the quality of the picture on a potential subscriber's television set for any signal strength showing. PrimeTime has ignored or turned a blind eye to the necessity of objective signal strength testing and thus willfully or repeatedly provides network programming to subscribers under SHVA.⁴³

The court found a "pattern and practice of willful or repeated copyright infringement" and therefore enjoined transmission within the "locality or region" as is provided for in the enforcement provisions of the statute. PrimeTime 24 has provided network services to as many as 35,000 households in the ABC affiliate's Raleigh/Durham market.⁴⁴ At the time of the court's decision, PrimeTime 24 continued to serve more than 9,000 subscribers within the affiliate's Grade B contour.⁴⁵

21. Several other lawsuits have been filed by both broadcasters and satellite carriers. In Amarillo, Texas, an NBC affiliate has sued PrimeTime 24 in federal district court in a case that still awaits judgment.⁴⁶ In Denver, Colorado, EchoStar has filed suit against CBS, Fox, NBC, and ABC on

³⁹Letter from William E. Kennard, Chairman, Federal Communications Commission, to Senator John McCain and Representative Tom Bliley, September 4, 1998 (figures based on publicly available information).

⁴⁰*Id.* As noted, the court chose the preliminary injunction's March 11, 1997 date because that is when CBS and Fox filed their lawsuit against PrimeTime 24.

⁴¹*ABC, Inc. v. PrimeTime 24, Joint Venture*, 17 F.Supp.2d 467 (M.D. N.C., July 16, 1998) ("*ABC v. PrimeTime 24*, Court Opinion").

⁴²*ABC, Inc. v. PrimeTime 24, Joint Venture*, 17 F.Supp.2d 478, 490 (M.D. N.C., Aug. 19, 1998) ("*ABC v. PrimeTime 24*, Permanent Injunction").

⁴³1998 WL 544297, *2.

⁴⁴*ABC v. PrimeTime 24*, Permanent Injunction, 1998 WL 544297, *2; *ABC v. PrimeTime 24*, Court Opinion, 1998 WL 544286, *9.

⁴⁵1998 WL 544297, *2, *6; 1998 WL 544286, *9.

⁴⁶*Kannan Communications, Inc. v. Primetime 24 Joint Venture*, No. 2-96-CV-086 (N.D. Tex.).

October 19, 1998 in federal district court.⁴⁷ EchoStar has asked the court to find that the Commission has never endorsed a particular model for predicting or measuring Grade B intensity for the purposes of the SHVA. Echostar wants the court to declare that a viewer's own opinion of the quality of his or her signal is adequate for determining whether that home is unserved under the SHVA, and asks the court to endorse a predictive model for identifying served households such that 95% of households receive a Grade B signal 95% of the time with a 50% degree of confidence.⁴⁸ The networks followed EchoStar's action by countersuing in Miami.⁴⁹ No decisions have been issued in either EchoStar case.

D. The NRTC and EchoStar Petitions

22. In its petition for rulemaking, the NRTC, a distributor of DirecTV DBS service, has asked the Commission to adopt, exclusively for purposes of interpreting the SHVA, a new definition of "unserved" that includes all households located outside a Grade B contour encompassing a geographic area in which 100 percent of the population receives over-the-air coverage by network affiliates 100 percent of the time using readily available, affordable receiving equipment. EchoStar, which is a provider of DBS service, urges the Commission in its petition to adopt a prediction model to locate unserved households. EchoStar endorses a model that predicts an area where 99 percent of households receive a Grade B signal 99 percent of the time with a 99 percent confidence level. EchoStar also urges adoption of a methodology for measuring signal strength that more closely reflects the signal that a viewer's television set actually receives. It argues that a number of flaws exist in the current measurement and prediction processes when they are used for purposes of the SHVA. After receiving comment on these Petitions, the Commission issued the NPRM in this proceeding.

II. ANALYSIS

23. The SHVA's concern with adequate television signal intensity at individual households, rather than across broad areas, is central to this rulemaking.⁵⁰ This important distinction leads us to consider measurement and prediction methodologies that have a different purpose from the methodologies for determining Grade B service areas.⁵¹ The definition of an unserved household as "a household that

⁴⁷*Echostar Communications Corp. et al. v. CBS, Inc., et al.*, Civil Action No. 98-B-2285 (D. Colo. filed October, 1998).

⁴⁸*Id.* EchoStar's 95 / 95 / 50 court request contrasts with the request in its petition before the Commission, in which it asks for a 99 / 99 / 99 model.

⁴⁹*CBS Broadcasting, Inc., et al. v. Echostar Communications Corp., et al.*, Case No. 98-2651-CIV-Middlebrooks (S.D. Fla. filed November, 1998).

⁵⁰See H.R. Rep. 100-887(I), at 1 ("The purpose of the proposed legislation is to create an interim statutory license in the Copyright Act for satellite carriers to retransmit television broadcast signals of superstations and network stations to earth station owners for private home viewing"); 17 U.S.C. § 119(d)(1) (definition of distributor refers to secondary transmission of network signals to "individual subscribers"); § 119(d)(8) (definition of subscriber refers to an "individual" who receives satellite service); H.R. Rep. 100-887(I), at 5-6 (1998), *reprinted in* 1988 U.S.C.C.A.N. 5577 (before the 1988 SHVA, "[v]ery little attention was paid to copyright issues posed by satellite transmissions directly to individuals for private home viewing . . . it is appropriate for Congress to intercede and delineate this Nation's intellectual property laws").

⁵¹See 47 C.F.R. §§ 73.683, 73.684, and 73.686.

cannot receive ... a signal of Grade B intensity" most logically refers to television signal reception at an individual household and reflects a concern for individual viewers that is not at issue in most applications of the Grade B standard. Moreover, when Congress created the limited compulsory license, it clearly intended to help individual consumers who are unable to receive an acceptable, over-the-air television picture.⁵² In a report accompanying the 1994 reauthorization of the SHVA, the House stated that "households that cannot receive over-the-air broadcasts or cable can be supplied with television programming via home satellite dishes."⁵³ The Senate, in its 1994 report, stated that the restriction on satellite delivery of network signals refers to "subscribers [who] are unable to receive the signal of a particular network."⁵⁴ And when originally adopted in 1988, the House stated, "The distribution of network signals is restricted to unserved households; that is, those that are unable to receive an adequate over-the-air signal."⁵⁵

A. The Commission's Role and Responsibility Under the SHVA

24. The *NPRM* raised issues regarding the scope of the Commission's authority to conduct this rulemaking and involve itself in matters related to the SHVA. The comments reflect a wide range of opinion regarding our authority to act.

25. Commenters representing broadcasters, network affiliates, and state or national television associations argue that SHVA is a copyright statute, not a telecommunications statute and that, as a result, the Commission has no authority to either administer or enforce it.⁵⁶ Moreover, they assert, Congress did not delegate to the Commission any authority to rewrite SHVA.⁵⁷ Some commenters argue that Congress intended "unserved household" to be defined using the Commission's Grade B standard that existed at the time SHVA was adopted in 1988, and that if Congress had intended or wished to create a larger geographical "white area"⁵⁸ for satellite providers it could have done so at its own discretion.⁵⁹ In any event, many of these commenters point out that the "white area" problem has diminished due to an

⁵²The Copyright Office describes the intent of the House Subcommittee on Courts, Civil Liberties and the Administration of Justice in drafting the SHVA as "defining an 'unserved household' as one that received a signal at the household (not street) antenna location that was so weak that, assuming receiving equipment of decent quality and maintenance, the household would not receive an acceptable picture most, if not all, of the time." U.S. Copyright Office Reply at 5.

⁵³H.R. Rep. No. 103-703, at 5 (1994). Representative Boucher, in a January 19, 1999 letter to Chairman Kennard, stated that Congress intended to help "the millions of people across the United States who want to receive network programming but because of terrain and other obstacles cannot receive that programming from local stations."

⁵⁴S. Rep. No. 103-407, at 5 n.2 (1994).

⁵⁵H.R. Rep. No. 100-187(I) at 14-15, 18, 26, *reprinted in* 1988 U.S.C.C.A.N. 5638 (1988).

⁵⁶NAB Comments at 10-11; Network Affiliate Comments at 2; Hearst-Argyle Comments at 3.

⁵⁷Waterman Broadcasting Comments at 6; Media Venture Comments at 3.

⁵⁸The term "white area" is generally used to indicate areas that cannot receive adequate signal strength.

⁵⁹Network Affiliate Comments at 6; Walt Disney Co. Comments at 16.

increase in television stations and improvement in transmitters, receivers, and antennas.⁶⁰ Some of these commenters also assert that using the SHVA to nurture competition would be irreconcilable with the fundamental purpose of the Copyright Act, whose intent is to preserve local broadcast services, and any attempt by the Commission to circumvent the legislation would encroach on Congress' prerogatives.⁶¹

26. The majority of broadcasting commenters disagree with the satellite carriers' characterization of the underlying disputes as a "crisis."⁶² The conflict over who is unserved is self-inflicted, they argue, because satellite carriers have been exceeding the limits of their compulsory licenses since the SHVA became law in 1988.⁶³ They state that the Commission should not use this proceeding as a means to rescue satellite carriers from the consequences of their illegal activities.⁶⁴ They contend that the core of satellite network subscribers are not in rural areas, as the Congress envisioned in 1988, but includes households located in more populous areas.⁶⁵ Several commenters assert that the number of households watching distant network stations via satellite bears no relation to the number of households that truly cannot receive their local affiliates over-the-air.⁶⁶ Indeed, they argue that most of their challenges to allegedly served subscribers have proven, through actual signal tests, that the subscribers were receiving signals of Grade B intensity.⁶⁷ The NAB asserts that the majority of dish owners who are served but still sign up for network service do so because they want to watch the same programming at different times (time-shifting), obtain sports or other programs not broadcast by their local stations, or avoid placing an antenna on their roofs.⁶⁸

27. In contrast, commenters representing satellite carriers state that the Commission has broad authority to address issues surrounding the SHVA and specific authority to address the definition, measurement, and prediction of signals of Grade B intensity. Most satellite commenters strongly urge the Commission to define "signals of Grade B intensity" expressly for SHVA purposes.⁶⁹ They argue that agencies have broad discretion to make policy either through rulemaking or adjudication, and if the Commission can redefine Grade B intensity in general, it certainly has the authority to create a new definition in a SHVA-specific rulemaking.⁷⁰ They maintain that nothing in the statute or the pertinent

⁶⁰Network Affiliate Comments at 11; MSTV Comments at 22.

⁶¹NAB Comments at 63; MSTV Comments at 5; Entravision Comments at 10; CBS Corp. Comments at 5.

⁶²A.H.Belo Comments at 8; NBC Comments at 8.

⁶³NAB Comments at 56-61; Network Affiliates Comments at 12.

⁶⁴MSTV Comments at 4; NBC Comments at 2.

⁶⁵Network Affiliates Comments at 10; NBC Comments at 8.

⁶⁶KKCO-TV Comments at 5; Network Affiliates at 10.

⁶⁷See, e.g., KEYC-TV Comments at 3; WWNY-TV Comments at 3; KKCO-TV Comments at 5.

⁶⁸NAB Comments at 3.

⁶⁹PrimeTime 24 Comments at 7; Superstar/Netlink Comments at 13; SBCA Comments at 5.

⁷⁰Echostar Comments at 4; SBCA Comments at 5.

legislative history contradicts this conclusion. The commenters also argue that Congress did not "freeze" the definition of Grade B signal intensity when it adopted the SHVA in 1988.⁷¹ Commenters assert that the SHVA does not incorporate the language of any rule into the statute and refers to Grade B "as defined by the Federal Communications Commission," so the law clearly grants the Commission the authority to define and redefine a signal of Grade B intensity.⁷² Indeed, several satellite commenters point out that the Commission has never defined an "over-the-air signal of Grade B intensity" as received "through the use of a conventional outdoor rooftop receiving antenna" and it should adopt such a definition now.⁷³ They contend that Congress, in Section 119(d)(1) of the SHVA, recognized and deferred to the Commission's expertise in this area and that it clearly intended the "unserved household" restriction to fall under the Commission's expertise. In addition, satellite carriers state that Congress has utilized the Commission's Grade B prediction and measurement standards in the past, so the Commission's authority to define Grade B signal intensity must naturally include the ancillary authority to adopt methods for predicting and measuring signal intensity.⁷⁴ Although the parties agree that a prediction methodology should not preclude a party from conducting actual tests, they assert that requiring an individual measurement at each household is unworkable due to the high cost and time commitment involved.⁷⁵

28. Questions concerning the Commission's role and responsibility with respect to this matter arise on two levels. Several commenters assert the Commission should elaborate on the objectives of the SHVA or change its administration to help satellite carriers become more competitive with cable television systems. These commenters argue that home satellite companies provide the strongest challenge to entrenched cable monopolies, but are hindered by their inability to deliver network signals via satellite to consumers who want them. While increased competition among service providers is an important and longstanding goal of the Commission, we cannot make it a primary goal of this proceeding. The SHVA is a copyright law designed to balance owners' and users' rights. It is not a communications law with an express purpose of increasing competition among MVPDs. The SHVA is primarily administered by the Copyright Office and enforced by the federal courts, and contains the basic Congressional decisions regarding how and to whom satellite distributed network broadcast signals are made available.⁷⁶ We may not change the policy behind the law, nor may we go beyond two terms Congress used in defining "unserved households." First, Congress explicitly incorporated the Grade B standard into the definition, so only Congress may consider the use of another measure. Second, the law demands that a consumer

⁷¹SBCA Comments at 5; Pegasus Communications Comments at 9; DirecTV Comments at 7.

⁷²DirecTV Comments at 8; PrimeTime 24 Comments at 7; Pegasus Communications Comments at 10.

⁷³Pegasus Communications Comments at 5; PrimeTime 24 Comments at 6.

⁷⁴Superstar/Netlink Comments at 14; SBCA Comments at 6.

⁷⁵SBCA Comments at 9; Primestar Partners Comments at 6.

⁷⁶Senator Leahy states that no subscriber to distant network signals via satellite should be disconnected "if the customer is unable to receive local TV broadcasts over-the-air." Leahy Comments at 1. The Copyright Office describes the intent of the House in drafting the SHVA as "defining an 'unserved household' as one that received a signal at the household (not street) antenna location that was so weak that, assuming receiving equipment of decent quality and maintenance, the household would not receive an acceptable picture most, if not all, of the time." U.S.Copyright Office Reply at 5."

be unable to receive a television signal "using a conventional outdoor rooftop antenna" before qualifying as unserved. We may not change that requirement, nor may consumers ignore it.⁷⁷

29. In addition, there are questions about the Commission's specific authority to interpret and amend the Grade B standard, whether for all purposes or only for the SHVA. We continue to believe, as the *NPRM* preliminarily concluded, that we have the authority to change the definition of a signal of Grade B intensity as a general matter.⁷⁸ Broadcasters concur with our general authority to make changes for non-SHVA purposes, but argue that such a change would have no effect on the interpretation of the SHVA because the definition of Grade B is frozen in time by the language and intent of the SHVA.⁷⁹ Satellite carriers and other commenters disagree.⁸⁰ The U.S. Copyright Office, for example, reviewed the legislative history and found nothing to support the conclusion that Congress intended to freeze particular values for Grade B signal intensity in the SHVA.⁸¹

30. We conclude that Congress did not freeze the Grade B rules in place when it enacted the SHVA. Congress gave the Commission a continuing role when it defined "unserved households" as those that cannot receive "an over-the-air signal of Grade B intensity (as defined by the Commission)."⁸² When it incorporated Grade B into the definition of "unserved households," Congress did not incorporate specific values, such as the dBu levels the Commission uses in Section 73.683. Moreover, nothing in the SHVA itself or its legislative history indicates that Congress intended to freeze the value of Grade B when it passed the law in 1988 or when it renewed it in 1994. When Congress has chosen to freeze Commission regulations for other purposes, it has explicitly done so. For example, Congress expressly referenced rules "in effect on April 15, 1976" when it froze in place regulations relating to copyright compulsory licensing. No such reference exists here. Case law also supports the proposition that the meaning of "signal of Grade B intensity" was not frozen when the SHVA was enacted.⁸³ For example, the Supreme Court has held that "[i]t is of course not true that whenever Congress enacts legislation using a word that has a given administrative interpretation it means to freeze that interpretation in place."⁸⁴ The Supreme Court reasoned that if legislation so constrained an agency's ability to conduct rulemaking under its enabling

⁷⁷Commenters in this proceeding have offered contradictory views on the meaning of "conventional outdoor rooftop antenna." Congress did not define this term in the SHVA. See Copyright Office Reply at 8-9; *CBS v. PrimeTime 24*, Permanent Injunction, slip op. at 16-17 (complying with the SHVA requires a rooftop antenna, properly oriented and in good working order).

⁷⁸*NPRM* at ¶ 22.

⁷⁹See NAB Comments at 27-33.

⁸⁰See, e.g., DirecTV Comments at 7; SBCA Comments at 5; and Echostar Reply at 2 (Had Congress intended a term frozen in time it would have picked a dBu number from the then-Commission's rules and frozen it by inclusion in the statutory text.). See also Electronics Technicians Association, International, Inc. (ETAI) Comments at 10 and U.S. Copyright Office Reply at 2-5.

⁸¹U.S. Copyright Office Reply at 5.

⁸²17 U.S.C. § 119(d)(10)(A) (emphasis added).

⁸³See *Lukhard v. Reed*, 481 U.S. 368 (1989); and *Helvering v. Wilshire*, 308 U.S. 90 (1939).

⁸⁴*Lukhard v. Reed*, 481 U.S. at 379.

legislation, then "the result would be to read into the grant of express administrative powers an implied condition that they were not to be exercised unless, in effect, the Congress had consented. We do not believe that such impairment of the administrative process is consistent with the statutory scheme which the Congress has designed."⁸⁵

31. Although we conclude that the Commission has the authority to modify Grade B intensity values for all purposes, we believe that it is significant that Congress tied the SHVA compulsory license to the Commission's Grade B standard, which was and is used for a multiplicity of purposes. We think Congress' use of the widely used Grade B standard in SHVA indicates that we should not adopt a separate Grade B intensity standard for purposes of SHVA alone. Moreover, additional considerations also lead us to conclude that it would be inadvisable to adopt a separate Grade B standard for SHVA purposes. As discussed below, a second set of signal strength values, also called "Grade B signal intensity," is likely to create confusion for the broadcast industry and others affected by Commission regulations.⁸⁶

B. Defining a Signal of Grade B Intensity

32. The SHVA uses an objective standard to determine whether a household is "unserved" and thus permitted to receive network signal via satellite. SHVA's criterion is whether the household can receive "through the use of a conventional outdoor rooftop receiving antenna, an over-the-air signal [of a particular network station] of grade B intensity (as defined by the Federal Communications Commission)." By incorporating the objective Grade B signal intensity standard into the SHVA, Congress declined to account for viewers' individual subjective opinions about the quality of their television reception, as well as the adequacy of the household's existing antenna.⁸⁷ Use of the Grade B signal intensity standard in the SHVA both invites and limits the Commission's involvement with this statute. The reference to Grade B signal intensity "as defined by the Federal Communications Commission" brings the Commission's rules and our interpretations of our rules into play. But, by using Grade B signal intensity to define unserved, the SHVA also limits what the Commission can do to address any drawbacks to this standard. The Grade B signal intensity values were used in the SHVA as an available objective benchmark for determining whether a household is "served." While those values may have proven difficult to apply in practice as the sole standard for determining whether a household is unserved, this is the standard in the statute and must be employed here when distinguishing served and unserved households.

33. The Commission's rules define values for Grade B signal intensity in connection with authorizing television stations and the stations' service areas or "contours."⁸⁸ It was not, however, created for evaluating picture quality in individual households. Rather, the system was developed to address the very different and difficult problem of creating station service areas and to determine the proper allocation of television channels in the early days of television. The Commission created two "grades of service."⁸⁹

⁸⁵*Helvering v. Wilshire*, 308 U.S. at 101.

⁸⁶See discussion, *infra* at ¶ 43.

⁸⁷See *Miami Decision*, slip op. at 31 ("strictly objective standard").

⁸⁸47 C.F.R. § 73.683(a).

⁸⁹*Television Broadcast Service, Third Notice of Further Proposed Rule Making ("Third FNPRM")*, 16 FR 3072, 3075 (1951), adopted by *Television Broadcast Service, Sixth Report and Order*, 41 FCC 148 (1952).

The specifications for "Grade A" and "Grade B" service were established so that "a quality acceptable to the median observer is expected to be available for at least 90 percent of the time at the best 70 percent of receiver locations at the outer limits of [Grade A] service. In the case of Grade B service the figures are 90 percent of the time and 50 percent of the locations."⁹⁰ The service areas were established to effectuate the Commission's stated twofold purpose "to provide television service, as far as possible, to all people of the United States and to provide a fair, efficient and equitable distribution of television broadcast stations to the several states and communities."⁹¹ The signal intensity values (also referred to as "field strengths") were determined based on certain assumptions, which differ for the Grade A service area, which is urban and suburban, and the Grade B service area, which is rural. For example, the type of receiving antenna assumed for Grade A service is smaller than the receiving antenna assumed for Grade B, and the terrain assumed for Grade A differs from that assumed for B.⁹²

34. The "acceptable quality" contemplated in these early Commission Orders was based on quality levels developed by the Television Allocation Study Organization ("TASO").⁹³ TASO used data from actual viewers. These viewers were shown television pictures and were asked to rate them on a scale from 1 (excellent) to 6 (unusable). Level 3, on which the Grade B service level was based, was defined as "(Passable) - The picture is of acceptable quality. Interference is not objectionable."⁹⁴ Based on the results of viewer ratings, a specific signal (or carrier) to noise ratio at the television receiver was found to be associated with the grade 3 level -- that is, a level of signal that the median observer identified as acceptable. In association with this level of acceptable quality, and with the primary goal of creating service areas with minimal interference and maximum coverage, the Commission developed assumptions, generally described as planning factors, regarding the environment in which viewing would take place. Assumptions were made as to the quality of the television receiver used focusing on the amount of electrical noise created in the tuner, the signal losses that take place in the wire connection from the receiver to the antenna, the nature (gain, directionality, and height) of the antenna to be used, and the amount of electrical noise in the environment that the signal would have to overcome to be viewable. Because radio signal propagation varies over time, certain statistical assumptions were built into the definitions used, including the assumption that the signal in question would be of acceptable quality to the median observer at least 90 percent of the time.⁹⁵

⁹⁰*Third FNPRM*, 16 FR at 3075.

⁹¹*Id.*

⁹²*Id.* at 3080. The receiving antenna assumed in the planning factors for Grade A is a simple dipole, while for Grade B it is a directional antenna with 6 dB gain for low and high VHF and 13 dB gain for UHF.

⁹³See *Engineering Aspects of Television Allocation, Report of the Television Allocations Study Organization*, March 16, 1959; and O'Connor, Robert A., "Understanding Television's Grade A and Grade B Service Contours," *IEEE Transactions on Broadcasting*, 139 (December 1968). See also *PrimeTime 24 Comments, Hassinger Declaration and attachments and Miami Decision*, slip op. at 15 ("there is a strong correlation between signal intensity and picture quality when multiple, neutral observers evaluate picture quality using properly functioning rooftop antennas").

⁹⁴See O'Connor, *supra*.

⁹⁵*Id.*

35. Satellite industry and consumer comments⁹⁶ argue in this proceeding that the Grade B signal intensity levels as currently defined are inappropriate to use to determine eligibility for broadcast network service via satellite because they do not ensure a good television picture. They ask the Commission to change the Grade B signal intensity values to reflect what they contend are changed circumstances. The satellite industry asserts that technology, environmental noise, and consumer expectations have changed since Grade B signal strength was first defined and contend that these changed expectations justify upward adjustments to the Grade B values. PrimeTime 24 states that Grade B was based on television pictures received on black-and-white televisions and the Commission should revise the definition of Grade B signal intensity to adjust for "today's modern world of VCRs, large screen color televisions, and heavy television watching."⁹⁷

36. While satellite industry commenters are in agreement that the Grade B signal values should be increased, they disagree on the precise values that should be used.⁹⁸ For example, PrimeTime 24's engineering consultant asserts that the planning factor for the C/N (carrier to noise) ratio should be increased from 30 dB to 43 dB based on the Commission's 1992 cable television standards. He also adds a new planning factor to address ambient (environmental) noise and decreases the assumed antenna gain for UHF signals from 13 dB to 9 dB. These revisions produce Grade B values of 67 dBu (low VHF), 72 dBu (high VHF), and 81 dBu (UHF).⁹⁹ PrimeTime 24's Hassinger also describes a different set of revised values for Grade B based on an "empirical approach," which produces a mix of higher and lower values.¹⁰⁰ Hassinger acknowledges that his proposed values do not deal with the problem of "multipathing" (i.e., ghosting or multiple images due to signal reflection) and acknowledges that the stronger signal intensity he proposes "may make the effect of multipathing more pronounced."¹⁰¹ PrimeTime 24 concedes that these increased values would approximate or exceed current Grade A contour values, but contends the FCC is not constrained by the existing Grade A values since the Grade B values proposed would be for purposes of the SHVA only.

37. The Satellite Broadcasting Communications Association (SBCA) argues for values of 70.75 dBu (low VHF), 76.5 dBu (high VHF), and 92.75 dBu (UHF) to better reflect "today's more complex signal propagation environment."¹⁰² SBCA's Consulting Engineers propose changes to certain

⁹⁶See, e.g., Superstar/Netlink Group Comments at 18; PrimeStar Partners at 5; PrimeTime 24 Comments at 10; J.E. Schmidt Comments at 1; Michael W. LaBoone Comments at 1; Elizabeth Hooks Comments at 1; Penny R. Ball Comments at 1; Robert J. Mazzeo M.D. Comments at 1; Larry & Gina Wilson Comments at 1; John Tamosaitis Comments at 1; and Dale Miller Comments at 1.

⁹⁷PrimeTime 24 Comments at 10-13.

⁹⁸Compare PrimeTime 24 Comments at 10-13 with SBCA Comments at 13.

⁹⁹PrimeTime 24 Comments, Hassinger Declaration at 9-11.

¹⁰⁰*Id.* at 12-15.

¹⁰¹*Id.* at 16. In ghosting, also known as multipathing, as the signal strength increases, the "noise" in the picture is reduced. Unfortunately, noise (e.g., electrical noise in the tuner or environment) masks ghosting. Thus, as the noise is reduced, which is a benefit to picture quality in the absence of multipath problems, the ghosting disturbance becomes more noticeable.

¹⁰²SBCA Comments at 13.

of the planning factors that are the basis for the Grade B values to increase the receiver noise figure, the required signal to noise ratio, the receiver antenna gain, and line loss.¹⁰³

38. Satellite industry commenters also contend that the improvements in receivers since the 1950s do not adequately offset other factors that have made picture quality decline.¹⁰⁴ PrimeTime 24 asserts that the appropriate standard for DTV allotments or Grade B contours is irrelevant and that what matters is the appropriate signal strength to assure "that an individual household receives an acceptable quality picture."¹⁰⁵

39. Broadcast industry commenters argue that even if the Commission had authority to revise the definition of Grade B as it is used in the SHVA, the Grade B values should be lowered rather than raised. They assert that television receivers and antennas have improved since the 1950s and now give viewers better picture quality at the Grade B signal level than they had when Grade B was adopted.¹⁰⁶ The broadcast industry also asserts that the definition of Grade B has been repeatedly reevaluated over the past 40 years and reaffirmed on each occasion.¹⁰⁷ NAB's consulting engineer, Jules Cohen states that over the forty years since the Grade B values were established, viewers may have become more sophisticated and their definition of an "acceptable" picture may have changed. He contends, however, that improvements in receivers have improved the C/N ratio at the same signal strength.¹⁰⁸ He also notes the conclusion of the Advisory Committee on an Advanced Television Service in 1994 that Grade B as defined in 47 C.F.R. § 73.683 is still the logical signal strength level for acceptable picture quality.¹⁰⁹ Broadcasters also state that increasing the Grade B values will seriously undermine the viability of local

¹⁰³SBCA Comments Engineering Statement at 5 and Appendix 2.

¹⁰⁴PrimeTime 24 Reply at 12, n. 9. *See also* SBCA Comments at 13; NRTC Comments at 18 (To ask viewers used to high quality distant network satellite service to return to analog, over-the-air local pictures deemed "acceptable" pursuant to some 1950s standard is completely inappropriate as well as counterproductive to the development of a vibrant, competitive MVPD market).

¹⁰⁵PrimeTime 24 Reply at 13.

¹⁰⁶*See, e.g.*, Fox Broadcasting Co. Comments at 4-5; Network Affiliate Associations Comments at 42.

¹⁰⁷*See, e.g.*, Network Affiliate Associations Reply at 7 and n. 13 citing *Television and FM Field Strength Curves, Report and Order*, FCC 75-636, 34 Rad.Reg. 2d (P&F) 361 (1975) (Every time the Commission or staff consider revising the Grade B values, they conclude no revision is warranted, and in 1975, the proposal was to lower -- not raise -- Grade B field strength values because equipment refinements justified a reduction in estimated receiver noise, an increase in antenna gain, and reduction for transmission line loss.); Association for Maximum Service Television Comments at 6, 17-20 (The FCC has reexamined the premises and technical rationale for the Grade B standard over the years and on every occasion has determined that the standard should be retained. The long history and careful evaluation and reevaluation of the Grade B standard must not be jettisoned through an expedited rulemaking.); NAB Comments at 35; and Affiliates Association Comments at 27. *See also* Staff Report, *Comparability For UHF Television: A Preliminary Analysis*, 180-83 (Sept. 1979) and Final Staff Report, *Comparability for UHF Television*, 246 (Sept. 1980) and NAB Reply at 9.

¹⁰⁸Jules Cohen Engineering Statement on Behalf of Maximum Service Television, Inc. Comments ("Cohen MSTV Statement") at ¶ 8. *Contra*, PrimeTime 24 Reply at 12.

¹⁰⁹Cohen MSTV Statement, *supra*, at ¶ 9.

television stations by reducing the size of their markets, which will decrease advertising revenue.¹¹⁰ Decreased advertising revenue threatens their survival, which, they contend, threatens localism. Echostar responds that none of the broadcasters have quantified their alleged loss of advertising revenue.¹¹¹

40. *Discussion.* The comments submitted by the satellite industry and consumers urge vigorously that for many people the existing Grade B signal intensity values do not equate to truly acceptable picture quality. The first attack on the existing standards has to do with the possibility that viewers' expectations as to signal quality have increased over time. If this were the case a stronger signal would be needed to produce a picture that would now be regarded as acceptable. Although there is some speculation in the comments that viewer expectations have indeed changed, no current study documents this or replicates the initial TASO study that correlated viewer judgments of television picture quality with specific signal levels.¹¹² In response to contentions that the current values for Grade B signal intensity are erroneous because they were based on viewer evaluations of monochrome images, we note that the planning factors established in April 1952 (Doc. 8736) were revisited in 1959 by TASO, which was established in response to a Commission request to study the technical principles which should be applied in television channel allocations. TASO studied these issues for two years, used 21 inch monochrome and color television sets, and essentially confirmed the same carrier to noise ratio as was established earlier.¹¹³ Research on subjective evaluations of television pictures may show that viewers have raised their level of expected performance, but the results of any subjective testing is dependent on the testing methodology and conditions. Many of these recent tests were conducted by cable television sponsors using viewers who may have expected to pay for these better pictures.¹¹⁴

41. In addition to suggesting that viewer expectations are different, it is also argued that radio frequency noise in outlying areas has increased so that rural areas are today more akin to urban areas of the 1950's, that the typical household now has multiple television receivers necessitating antenna lead splitters that increase line loss, and that antenna gain figures (particularly in the UHF frequencies) should be re-evaluated.¹¹⁵ We believe that the technology of receivers and antennas has kept pace with changing

¹¹⁰See, e.g., MSTV Comments at 5, 15, 24; Entravision Holdings LLC Comments at 2, 9; The Post Company (KIFI-TV) at 7; Withers Broadcasting Companies Comments at 4; ABC, CBS, NBC & Fox Joint Comments at 78.

¹¹¹Echostar Reply at 12.

¹¹²PrimeTime 24's consulting engineer, William Hassinger, points to two viewer studies, one by Neil Smith in 1971 and another conducted in Charlotte in 1996. See PrimeTime 24 Comments, Declaration of William Hassinger, Neil Smith Study, and *ex parte* presentation of January 14, 1999. Neither study was conducted in accordance with the accepted standard for viewer studies, ITU Recommendation 500-4, "Method for the Subjective Assessment of the Quality of Television Pictures." Neil Smith acknowledged that his sample was too small to be sufficient for any generalizations. Neil Smith Study at 18-19. The Charlotte study did not use study subjects from the general public and viewing conditions were not appropriate for a scientific study.

¹¹³See Engineering Aspects of Television Allocation, March 16, 1959, *supra*.

¹¹⁴Recommendation 500-4, "Methods for Subjective Assessment of Picture Quality of Television Pictures," Recommendations and Reports of the CCIR, Vol. XI, Part 1, Dubrovnik, 1986 and Subjective Assessment of Cable Impairments on television Picture Quality, Bronwen Lindsay Jones, 1992 NCTA Technical Papers.

¹¹⁵See PrimeTime 24 Comments, Declaration of William Hassinger at 9-11; and SBCA Comments, Engineering Statement of Hatfield & Dawson at 3.

consumer expectations and with increased noise.¹¹⁶ Thus, it is necessary to consider the totality of changes that have taken place over the past fifty years. In the 1950s low cost electronic technology at television frequencies was hard to find. Therefore, the planning factors had to be set low enough to ensure that television sets could be affordable by the public. The noise figure used in the planning factors serves as a good example. The noise figure is a measure of the amount of electronic noise produced by the components in the television. This must be added to the signal budget just like man-made noise and must be overcome to produce a passable picture. In the 1950s, the television tuner technology consisted of low cost noisy tubes and attached components. Today, this technology has progressed to modern solid state components that produce lower set noise. Thus, although many developments have taken place since the standards were first adopted, it is not clear that increases in the values involved are warranted.

42. We conclude that the record in this proceeding provides an inadequate basis for changing the Grade B signal intensity values either generally or for purposes of the SHVA specifically. First, the evidence in the record suggests that some of the environmental and technical changes that have taken place trend in opposite directions and tend to cancel each other out. The Commission has examined the adequacy of the Grade B standard on several occasions since it was adopted in the 1950s, and in each case has decided not to make changes. In 1975, the Commission considered revisions to the Grade B contour, including a study of actual viewers' ratings.¹¹⁷ That study concluded that there was some evidence supporting minor changes in the Grade B values, but endorsed the Commission's existing standards as providing "a realistic picture of station coverage."¹¹⁸ The Commission concluded in that proceeding to revise the contour for UHF channels and to adopt a "terrain roughness factor," but declined to make other revisions because there was "no urgent need, from an engineering standpoint, to redefine the Grade B contour."¹¹⁹ In that *Order*, the Commission emphasized the dislocation that would be imposed on broadcasters by changing the Grade B contour.¹²⁰ Again, in 1980, Commission staff noted progress in obtaining good UHF weak signal performance under the existing rules and recommended against reducing the standards for maximum UHF noise figure.¹²¹ More recently, in the DTV Allotment proceeding, the Commission reconfirmed the usefulness of the Grade B values for the purpose for which they were originally created: defining service areas.¹²² The record in this rulemaking does not warrant a change from this recent decision.

¹¹⁶See, e.g., *Comparability for UHF Television: Final Staff Report* (1980), at 228 (UHF noise figure significantly reduced and further improved by Commission requirements).

¹¹⁷*Amendment of Sections 73.333 and 73.699, Field Strength Curves for FM and TV Broadcast Stations; Amendment of Part 73 of the Rules Regarding Field Strength Measurements for FM and TV Broadcast Stations* ("1975 Field Strength Order"), 53 FCC 2d 855 (1975).

¹¹⁸*Id.* and PrimeTime 24 Comments, Hassinger Declaration, Neil M. Smith Study at 23.

¹¹⁹53 FCC 2d. at ¶ 49. But note that even these changes were stayed and never made effective. 47 C.F.R. § 73.684(k) and (l) "are stayed indefinitely." 42 FR 25736 (1977).

¹²⁰1975 *Field Strength Order*, 53 FCC 2d at ¶¶ 21 and 49.

¹²¹*UHF Comparability* at 228.

¹²²See *DTV Sixth Report and Order*, 12 FCC Rcd 14588, 14607 and 14676; and 47 C.F.R. § 73.622(e) (DTV service areas; field strength evaluated using Longley-Rice point-to-point propagation model) and § 73.622(f)(1) (reference to Grade B contour, as defined in § 73.683, for corresponding analog TV station coverage).

43. Second, we do not believe that we have the authority to create a special Grade B solely for the purpose of the SHVA, nor do we believe this is an advisable approach to take. Establishing another set of values, also called Grade B, is likely to create confusion for the broadcast industry. It would risk harm to the network/affiliate relationship by creating an implication that another, different Grade B definition might be more suitable for other situations that are not contemplated in this proceeding. In addition, raising the values for Grade B such that they would equal or exceed the Grade A values may require reevaluation of the Grade A values, as well.¹²³ The significant and widespread ramifications of changing these definitions demand that we have a more complete and conclusive record, and more time to evaluate the record, than we have in this rulemaking.¹²⁴

44. Finally, some commenters raise concerns regarding the ability of the existing standard to address interference and other signal impairments. Although we are not changing the Grade B values, it is important to note that as a matter of general policy we agree that the Grade B standard incorporated by Congress into the SHVA implicitly includes within the definition a signal that is, in fact, viewable and not one so impaired by interference as to be degraded below the "acceptable to the median" observer level. While such problems can be identified by qualified engineering personnel through actual observations, this is not a matter, as satellite commenters in this proceeding acknowledge,¹²⁵ that can be resolved by simply adjusting the dBu levels involved. No readily usable mechanism for addressing this matter through changed definitions has been identified in the comments.

C. Measuring Television Signal Intensity at Individual Locations

45. For the SHVA to function more effectively, a relatively low cost, accurate, and reproducible methodology for measuring the presence of a Grade B intensity signal at an individual household is especially important. Individual testing is the key mechanism under the SHVA for proving that a specific household is unserved and, therefore, eligible to receive satellite delivery of network affiliated television stations.¹²⁶ The Commission already has a method for measuring signal intensity for describing a station's service area or for propagation analysis, but it has not yet devised a method for

¹²³It is possible that environmental and technology changes, as well as altered viewer expectations, warrant change in the Grade B values to keep pace with the standard of acceptability established in the 1950s but do not require change to Grade A values where, perhaps, environmental changes are not so great. Nevertheless, when Grade A and Grade B are used for their original purpose of creating contours, the Grade B contour must not meet or overlap the Grade A contour. Thus, we agree with commenters who say our ability to change the Grade B values is naturally constrained by the Grade A values.

¹²⁴See, e.g., NAB Comments at 26 ("massive ripple effects throughout the Commission's entire regulatory scheme.").

¹²⁵See, e.g., PrimeTime 24 Supplemental Comments, Declaration of William Hassinger, at 2 and 16 (desirable to include interference and other picture impairment factors in the Grade B standard but case-by-case analysis is the only substantive way to address this).

¹²⁶See *CBS v. PrimeTime 24*, Final Ruling at 48-49 ("the ultimate test for eligibility of any particular household is through an actual signal intensity test").

measuring signal intensity at a discrete location, such as an individual household.¹²⁷ We believe that the method we identify herein balances accuracy, affordability, and simplicity.

46. Many commenters have explicitly asked us to adopt a measurement methodology.¹²⁸ Satellite carriers contend that requiring an individual measurement at each household in every case is unworkable due to the high cost and time commitment. Some satellite commenters contend that the FCC's current method of conducting field strength measurements is inappropriate for SHVA purposes because many homes do not have 30-foot antennas, individual antennas are generally not oriented towards the station's broadcast tower because many do not have rotors, it does not take into account the number of splitters used in a household for multiple television sets, and the use of the 100-foot mobile run is flawed. Primetime 24 maintains that any measurements must be made as close to the house as possible, should define how signal strength variability is taken into account and, if the homeowner is cooperative, specify that the home's antenna be used for the test to obtain the most realistic result.¹²⁹ PrimeStar points to the simplified measurement techniques set forth in the Hatfield & Dawson Engineering Statement.¹³⁰

47. Broadcasting commenters assert that only an actual site test can settle the legal eligibility of an individual household. The majority of them agree that any prescribed testing methodology must be consistent with the Act, that measurements should be taken using standardized equipment, that the receiving antenna should be oriented toward the signal being received, and that splitters, which deliver a signal from one antenna to more than one television set, should not be considered during measurements. The major network affiliates suggest that the Commission adopt the measurement methodology used in an agreement they brokered with PrimeStar Partners, Netlink USA, and Telluride Cablevision ("PrimeStar/Netlink Agreement").¹³¹

48. *Inadequacy of the Current Grade B Measurement Methodology.* The Commission's current signal measurement method, requiring a so-called 100-foot mobile run, is inadequate for the purposes of the SHVA. The method typically involves a truck with a 30-foot antenna that takes

¹²⁷47 C.F.R. § 73.686(b) ("Collection of field strength data for propagation analysis"); §73.686(c) ("Collection of field strength data to determine television service in specific communities"). Propagation analysis generally involves determination of the strength of a signal over specified paths or areas. Propagation models may incorporate the effects of terrain elevations along the path and other inherent physical characteristics of the environment.

¹²⁸See, e.g., Pegasus Comments at 11-12; U.S. Copyright Office Reply at 2, 5-7; PrimeTime 24 Comments at 5; NAB Comments at 43; SBCA Comments at 9-10; EchoStar Comments at 10; Network Affiliates Comments at 65; DirecTV Comments at 27; NRTC Comments at 15-16, 20; SNG Comments at 20; SBCA Reply at 22; and NAB Reply at 36.

¹²⁹PrimeTime 24 Comments at 28.

¹³⁰PrimeStar Partners Comments at 9.

¹³¹Network Affiliate Associations Comment at 73 and Reply, Exhibit B, *Settlement and Compliance Agreement Between ABC, Inc., CBS Broadcasting, Inc., Fox Broadcasting Company, National Broadcasting Company, and Certain ABC, CBS, Fox, and NBC Network Stations; the National Association of Broadcasters; the ABC Television Affiliates Association, the CBS Television Network Affiliates Association, the Fox Television Affiliates Association, and the NBC Television Affiliates Association AND Primestar Partners, L.P., Netlink USA, and Telluride Cablevision, Inc., Schedule 7.*

continuous measurements as it travels a distance of 100 feet.¹³² Under Commission rules, the antenna must be rotated to the best receiving position, and engineers must record factors that might affect signal intensity, such as topography, height and type of vegetation, buildings, obstacles, and weather conditions. If overhead obstacles prevent a 100-foot run, a cluster of five measurements may be taken at locations within 200 feet of each other. Testing can cost several hundred dollars each time it is performed -- an expensive proposition for a satellite company or a consumer who wants to prove that a household is unserved by over-the-air signals.¹³³ When multiplied over hundreds of households in a station's service area, the cost may become prohibitive and may preclude many truly unserved consumers from receiving broadcast network service. Mitigating the costs of the procedure, without sacrificing the integrity of the testing results, is an important goal of the new signal measurement methodology.

49. In addition to the difficulties inherent in the existing measurement test, many of its assumptions do not hold in individual Grade B situations. The purpose of the procedure currently specified in the rules is not to determine the receivability of a signal at a single spot, but to determine, through measurements at a series of grid intersections over a community, the nature of service to the community.¹³⁴ Thus, the current procedure has limited use in measuring signal intensity at individual locations. For example, many homes do not have antennas 30 feet above the ground, especially if they are one-story homes. The definition of unserved household only describes reception over a conventional outdoor rooftop receiving antenna,¹³⁵ so requiring measurements on a 30-foot antenna may not reflect what

¹³²47 C.F.R. § 73.686(b)(2).

¹³³See, e.g., *EchoStar Communications Corp., et al. v. CBS Broadcasting, Inc., et al.*, Plaintiff's Original Complaint and Request for Declaratory Judgment, Civil Action No. 98-B-2285 (D. Colo.) (October 19, 1998) (testing averages \$150 per household).

¹³⁴The Miami court ruled that the signal strength test should be "conducted in accordance with the procedures outlined in the Declaration of Jules Cohen, filed on March 11, 1997." Mr. Cohen states in his Declaration that the procedure "was based on that prescribed by the FCC in 47 C.F.R. § 73.686." Declaration of Jules Cohen in *CBS, et al., v. PrimeTime 24 Joint Venture*, CIV-Nesbitt No. 96-3650 at 8 (executed on March 8, 1998). Mr. Cohen describes the measuring procedure in the following terms. At an accessible road closest to a household, a 100-foot mobile run is made with a conventional rooftop antenna elevated to 30 feet. During the run, a station's field intensity is recorded and the data is stored in a computer. Analysis of the data, made with the aid of a computer program, permits the extraction of the maximum, minimum, and median field intensity found, together with the standard deviation. Median field intensity minus standard deviation is a measure of the least signal intensity likely to be found at the specific location of the household.

In contrast, EchoStar has proposed a signal strength test, in a lawsuit filed in October 1998, that focuses more directly on a single point at a household. *EchoStar Communications Corp., et al. v. CBS Broadcasting, Inc., et al.*, Plaintiff's Original Complaint and Request for Declaratory Judgment, Civil Action No. 98-B-2285 (D. Colo.) (October 19, 1998). Its procedure involves placement of a conventional outdoor rooftop antenna within three feet of the home and raised to the height of the roof. The antenna is oriented to maximize signal strength for the one local station that the consumer watches most often. A length of standard household cable is attached to the antenna, and a number of splitters are attached to duplicate the number of splitters the consumer uses to service multiple televisions. A signal measurement is then conducted. If the signal strength is not stable, the antenna is relocated and the same procedure utilized until a stable signal strength is achieved. Readings are taken approximately every thirty seconds for a period of five minutes. If any of the signal strength readings register less than the Grade B signal strength threshold as established by Congress and the FCC, the consumer will be deemed an "unserved household" eligible to receive distant network signals.

¹³⁵17 U.S.C. § 119(d)(10)(A).

is "conventional" at all locations around the country. Finally, requiring tests and a 100-foot mobile run ignores the fact that homes are stationary and that reception may vary considerably over a mobile run on a nearby street.

50. *Measurement Methodology for Individual Locations.* Because the SHVA is concerned with adequate television signals at individual households, it is entirely proper that the Commission, as the originator of the Grade B standard, develop an objective way to measure whether or not that standard exists at a particular location. In short, the methodology requires a tester to make at least five measurements in a cluster as close as possible to the location being tested. The median value of the measurements will be the signal intensity at the location. In deciding on which measurement methodology to adopt, we examined the following factors, discussed in detail below -- the type of testing antenna and equipment, where and how many measurements should be taken, the effect of time and weather on signal strength, the height the testing antenna should be raised, the orientation of the testing antenna, and what information should be recorded.¹³⁶

51. Regarding the preparation for measurements, we considered the kind of testing antenna that should be used and conclude that a tuned half-wave dipole is the best choice.¹³⁷ It is widely available, inexpensive, and simple to use. In situations where definite readings are required, it has advantages over gain antennas¹³⁸ that are difficult to characterize (calibrate) over a wide range of frequencies. Although dipole antennas are susceptible to interference from signals other than the one being measured, the cluster measurements that we require will mitigate those effects.

52. We considered where the signal measurements should be taken -- on the roof, in the yard, as close as possible to the house, in the driveway, or at the nearest public road. We conclude that the measurements should be taken in a cluster as close as possible to a reasonable and likely spot for the receiving antenna.¹³⁹ In doing so, we do not require testers to climb up to the roof or trespass on property where they are denied permission to enter. Although we recognize, as the satellite carriers argue, that measurements taken at the television receiver would most accurately reflect the picture that a consumer watches, such an approach would be inconsistent with the intent of the SHVA, which requires the use of

¹³⁶The measurement rule itself is found in Appendix B.

¹³⁷A dipole is a wire or telescoping metallic antenna consisting of two straight collinear conductors of equal length separated by a small gap where the transmission line is attached. The "rabbit ears" on a television set are a type of dipole. A "half-wave" dipole has an overall electrical length equal to half the wavelength of the frequency of interest. For example, the wavelength of a radio signal at 300 MHz is one meter. A half-wave dipole for receiving a 300 MHz signal, therefore, would have an overall length of one-half meter (approximately 20 inches). However, the physical length of an actual half-wave dipole is approximately 5% shorter due to the thickness of the conductor or the end effect of a wire antenna.

¹³⁸A "gain antenna" is an antenna that provides a stronger signal (if it is a "positive" gain antenna) to the receiver than the reference antenna. The "reference" antenna is usually either a dipole or an isotropic radiator. There are "negative" gain antennas, but they are not generally used for television reception. An isotropic radiator (antenna) is a hypothetical antenna that radiates equally well in all directions - up, down, left, right. It has no directional characteristics and has no practical application other than as a reference antenna.

¹³⁹This conclusion is consistent with the settlement agreement reached in the Primestar/Netlink Agreement, which requires five measurements taken in a cluster in the home's driveway or otherwise close to the home. Primestar/Netlink Settlement Agreement, Schedule 7, item (d) at 1. See also NAB Comments at 44-45.

an *outdoor rooftop* antenna. Measurements at the television receiver are inappropriate for determining the ambient signal intensity available at a household's roof.

53. We considered how many measurements are necessary and conclude that at least five measurements must be taken, each at a pre-determined spot. Multiple readings are necessary because a single reading may give misleading results. Reflections from surrounding objects could cause a reading to be either a higher or lower than normal. Multiple readings will tend to mitigate these effects. The spots must be chosen before measurements are taken to prevent gaming of the results. They must be a minimum distance of three meters from each other, an appropriate spacing to enable reasonably accurate results. To help ensure the objectivity of the tests, we suggest that, if possible, the first testing point should be chosen as the center point of an imaginary square whose corners are the four other spots. The tester shall calculate and report the median of the measurements (in units of dBu) as the measurement results. For purposes of the SHVA, this median measurement will determine whether a household is unserved. If signals of more than one transmitter (*e.g.*, more than one television station) are being tested, the tester shall use the same spots for all the measurements.

54. Regarding measurement procedure, we believe that a one-time measurement is sufficient to determine the signal intensity at individual locations. Satellite carriers and broadcasters appear to agree with this conclusion.¹⁴⁰ We recognize that several measurements over time may determine even more accurately the actual signal intensity at individual locations, but we have sought to create a testing methodology that is both accurate, practical, and relatively inexpensive.

55. We require the tester to measure the field strength of the visual carrier with a calibrated instrument with a bandwidth of at least 450 kHz, but no greater than one megahertz. The tester must perform an on-site calibration of the instrument in accordance with the manufacturer's specifications. The instrument must accurately indicate the peak amplitude of the synchronizing signal. The tester must use a shielded transmission line between the testing antenna and the field strength meter. The tester must match the antenna impedance to the transmission line, and, if using an unbalanced line, employ a suitable balun. Finally, the tester must account for the transmission line loss for each frequency being measured.

56. We considered the effect that time and weather have on signal strength. Generally, neither time nor steady-state conditions of weather have an appreciable effect on broadcast television frequencies. However, in inclement weather or when major weather fronts are moving through the measurement area, some noticeable consequence may result. The tester should not take measurements at such times.

57. We considered the effect that signal interference has on the strength of the primary signal being measured.¹⁴¹ We have not found an easily reproducible, practical or cost-effective objective process

¹⁴⁰See, *e.g.*, Network Affiliate Associations Comments, Appendix 1 at 14; SBCA Comments at 21; and NAB Comments at 44-45.

¹⁴¹There are three significant types of signal interference -- co-channel, adjacent channel, and UHF taboo. Co-channel (same channel number but assigned to a different market) and adjacent channel (channel numbers that are adjacent in the spectrum, which are also assigned to different markets) stations are generally assigned well outside of a station's Grade B contour. However, UHF-taboo related stations (adjacent in the UHF part of the spectrum) are in many cases located inside a station's Grade B contour.

for measuring interference that impairs reception.¹⁴² Adding expense and complication to the testing methodology would be inconsistent with our goal of creating a practical and economical measurement method. While we recognize that interference can make signals unviewable at a given location, and thus ideally issues of this nature should be reviewed as part of the standard measurement process, the only current way to include these factors is for all interested parties to undertake a common subjective evaluation at the test site and make a common judgment on the issue. In the absence of a common subjective judgment, it remains necessary to rely on the standard process that does not take this factor into account. Because common testing cannot be required and because it would add expense to the testing procedure, we believe it would be highly desirable for the parties to develop procedures to address these concerns through waivers or impartial testing personnel. This is especially desirable in those situations where interference is predicted or expected to exist.¹⁴³ In such situations, it is not illogical to give some precedence to the prediction involved since interference can be reliably predicted and should be confirmable by on-site observation, even if not recordable using the standard test procedure. Moreover, where local broadcasters are aware of interference, we expect they will be willing to acknowledge its effects. We believe that the intent of the SHVA will be better realized if parties consider interference when classifying households as served or unserved, and we encourage the engineering community to focus on this issue to improve objective measurement techniques.

58. We considered the height of a "conventional outdoor rooftop antenna" so that the tester would know how high to raise the testing antenna. Commenters offered several options, including five feet above the roof,¹⁴⁴ 30 feet for all circumstances, and a combination of 20 feet for a one-story house and 30-feet for two story houses.¹⁴⁵ There is evidence that signal intensity varies at different heights above the ground, so the height of the testing antenna could affect whether a household is deemed unserved.¹⁴⁶ Because the SHVA relates to actual ambient signal intensity at individual households, we believe that the height of the individual home is significant and, therefore, relevant when dictating the height of the testing antenna. In the interest of simplicity and consistency, we do not require the tester to raise the antenna to 5 feet above the height of the roof, which would result in measurements taken at an endless variety of heights and would increase dramatically the complexity of the testing and predictive models. We also decline to require that the measurement be taken at 30 feet in all circumstances, primarily because many American homes are one-story households that do not, and would not, erect a 30-foot antenna. We conclude that the tester should raise the testing antenna 20 feet (6.1 meters) above the ground for one-story buildings and 30 feet (9.1 meters) above the ground for buildings taller than one-story. This accounts for most households in the country, while maintaining an easy-to-administer standard. For example, testers will not be required to measure the height of each individual household and they will

¹⁴²Interference from other television stations may have no effect on measured signal strength even though it affects the picture quality.

¹⁴³Because all sides acknowledge that interference affects picture quality and because the Longley-Rice prediction model recommended below is capable of considering interference in its predictions, we include interference in the version of Longley-Rice that we endorse in this proceeding. See ¶ 84 *infra*.

¹⁴⁴See, e.g., PrimeTime 24 Comments at 17.

¹⁴⁵See, e.g., Network Affiliates Association Reply at 69-72.

¹⁴⁶See, e.g., PrimeTime 24 Comments, Declaration of Richard Biby at 2; DirecTV Comments at 27; SBCA Comments at 20.

not have to raise an unwieldy testing antenna that is higher than 30 feet.¹⁴⁷ The 20 foot / 30 foot rule is also consistent with at least one agreement between the broadcasters and satellite carriers regarding measuring methodology.¹⁴⁸ We recognize that many households are part of multiple dwelling units (MDUs) that present special problems.¹⁴⁹ We believe that where households have access to a master antenna on the MDU's roof, the test should be made there, if possible.¹⁵⁰ If the MDU has no master antenna, then the test should be made at the household (outside if possible, on a balcony or patio) where the consumer might place a conventional antenna.¹⁵¹ In some instances, particularly in MDUs taller than three stories, the signal strength may be adequate inside the unit, as with "rabbit ears" on the television itself. If the signal intensity is stronger inside the unit, in these cases, the measurement should be taken inside, near the television and using the prescribed testing antenna. We note that MDU residents may require specialized attention due to the differences inherent in large or tall multi-unit buildings. The rulemaking record is largely directed to issues affecting individual homes and does not contain sufficient detail on the MDU issue to address every circumstance here.

59. We considered how the testing antenna should be oriented. The maximum gain of the testing antenna (over an isotropic antenna) should face the strongest signal coming from the transmitter whose signal is being tested. If more than one station's signal is being measured, the testing antenna should be oriented separately for each station. This orientation is consistent with good engineering practice, with the technique required by the Commission's signal measurement rules,¹⁵² and with the PrimeStar/Netlink Agreement on determining eligible households.¹⁵³ It is also consistent with the Copyright Act, which defines an unserved household in relation to an individual television station rather than to all network affiliates in a market. Section 119(d)(10) defines unserved household "with respect to a particular television network" and states that such a household must be unable to receive the signal of "a primary network affiliate station affiliated with that network." Based on this distinction, we believe that signal testers should focus on individual stations. Because one of the primary purposes of this *Order*

¹⁴⁷Requiring that the testing antenna be elevated to greater than 30 feet would increase the complexity and expense associated with the test. Requiring that the tester climb on the roof of a single family home or townhouse creates potential liability problems. Therefore, the test methodology does not include these requirements.

¹⁴⁸PrimeStar/Netlink Agreement at Schedule 7, p. 1; *see* NAB Comments at 45.

¹⁴⁹The Copyright Office has specifically urged the Commission to adopt a standard for measurement to account for these circumstances. U.S. Copyright Office Reply at 8. The technique we adopt is consistent with that suggested by the NAB. NAB Comments, Exhibit C, Engineering Statement of Jules Cohen at 13.

¹⁵⁰There is support in the record for measuring in the vicinity of the master antenna, if there is one, or on the balcony or patio where the dish is located. *See* NAB Comments, Exhibit C, Engineering Statement of Jules Cohen at 13.

¹⁵¹The right of consumers to erect an antenna or other over-the-air reception device in areas under his or her exclusive use is protected pursuant to Section 207 of the Telecommunications Act of 1996. *See Over-the-Air Reception Devices Rule*, 47 C.F.R. § 1.4000.

¹⁵²47 C.F.R. § 73.686.

¹⁵³*See* NAB Comments at 45 and Network Affiliate Associations Reply, Exhibit B, PrimeStar/Netlink Agreement at Schedule 7.

is to provide a practical and reliable measurement methodology, we include in the testing procedure the proper orientation, which is essential to ensure the validity and integrity of the signal intensity test.

60. Finally, we considered how to ensure the integrity of the signal tests simply and with as little burden as possible. The tester shall make and maintain a written record of the measurements that includes several items -- (i) a list of calibrated equipment used in the field strength survey, which for each instrument, specifies the manufacturer, type, serial number and rated accuracy, and the date of the most recent calibration by the manufacturer or by a laboratory; (ii) a detailed description of the calibration of the measuring equipment, including field strength meters, measuring antenna, and connecting cable; (iii) for each spot at the measuring site, all factors which may affect the recorded field, such as topography, height and types of vegetation, buildings, obstacles, weather, and other local features; (iv) a description of where the cluster measurements were made; (v) time and date of the measurements and signature of the person making the measurements; (vi) for each channel being measured, a list of the measured value of field strength (in units of dBu and after adjustment for line loss and antenna factor) of the five readings made during the cluster measurement process, with the median value highlighted. We note that slight, unintentional departures from these written procedures will not invalidate a test if there is no basis to believe they affected the outcome.

D. Predicting Television Signal Intensity at Individual Locations

61. Although the SHVA appears to require actual signal measurements when determining whether households are unserved, broadcasters and satellite carriers often use a predictive model to avoid the costs and difficulties associated with such on-site measurements. However, they do not always agree on which model is most appropriate. Even when parties use the same model, they often disagree on the factors that are considered in that model. For example, different predictive models may or may not account for the effects on signal strength of receiving antenna height, vegetation, ground clutter, buildings, signal interference, or multipathing. Additionally, predictive models may account differently for variability in signal strength over time and location, and may predict signal strength with varying levels of confidence. Also, values for these parameters may be varied within some predictive models.

62. Many commenters, particularly satellite-affiliated commenters, have asked the Commission to adopt a predictive model in this rulemaking, and they express strong preferences for what that model should look like. Satellite carriers assert that the Commission has the authority to develop a model for predicting whether a household can receive a signal of Grade B strength, but most concede that such a methodology should not preclude a party from conducting actual tests. Some commenters state that any challenger to a presumption created by the test should bear cost of the tests, regardless of the results.¹⁵⁴ Other commenters argue that the loser in a challenge should pay the cost of measurements.¹⁵⁵ Satellite carriers do not agree on which of two predictive models, Longley-Rice or Terrain Integrated Rough Earth Model (TIREM), is the best model for SHVA purposes, although most favor TIREM.

63. *Usefulness of Predictive Models.* In the *NPRM*, we asked whether we could mandate a model for SHVA purposes or merely endorse one. Broadcasters contend that only an actual site test can settle the legal eligibility of an individual household and that the Act grants the FCC no authority to

¹⁵⁴See, e.g., DirecTV Comments at 26; DirecTV Reply at 13-14; NRTC Comments at 24; SBCA Comments at 18.

¹⁵⁵See, e.g., NAB Reply at 44; Media Venture Management Comments at 3; ETAI at 26; Network Affiliate Associations Reply at 67-68; Biby Comments at 6 and 18.

unilaterally substitute a predictive model.¹⁵⁶ They assert that satellite providers and broadcasters may privately negotiate the use of a predictive model, but the SHVA precludes the Commission from mandating a particular predictive methodology. If the Commission does endorse a model, most broadcasters argue that the model should only create a rebuttable presumption of service or lack of service.¹⁵⁷ The satellite providers counter that the Commission certainly has the authority to develop a predictive model.¹⁵⁸ Some satellite commenters state that such a methodology should not preclude a party from conducting actual tests,¹⁵⁹ but at least one commenter argues that a prediction is enough, by itself, to satisfy a satellite carrier's burden of proving that a household is unserved.¹⁶⁰ The satellite providers also argue that because the Commission has created predictive models for other uses of the Grade B construct, it may develop a predictive model specifically for the use of Grade B in the SHVA.

64. We conclude that predictive models can be effective and helpful proxies for individual household measurements and that we have the authority to develop and endorse a model for making predictions of signal strength at individual locations. The Commission has developed and used predictive models for determining signal intensity in other contexts (*e.g.*, determination of stations' DTV service areas).¹⁶¹ Two prominent examples are the newer Longley-Rice models and the procedure set forth in Section 73.684 of our Rules for determining traditional Grade B contours using the radio propagation curves for broadcast television set forth in Section 73.699. We believe our position as the originator of the Grade B criterion qualifies us to determine the effectiveness and accuracy of predictive models that relate to it.

65. The difference in taking actual measurements at individual households and using predictive models is significant, because measurement requires time, money, and other resources that often outweigh the benefits. For example, it may cost more for a satellite company to take a measurement than it can recover through subscriber and advertising fees. To avoid these costs, satellite providers may have refused or terminated service to consumers who are actually unserved.¹⁶² Additionally, satellite providers, broadcasters, and consumers have often turned to predictive models that erroneously permit some served households to receive satellite network service, or, conversely, prevent some unserved households from

¹⁵⁶See, *e.g.*, Association of America's Public Television Stations (APTS) Comments at 6; Network Affiliate Associations Reply at 64; Walt Disney Company (ABC) Comments at 19-21; Shockley Communications Corp. et al. Comments at 5; and Cordillera Communications et al. Comments at 14 (statute clearly requires actual measurements, precludes Commission mandating a model, but use of accurate model by satellite carriers can dramatically reduce the number of households that would have to be tested). *But see* Capitol Broadcasting Comments at 4 (urges Commission to use predictive model in lieu of actual measurement).

¹⁵⁷See, *e.g.*, Shockley Communications Corp. Comments at 5; Wilmington Telecasters Comments at 5; National Communications Comments at 5; JME Media Comments at 5.

¹⁵⁸See, *e.g.*, DirecTV Comments at 15-16.

¹⁵⁹See, *e.g.*, NRTC Comments at 21, 23; DirecTV Comments at 5-6, 26.

¹⁶⁰DirecTV Comments at 26; DirecTV Reply at 13-14.

¹⁶¹47 C.F.R. § 73.684.

¹⁶²See, *e.g.*, PrimeTime 24 Comments at 5 (tests too expensive to be economically feasible); Superstar/Netlink Comments at 4; and SBCA Comments at 14.

being eligible to receive network stations via satellite.¹⁶³ When truly unserved households are deemed ineligible for broadcast network service via satellite, consumers are hurt and the SHVA's intent is thwarted. Likewise, when served households are deemed eligible for satellite-delivered broadcast network service, network affiliates are harmed and the SHVA's intent is also thwarted. We believe the Commission's endorsement of a model will address some of the problems that consumers, as well as the broadcast and satellite industries, encounter when following the SHVA. We expect our endorsement to reduce conflicts regarding which model satisfactorily predicts a household's true status as served or unserved, and we hope that a single model makes it easy for consumers to determine their eligibility for satellite-delivered broadcast network service at the time they subscribe to a DTH satellite service (at the point of sale).

66. We recognize that we speak only as the expert agency on the Grade B construct, not as the primary enforcer of the SHVA. That role belongs to the courts. We also acknowledge that we cannot change satellite carriers' burden under the SHVA of proving that a household is unserved,¹⁶⁴ and use of the predictive model we endorse is discretionary with the parties.¹⁶⁵ While our predictive model need not replace actual measurement, it could serve as a presumption of service or lack of service for purposes of the SHVA.¹⁶⁶ A presumption should make administration of the unserved household rule easier and more cost-effective for both consumers and the industries. Broadcasters and satellite providers should be able to rely on a Commission-endorsed model when deciding whether individual consumers are presumed to be eligible to receive satellite-delivered network signals.¹⁶⁷ Moreover, we recommend that courts accept the model's predictions as sufficient to show that a satellite service provider has carried its statutory

¹⁶³See National Telecommunications and Information Agency (NTIA) Comments on NRTC Petition at 1-2; PrimeTime 24 Comments on NRTC Petition at 4, 7, 13; PrimeTime 24 Comments on Echostar Petition at 3-4; DirecTV Joint Comments on Petitions for Rulemaking at 17; PrimeStar Partners Comments at 6-7; NRTC Comments at 20; and DirecTV Reply Comments at 11-12.

¹⁶⁴See 17 U.S.C. § 119(a)(5)(D).

¹⁶⁵But see ¶ 97.

¹⁶⁶For example, we note that some broadcasters have entered into agreements with Primestar and Netlink (satellite television providers) to resolve disputes arising from the SHVA requirements. These settlements assign five-digit zip codes to each station and classify each zip code as "red light" if more than 50% of the zip code's population is served -- based on Longley-Rice propagation data -- and as "green light" if 50% or less of the population in the zip code is served. Primestar and Netlink agreed in this settlement that they will not sign up new subscribers who are in a "red light zip code" unless the station grants a waiver or the satellite carrier conducts a signal intensity test that shows the household does not receive a Grade B intensity signal. The agreement also describes a simplified testing methodology for measuring signal intensity at a home and provides that the "loser pays" for any tests that are conducted. See *Settlement and Compliance Agreement Between ABC, Inc., CBS Broadcasting, Inc., Fox Broadcasting Company, National Broadcasting Company, and Certain ABC, CBS, Fox, and NBC Network Stations; the National Association of Broadcasters; the ABC Television Affiliates Association, the CBS Television Network Affiliates Association, the Fox Television Affiliates Association, and the NBC Television Affiliates Association AND Primestar Partners, L.P., Netlink USA, and Telluride Cablevision, Inc.* This settlement is a part of the public record in this proceeding.

¹⁶⁷Commenters note that consumers and industry need certainty in this area. See, e.g., PrimeTime 24 NRTC Comments at 8-9, 13; Superstar Echostar Comments at 8-10; DirecTV Joint Comments at 2, 10-11, 19.

burden of showing that a household is unserved.¹⁶⁸ We believe that such an approach is consistent with the Miami federal court's use of one variation of the Commission's Longley-Rice predictive methodology in its injunctions.¹⁶⁹ Finally, we recommend that the rebuttable presumptions created by our model will be combined with in-court and out-of-court "loser pays" mechanisms to help the SHVA operate more smoothly.¹⁷⁰ Such a loser pays scheme would require the loser of any challenge to a predictive model's presumption to pay the costs of an on-site test following the challenge.

67. *Inadequacy of the Traditional Grade B Contour Methodology.* In the *NPRM*, we sought comment on the application of existing predictive models in the SHVA context, including our "traditional" Grade B contour methodology and the Longley-Rice predictive model.¹⁷¹ We tentatively concluded that the Commission's traditional predictive methodology for determining a Grade B contour is inappropriate for predicting signal strength at individual locations. Our rules state that this methodology is for three purposes only: (1) estimation of coverage resulting from the selection of a particular transmitter site, (2) problems of coverage related to 47 C.F.R. § 73.3555 (ownership restrictions), and (3) determination of compliance with § 73.685(a) concerning minimum field strength over the principal community.¹⁷² The traditional methodology predicts signal strength on the basis of average terrain elevation along radial lines extending only ten miles from a television station's transmitter.¹⁷³ The traditional methodology does not accurately reflect all the topographic differences in a station's transmission area, and explicitly does not account for interference from other signals.¹⁷⁴ These omissions make it an imperfect methodology for predicting whether an individual household can receive an adequate signal.¹⁷⁵ For example, the model may fail to account for terrain features that could block a house's reception.

68. Commenters agree that the traditional methodology for predicting a Grade B contour should not be used as a prediction model for purposes of the SHVA. Satellite industry commenters state that these field strength contour and coverage prediction rules were never intended to be used to determine

¹⁶⁸17 U.S.C. §119(a)(5)(D).

¹⁶⁹*CBS v. PrimeTime 24*, Preliminary Injunction at 3; *CBS v. PrimeTime 24*, Final Ruling, slip op. at 49; *CBS v. PrimeTime 24*, Permanent Injunction, slip op., at 2 (court uses Longley-Rice Version 1.2.2 per Commission's OET Bulletin No. 69 to determine which households may receive network programming from PrimeTime 24).

¹⁷⁰See ¶¶ 93, 97 *infra*.

¹⁷¹*NPRM* at ¶ 33; see 47 C.F.R. §§ 73.684(d) and 73.686(b) (traditional Grade B contour method); OET Bulletin 69 (Longley-Rice methodology).

¹⁷²See 47 C.F.R. § 73.683(c). See also Superstar/Netlink Comments at 17 (noting that the rule cautions that these contours are limited in estimating levels of field strength and asserting that these contours give no assurance of service to any specific percentage of receiver locations) *Id.* at n. 38.

¹⁷³See 47 C.F.R. §§ 73.684(d) and 73.686(b) and (c).

¹⁷⁴47 C.F.R. §§ 73.683 and 73.684(a).

¹⁷⁵The Commission also declined to use the traditional methodology in the DTV allocations proceeding, favoring instead one variation of Longley-Rice model 1.2.2. See *Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service, Sixth Report and Order*, 12 FCC Rcd 14588, 14676 (1997) ("DTV Sixth Report and Order").

whether a particular individual could see an acceptable picture at his or her home.¹⁷⁶ The SBCA's Consulting Engineers, Hatfield & Dawson, call the methodology in Section 73.684 of our rules "simplistic," and commends the Commission for ignoring pleas to use the traditional methodology in the DTV Allotment determinations.¹⁷⁷ Broadcasting industry commenters agree that the traditional methodology is insufficient.¹⁷⁸ In practice, as well as in the Miami lawsuit, they have endorsed the Longley-Rice model for signal strength predictions.¹⁷⁹ In their pleadings, the majority of broadcasters say that the Commission should endorse the Longley-Rice model "as implemented for DTV,"¹⁸⁰ although some feel that, for SHVA purposes, the model should not be adopted in all particulars. Other broadcasters feel that SHVA did not intend the use of any predictive methodology¹⁸¹ and that such models have no legal relevance to the ultimate determination of subscriber eligibility.¹⁸²

69. *Longley-Rice Point-to-Point Model for Digital Television.* We noted in the *NPRM* that the Commission recently adopted, in the digital television (DTV) proceeding, rules for analyzing TV service areas using a point-to-point prediction method based on version 1.2.2 of the Longley-Rice propagation model.¹⁸³ We proposed that this variation of Longley-Rice be used to determine Grade B service at individual households. The Longley-Rice propagation model is the most widely-used private means of predicting the existence of a signal of Grade B intensity for SHVA purposes.¹⁸⁴ Although it is similar to the traditional method for determining a Grade B contour, Longley-Rice improves the traditional model by adjusting the predictions for changes in terrain (*e.g.*, hills and valleys between the transmitter and the house) along the entire path from the transmitter to the specified receive site. Thus, while the Commission's traditional contour method often results in smooth concentric circles surrounding a transmission tower, the Longley-Rice method produces rougher outlines that more precisely depict areas of coverage.

¹⁷⁶See, *e.g.*, Superstar/Netlink Comments at 18; DirecTV Comments at 21-22.

¹⁷⁷SBCA Comments, Hatfield & Dawson Engineering Statement at 7.

¹⁷⁸See, *e.g.*, Network Affiliate Assn. Comments at 60.

¹⁷⁹See, *e.g.*, NAB Comments at 38-39; MSTV Comments at 25; Network Affiliate Assn. Comments at 60. ("Both the broadcasting and satellite industries are familiar with Longley-Rice, and, as the Commission determined in the DTV proceeding, a better predictive model has not been developed.")

¹⁸⁰See, *e.g.*, Network Affiliate Assn. Comments at 60.

¹⁸¹See, *e.g.*, Walt Disney Company Comments at 20.

¹⁸²See, *e.g.*, Cordillera Communications, *et al.*, Comments at 12.

¹⁸³The Longley-Rice model used for analysis of DTV and analog TV service in the DTV proceeding is described in "Longley-Rice Methodology for Evaluating TV Coverage and Interference," OET Bulletin 69, Federal Communications Commission (July 2, 1997) <<http://www.fcc.gov/oet/info/documents/bulletins/#69>>. Longley-Rice is the Commission's designated methodology for determining where service is provided by a DTV station. See 47 C.F.R. § 73.622(e). See also *Advanced Television Systems: Sixth Report and Order* ("DTV Sixth Report and Order"), 12 FCC Rcd 14588, 14672-76.

¹⁸⁴See *CBS v. PrimeTime 24*, Final Ruling, slip op. at 23-25. See also NAB Comments, Declaration of Jules Cohen at 14-15.

70. The broadcasters support the use of the Longley-Rice point-to-point model in the SHVA context (assuming, they state, that the Commission may endorse a model in the first place), but the satellite interests claim it is insufficient. The Network Affiliate Associations declares,

To the extent the Commission wishes to advise Congress, [we] endorse the Commission's proposal to recommend the Longley-Rice propagation model as a means of predicting Grade B service at individual locations. Both the broadcasting and satellite industries are familiar with Longley-Rice, and, as the Commission determined in the DTV proceeding, a better predictive model has not been developed.¹⁸⁵

The broadcasters accept Longley-Rice with the proviso that it should not make predictions for households only within a station's predicted Grade B contour.¹⁸⁶ This argument recognizes that many served households exist outside a station's contour, and it highlights the irrelevance of a station's service area when determining, for purposes of the SHVA, what is happening at an individual household. Broadcasters also assert that the time and location variability factors and the statistical confidence levels should all be 50%.¹⁸⁷ Many satellite commenters reject Longley-Rice as a first choice because they allege it is based on extremely low and unrealistic prediction of service probabilities and fails to account for several important factors that affect signal availability, including interference from other signals, vegetation, and buildings.¹⁸⁸ They propose the use of the TIREM methodology, jointly developed by the Department of Defense and the National Telecommunications and Information Agency (NTIA).¹⁸⁹ TIREM is fully discussed below. If we do not accept TIREM, the satellite carriers accept Longley-Rice as the next best option.¹⁹⁰ PrimeTime 24 submits that if we do endorse Longley-Rice, the Commission must pay particularly careful attention to the parameters used in the model and should require the model to assume the receiving antenna height is 5 feet above the actual height of the household's roof or, alternatively, no more than 20 feet above ground.¹⁹¹

71. *A Predictive Model for Individual Locations.* The model we endorse is a version of Longley-Rice 1.2.2 that we have adapted for predicting signal strength at individual locations. Called "Individual Location Longley-Rice" or "ILLR," it is similar to the point-to-point predictive model we established for digital television (DTV) allocations.¹⁹² We believe ILLR is an accurate, practical, and

¹⁸⁵Network Affiliate Assn. Comments at 60.

¹⁸⁶See, e.g., Hearst-Argyle Comments at 12; Network Affiliate Assn. Comments at 61 and Reply at 20.

¹⁸⁷See, e.g., Network Affiliate Associations Comments at 62 and Reply at 45-47; MSTV Comments at 12; and NAB Reply at 29-30.

¹⁸⁸See, e.g., NRTC Comments at 22; PrimeTime 24 Comments at 17; SBCA Comments at 15.

¹⁸⁹See, e.g., SBCA Comments at 15; Pegasus Communications Comments at 21; NRTC Comments at 23-24; EchoStar Comments at 8-9.

¹⁹⁰See, e.g., PrimeTime 24 Comments at 5; Primestar Partners Comments at 8-9.

¹⁹¹PrimeTime 24 Comments at 15.

¹⁹²The DTV Longley-Rice model also used Longley-Rice version 1.2.2.

readily available model for determining signal intensity at individual locations. ILLR has several characteristics, discussed in detail below, which make it unique:

- the time variability factor is 50%¹⁹³ and the confidence variability factor is 50%;
- the model is run in individual mode;
- terrain elevation is considered every 1/10 of a kilometer;
- receiving antenna height is assumed to be 20 feet above ground for one-story buildings and 30 feet above ground for buildings taller than one-story;
- land use and land cover (e.g., ~~vegetation and buildings~~) shall be included when an accurate method for doing so is developed;
- where error codes appear, they shall be ignored and the predicted value accepted or the result shall be tested with an on-site measurement;
- locations both within and beyond a station's Grade B contour shall be examined.

We believe the ILLR can be used for predicting signal strength for purposes of the SHVA as well as for other purposes that require information about signal intensity at discrete locations. The model would not supplant currently-existing approaches for depicting a field strength contour or for describing a station's service area. Specifically, the ILLR will not replace the current Commission rules for field strength contours (47 C.F.R. § 73.683) or prediction of coverage for non-SHVA purposes (47 C.F.R. §73.684).¹⁹⁴ In fact, the ILLR should not affect a station's Grade B contour or service area, because areas are irrelevant when predicting what signals exist at a particular location. As both satellite carriers and broadcasters have recognized, a predictive model for individual locations might identify unserved households that lay within a station's Grade B contour or, likewise, might identify served households outside a Grade B contour.¹⁹⁵

¹⁹³When the time variability factor for the predicted field strength is 50%, an acceptable quality picture should be available 90% of the time.

¹⁹⁴As stated in Section 73.683(c), field strength contours are considered for three purposes only, none of which include determination of signal intensity at individual locations: (1) estimating coverage resulting from the selection of a particular transmitter site, (2) in connection with problems of coverage related to the Commission's duopoly rules (47 C.F.R. §73.3555), and (3) determining compliance with §73.685(a) concerning the minimum field strength to be provided over the principal community. Section 73.683 makes it clear that field strength contours are insufficient tools for determining what is happening at any particular location:

Under actual conditions, [a signal's] true coverage may vary greatly from these estimates because the terrain over any specific path is expected to be different from the average terrain on which the field strength charts were based.

* * *

[T]he actual extent of service will usually be less than indicated by these estimates due to interference from other stations. Because of these factors, the predicted field strength contours give no assurance of service to any specific percentage of receiver locations within the distances indicated.

¹⁹⁵See, e.g., NRTC Comments at 13; Richard Biby Comments at 2; Professional Service Association Comments at 27; Network Affiliate Associations Comments at 61; Grant Broadcasting Comments at 4; and Walt Disney Comments at 21.

Importantly, our model should not increase or decrease the number of truly unserved households.¹⁹⁶ The number of unserved households remains finite under any single definition of Grade B intensity, and we do not change that definition here. If a household is unserved in reality, the ILLR prediction model will not change that situation. Likewise, if a household is currently served, the prediction model will not change it to an unserved household. A predictive model of any sort simply reflects reality without actually testing or observing it, and some are better than others at painting the most lifelike picture. The ILLR corrects for the mistakes of less-appropriate and less-accurate models by more precisely identifying households as served or unserved.

72. *Time, Location, and Confidence Factors.* Predictive models are inherently imperfect because they seek to replicate reality without actually measuring or observing it. These imperfections can be mitigated through statistical means and by varying the "ingredients," or factors, included in any particular model. For example, although signals of Grade B intensity are defined as discrete values measured in dBu, the intensity of broadcast signals at particular locations and at particular times cannot be precisely determined, regardless of the predictive method used.

73. One way to account for these factors is to build them directly into signal strength values. The Grade B intensity levels are actually median signal strengths -- *i.e.*, 50% of locations in a particular area should receive a Grade B signal or higher at least 50% of the time. However, this does not mean that 50% of the locations will receive an *acceptable picture* only 50% of the time. The Grade B values have a built-in time factor so that an acceptable picture is predicted at least 90% of the time. For example, a signal strength of 41 dBu equals an acceptable picture for channels 2-6. To ensure that a location receives such a signal 90% of the time, the Grade B value for those channels, 47 dBu, includes an extra time factor of 6 dBu.¹⁹⁷ Thus, although a location receiving a Grade B signal of 47 dBu will only get that signal 50% of the time, that same location will receive a 41 dBu signal 90% of the time.

74. Time, location, and confidence factors can also be built into predictive models.¹⁹⁸ However, it is often unnecessary to build an additional factor into a predictive model to get the desired results. For instance, the Grade B values already predict the existence of an acceptable television picture at least 90% of the time, so the model need only predict that a signal of Grade B intensity exists at least 50% of the time. Use of a higher time factor, such as 90%, would amount to unnecessary double-counting. The Longley-Rice model used for DTV allocations recognizes this and, therefore, incorporates the 50% time factor into its calculations. Both broadcasters and satellite carriers agree that this is also

¹⁹⁶In answer to concerns raised by some broadcasters, the predictive model can recognize that many households, particularly in rural areas, are served by "translator stations." See, *e.g.*, New Mexico Broadcasters Association Comments at 12 and Exhibit A. The ILLR model, like the on-site measurement, will consider the signal of either the affiliate station or its translator, as appropriate, to determine whether a household is receiving adequate signal strength.

¹⁹⁷See discussion at ¶ 15 n.30 *supra*.

¹⁹⁸See ¶ 79 for discussion on the location variability factor.

appropriate for purposes of the SHVA.¹⁹⁹ We therefore see no reason to change the number when adapting Longley-Rice to the individual location context.

75. Although the parties generally agree that the time factor should be 50%, they do not agree on the appropriate level for the confidence factor. Confidence, in this context, is a way of expressing how certain the model is that the predicted signal value is *at least* that high.²⁰⁰ Importantly, it is not a reflection of how accurate the model is. Longley-Rice has generally incorporated a 50% confidence factor in its calculations.²⁰¹ The broadcasters object to any higher number because they claim it underpredicts served households, and would discourage trust in the model while encouraging more signal testing. The broadcasters note that "confidence" does not mean, as the word implies, that the model is more accurate.²⁰²

76. We believe that increasing the "confidence" factor above 50% decreases errors of one type and increases errors of another type. For example, if we use a confidence factor of 90%, the model will "search" for a predicted signal value at a particular location in which it has 90% confidence that the value would, in reality, be that value or higher. The model could predict a particular signal value, say 47 dBu, and be 85% confident that the signal would be 47 dBu or higher in reality. Such a high level of confidence means it would be very likely that the location would get a 47 dBu signal. However, because it is searching for a value in which it has 90% confidence, the model would not predict 47 dBu and would continue searching. Eventually, the model would find a signal value in which it has 90% confidence, say 45 dBu, and deliver that as the result. Taking the example one step further, consider a "served" household under the SHVA to be a household that receives a signal of at least 47 dBu (the appropriate value for channels 2-6). If the model predicts with 90% confidence that a signal of *at least* 45 dBu exists, the 45 dBu household would be classified as "unserved," even though it is very likely (85% confidence) that it receives a signal of at least 47 dBu. We believe it would be inconsistent with the SHVA to classify a household as *unserved* when a model could predict it to be *served* with such a high degree of confidence. Therefore, a confidence variability factor of 90% is unsuitable for purposes of the SHVA because it overpredicts the number of truly unserved households.

77. A predictive model that includes truly served households in an unserved category, even temporarily, creates several undesired effects. First, consumers could be confused and frustrated. If the

¹⁹⁹See, e.g., Network Affiliate Assn Comments at 62-63 ("current Grade B field strength values already incorporate a time fading factor to achieve the desired level of statistical reliability, viz. that the best 50% of locations at the contour receive an acceptable picture at least 90% of the time. The Longley-Rice time variability input should only be changed to 90% if time fading factor is subtracted."); NAB Reply at 29 (90% time variability is already built into Grade B value, which is used in the DTV Longley-Rice model). See also, MSTV Comments at 11; ETAI Comments at 7; Primestar Partners Comments at 4; PrimeTime 24 Comments at 28.

²⁰⁰See Hufford, G.A., Longley, A.G., Kissick, W.A., *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 at 30, 36-37 (April 1982). This confidence factor differs from the "confidence interval" that is used to test a hypothesis in a statistical probability model. Mr. Hufford explains that "to an individual receiver of a broadcast station, [confidence] will be a measure of a combined situation and location variability." *Id.* at 36.

²⁰¹"To predict TV service . . . the FCC sets location variability at 50% and the time variability at 90%. The percent confidence is set at 50%, indicating that we are interested in median situations." OET Bulletin No. 69 at 7.

²⁰²See, e.g., NAB Supplemental Comments at 2-3 and Affiliate Associations Supplemental Comments at 12-13.

model overpredicts the number of unserved consumers, and those consumers subscribe to network service via satellite, they will face disappointment when the broadcaster forces termination of the broadcast network service. Conversely, if the model underpredicts the number of unserved consumers, they would be unjustly deprived of broadcast network service via satellite. Second, the SHVA protects network affiliates by making their served households off limits to satellite delivery of broadcast networks. A 90% confidence factor for served households would make many truly served households eligible for satellite-delivered network service, contrary to the intent of the SHVA. Third, if we endorse a model that underpredicts served households, broadcasters would have a great incentive to challenge the model's prediction by taking an actual measurement. Satellite carriers would pursue testing when models consistently underpredict unserved households. Either result would defeat our goal of endorsing a predictive methodology upon which all parties can rely.

78. We have chosen to incorporate a 50% confidence factor in the ILLR model because it neither overpredicts nor underpredicts served households. A 50% confidence factor does not create a statistical bias in favor of either satellite carriers or broadcasters. Rather, it provides a median result that does not predictably err in one direction or the other. We have sought to endorse a confidence factor that is fair to both sides. Importantly, broadcasters have accepted the 50% confidence factor in their pleadings and in their endorsement of the DTV Longley-Rice model in the Miami court case. Similarly, SBCA's engineering experts, Hatfield and Dawson, propose using a 50% confidence factor in the TIREM model that they endorse. They explain that when the confidence factor is 50%, the model predicts the median situation and "the user has no control over this statistical variable."²⁰³

79. *Individual Mode.* The ILLR will operate in a so-called "individual mode," reflecting an observer's point-of-view at a single location. In the ILLR, location variability becomes effectively irrelevant because only one location (e.g., a single household) is considered. The individual mode merges location variability (the measurable or observable differences between dissimilar locations) and so-called situational variability (the small, often hidden, differences between similar or identical locations) into the statistical confidence factor.²⁰⁴ One expert on the issues, George Hufford, states:

In the individual mode situation and location variability are combined so that there remain this combined variability and time variability. Here, the typical user would be the individual receiver of a broadcast station for whom reliability means the time availability, and confidence means the combined situation/location variability.²⁰⁵

Compare the "broadcast mode," in which the DTV Longley-Rice model operates, but which is inappropriate for the purposes of the SHVA.²⁰⁶ That mode reflects the broadcaster's point-of-view when

²⁰³SBCA Reply, Hatfield and Dawson Engineering Statement at 8-9. See also Network Affiliate Assn Supplemental Comments at 14. See discussion of TIREM model, ¶ 86 *infra*.

²⁰⁴According to one expert source, situational variability is caused by environmental changes or the effects of random elements in nature. He writes, "If we use like appearing situations -- that is, if we change operations from one area to another very similar area or if we merely change the sampling scheme somewhat -- then the observed changes in the location variability we call *situation variability*." Hufford Report at 30.

²⁰⁵Hufford Report at 37.

²⁰⁶See OET Bulletin No. 69 at 8.

it is determining a service area that includes many locations. The DTV allotment proceeding utilized the broadcast mode because it was predicting the service areas of the new DTV stations, not the status of individual households as served or unserved by analog (NTSC) signals.

80. *Terrain Elevation.* Because the model seeks to predict signal intensity at individual locations, the model we endorse considers terrain elevation every 1/10 of a kilometer. This distance is as precise as current technology allows. It contrasts with the DTV Longley-Rice model that considers terrain elevation every kilometer.²⁰⁷

81. *Antenna Height.* The ILLR model approximates the height of the household whose signal is being predicted. Current models presume an antenna height of 30 feet. The model we endorse, when used for purposes of the SHVA, shall incorporate an antenna height of 20 feet for one story buildings and 30 feet for buildings taller than one story, including MDUs. This requirement is generally consistent with our conclusions about the height a tester must raise a testing antenna when making actual, on-site signal measurements.²⁰⁸

82. *Land Use and Land Cover.* Satellite carriers and some other commenters argue that vegetation and buildings affect signal intensity. Some broadcasters agree that vegetation and buildings affect signal propagation, but assert that the Longley-Rice model, as well as the Grade B planning factors, already account for these effects.²⁰⁹ The Network Affiliate Associations acknowledge, however, that the empirical data allegedly incorporated in the Longley-Rice model consists of, at most, "sparse" ground cover and some "areas with moderate forestation."²¹⁰ They add that this data produces a model that includes the effects of foliage "only to the fixed degree that they were present in the data used." Other broadcasters contend that buildings have no appreciable effect on the rural areas that Congress sought to protect in the SHVA because large buildings exist primarily within the "city grade" where a broadcaster's field strength is strong enough to overcome any problems.²¹¹ Some broadcasters contend that vegetation changes seasonally and that both vegetation and land use change rapidly as land is developed.²¹²

²⁰⁷*Id.*

²⁰⁸See ¶ 58. We note that in some instances measurements in a high-rise MDU may be made at a height greater than 30 feet. MDU residents may require specialized attention due to their unusual circumstances, which will vary from person to person and building to building.

²⁰⁹The Network Affiliate Associations maintain that the empirical foundation for Longley-Rice incorporates some buildings and vegetation data and assert that adding additional vegetation or building data to the model would require that the empirical data be "backed out" of the model. Network Affiliate Assn Supplemental Comments at 1-3.

²¹⁰*Id.* at 2 and Hufford *et al.*, Guide at 12.

²¹¹Network Affiliates Assn Reply at 29 and NAB *ex parte* comments on January 21, 1999. Network Affiliate Associations also contend that Congress intended the SHVA to provide network signals via satellite to rural areas, not to cities. Therefore, they argue, it is unnecessary to adjust the predictive model to account for buildings. Network Affiliate Assn Supplemental Comments at 1-3.

²¹²Network Affiliate Associations also assert that "there is no complete and reliable database in existence for buildings on a national basis." They also contend the USGS database provides insufficient detail to be of use in signal strength predictions. Network Affiliate Assn Supplemental Comments at 1-4; and *ex parte* comments by Fox Network/News Corporation on January 5, 1999.

83. We conclude that land use and land cover affect signal intensity at individual locations and should be used in the ILLR when an appropriate application develops. The United States Geological Survey maintains a Global Land Information System ("GLIS")²¹³ database on land use and land cover indicating features such as vegetation and man-made structures. We believe that this information is both credible and useful. We acknowledge that larger buildings are usually found in urban areas and Congress expected that the SHVA would primarily benefit rural consumers, but the definition of "unserved" is not explicitly limited to those consumers. The statute does not impose a mileage limitation or distinguish between urban and rural households. While we expect the model to include land use and land cover, we are not aware of a standard means of including such information in the ILLR that has been accepted by the technical and scientific community. When an appropriate application has been developed and accepted, this information will be included in the ILLR. We challenge interested parties to develop such an application that more accurately reflects the signal intensity at an individual location.

84. *Interference.* The Longley-Rice model as used in the DTV Allotment proceeding is capable of predicting interference from nearby television stations. We believe that the model we endorse, ILLR, should include signal interference so that it will more accurately predict picture quality. We acknowledge that interference is not formally included in the measurement methodology we have established in this *Order*, primarily because of the difficulties that would be created if we required testers to attempt to measure for it.²¹⁴ However, all sides have acknowledged that interference affects picture quality, and we believe that, in contrast to the measurement methodology, interference can be reliably included in the predictive model, and so it should be included to create more accurate results.

85. *Error Codes.* Some satellite carriers have argued strongly for alleviation of the problems presented by error codes (KWX=3) that the Longley-Rice model sometimes presents after analysis of signal intensity at particular locations. Error codes result when the model makes a prediction of signal intensity, but essentially rejects the prediction for a reason that may or may not be significant. Hatfield and Dawson, in their Engineering Statement accompanying the SBCA Comments, describe error codes:

In circumstances where the program's capabilities are exceeded, [Longley-Rice 1.2.2] cannot compute a result that falls within its 'confidence' limits, and therefore returns an error code. The [DTV] version of the program assumes service (that is, signal above the desired threshold) for these conditions.²¹⁵

They explain that these drawbacks are trivial for DTV allotment and service analysis, but in the SHVA situation, "it is manifestly unjust at those locations where propagation path impairments may result in input parameter variations which cannot properly be calculated by Longley-Rice 1.2.2 [and] its use for SHVA compliance testing is unsupportable."²¹⁶ Broadcasters respond that this is a "non-issue." NAB claims that

²¹³See USGS Web page at < <http://edcwww.cr.usgs.gov/Webglis/glisbin/glismain.pl> >.

²¹⁴See ¶ 57 *supra*.

²¹⁵*Id.* at 7.

²¹⁶*Id.*

PrimeTime 24 wants a household automatically deemed "unserved" if the program returns an error code. The NAB asserts that this contradicts the advice offered by SBCA's engineers, Hatfield & Dawson, to ignore the error codes as if they were a "false alarm."²¹⁷ The Affiliates Association also contends that the error codes are false alarms that are not built into the Longley-Rice model and are ignored by the DTV version of Longley-Rice.²¹⁸ We conclude that a party should either accept the prediction by ignoring the error code or test the result with an on-site measurement.²¹⁹ If the result is accepted and is high enough to predict service, the household shall be classified as served. If the result is low enough to predict lack of service, the household shall be classified as unserved.

86. *TIREM*. Several satellite carriers have asked the Commission to endorse the TIREM predictive model instead of Longley-Rice.²²⁰ It was developed by the Joint Spectrum Center of the Defense Department to test specific paths with complex geometry.²²¹ News Corporation and the Corporation for Public Broadcasting have used one version of this model to examine their stations' coverage.²²² However, the NAB's engineering consultant, Jules Cohen, rejects the model, contending that there are many versions of TIREM, that it is unclear which version is recommended by satellite carriers, and that the TIREM version that is discussed most often is proprietary.²²³ He also states that TIREM's proponents have provided little data on which to examine the propriety of using TIREM in the SHVA context.²²⁴ The Affiliate Associations add that the proprietary version would cost \$500,000 to adapt for purposes of the SHVA.²²⁵ They also assert that neither the Commission nor the broadcast and satellite industries have extensive experience with TIREM, especially when compared to the experience the Commission already has with Longley-Rice.

87. We believe that TIREM shows promise as a tool for predicting signal intensity at individual locations, but we decline to endorse it at this time for several reasons. NTIA has confirmed the concerns raised by some commenters concerning the public availability of a standardized and useful

²¹⁷NAB Reply at 30.

²¹⁸Network Affiliate Assn Reply at 40.

²¹⁹As Hatfield and Dawson noted, the DTV implementation of Longley-Rice errs on the side of broadcasters by assuming service. If we change the model's assumption of service so that it assumes no service, we risk shifting the satellite carriers' burden of proving (through actual testing) that a household is "unserved" in such a way that appears to contravene the statute.

²²⁰See, e.g., SBCA Comments at 16; Echostar Comments at 9; and NRTC Comments at 21-24.

²²¹The original version of TIREM was developed by the Electromagnetic Compatibility Analysis Center (ECAC) within the Defense Department in the 1960s and has continued to be modified by that organization. ECAC's name was recently changed to the Joint Spectrum Center.

²²²*Ex parte* presentation by Fox/News Corporation (January 5, 1999); SBCA Comments, Hatfield & Dawson Engineering Statement at 8.

²²³*Ex parte* presentation by the NAB (January 21, 1999). See also Network Affiliate Assn Supplemental Comments at 9-10.

²²⁴*Id.*

²²⁵*Id.*

version of TIREM.²²⁶ For example, the NTIA states that the latest version of TIREM may not be readily available outside of eligible government agencies due to federal export restrictions.²²⁷ These impediments to access and use would severely impede TIREM's usefulness to the industries and to consumers. Further, there is not enough information regarding which, if any, version would work best in the SHVA context. We are unaware of any empirical information demonstrating that publicly available applications of TIREM are substantively more accurate than the ILLR. Indeed, the NTIA has run tests comparing the publicly available version found on its Internet site with both the Commission's traditional Grade B contour projections and a version of Longley-Rice similar to ILLR.²²⁸ The NTIA created a chart of sample contours for 16 designated market areas and accompanying maps that suggest that, in many cases, TIREM Version 3 predicts a station service area larger than the Commission's traditional Grade B contour.²²⁹

88. In contrast to TIREM, the Commission has many years of experience using and evaluating the Longley-Rice model. TIREM and Longley-Rice consider the same factors: "frequency, atmospheric conditions, the electrical parameters of the earth, and the shape of the terrain between the two points."²³⁰ The difference between the models is the algorithm used to consider the factors. Neither model's source code accounts for vegetation or buildings, but both models could be run including this data, as ILLR will be. Further, we are increasing the accuracy of the Longley-Rice model for the purpose of predictions for individual locations by requiring that terrain elevations be examined every one-tenth kilometer. In light of the significance and weight conveyed by the Commission's endorsement of a particular model, we believe that the ILLR model will provide most, if not all, of the same benefits claimed for TIREM by its proponents while avoiding its current potential flaws.²³¹

²²⁶See Letter to William Kennard from Larry Irving, Assistant Secretary of Commerce for Communications and Information, at 2 n.6 (January 29, 1999) (*ex parte* filing in CS Docket 98-201) ("NTIA TIREM Letter").

²²⁷See NTIA TIREM Letter at 2 n.6, describing TIREM Version 4 and noting its limited distribution pursuant to the Arms Control Act (22 U.S.C. 2751, *et seq.*) or Executive Order 12460.

²²⁸See NTIA TIREM Letter at 2.

²²⁹*Id.* For example, for WBTV-3 in Charlotte, the traditional Grade B contour encompasses 1,132,000 households, the TIREM Version 3 contour encompasses 1,541,000 households, and the contour created with the NTIA's variation of Longley-Rice encompasses 1,111,000 households. TIREM Version 3 is the one available from NTIA's website and appears to be the version advocated by SBCA. See SBCA *ex parte* Comments of January 26, 1999, statement by Hatfield & Dawson at 1.

²³⁰See SBCA *ex parte* submission of January 26, 1999, Hatfield and Dawson statement at 1-2.

²³¹See SBCA Comments, Hatfield & Dawson Engineering Statement at 11 (list of advantages of TIREM over Longley-Rice 1.2.2, including more sophisticated calculation of loss due to terrain obstructions, minimization of "abrupt discontinuities in calculated loss along a path," and ability to handle receiving sites that are close to obstructions without issuing error codes).

E. Loser Pays

89. The SHVA contains a "loser pays" mechanism that allows a party to recover the cost of conducting a signal measurement at a subscriber's household.²³² At the present time, the loser pays mechanism only applies when parties are in litigation. Under the current law, if a broadcast network station questions whether a subscriber is unserved, an actual measurement at the subscriber's household may be conducted by either the satellite carrier or broadcaster to determine eligibility.²³³ If a measurement shows that the household is unserved, the broadcaster must pay the cost of the test. Similarly, if the test shows that the household is served, the satellite carrier must assume the cost of the test. From 1994 to 1996, the SHVA had "transitional rules" that included a "loser pays" mechanism different from the one currently in effect.²³⁴ This "loser pays" mechanism was not confined to the context of civil litigation.²³⁵

90. In light of the Miami and Raleigh court findings that satellite carriers have signed up millions of people who are served, it appears that the loser pays mechanisms have not been effective in discouraging the enrollment of ineligible subscribers.²³⁶ The record is unclear on the reason for this failure, but anecdotal evidence suggests that both satellite carriers and broadcasters are disinclined to conduct tests, even when they are likely to win, because the tests could annoy their customers and generate ill-will.

91. Some commenters endorse the current loser pays mechanism in the SHVA.²³⁷ Several broadcasters have noted that the privately-negotiated settlement agreement between broadcasters and

²³²17 U.S.C. § 119(a)(9) (loser pays for signal intensity measurement; recovery of measurement costs in a civil action).

²³³The statute also provides that if a network station makes a "reasonable attempt" to conduct a test but the household denies the station access to conduct the test, and the station cannot otherwise conduct a test, the satellite carrier must terminate network service to that household. 17 U.S.C. § 119(a)(10).

²³⁴See 17 U.S.C. § 119(a)(8)(B)(ii) and (C)(ii). Section 119(a)(8) expired on December 31, 1996. *Satellite Home Viewer Act of 1994*, § 6(c), Pub. L. 103-369 (Oct. 18, 1994).

²³⁵17 U.S.C. § 119(a)(8)(B). A network station could challenge a satellite carrier regarding whether a particular subscriber was unserved. The satellite carrier could respond to the challenge by either terminating the subscriber or conducting a signal test at the challenged household. If the test found that the household was served, the satellite carrier was required to terminate service. If the test found that the household was unserved, the station that had challenged the service was required to reimburse the satellite carrier for the cost of the test. The SHVA also created a 5% cap on the number of challenges that stations could require and be compensated for. 17 U.S.C. § 119(a)(8)(C).

²³⁶*CBS v. PrimeTime 24*, Final Ruling, slip op. at 36-37. The permanent injunction in the Miami case specifies that the loser pays provision in the SHVA shall apply to the "reasonable costs of tests" conducted pursuant to the injunction. Miami Final Judgment and Permanent, slip op. at 2-4. Tests are an option provided by the injunction if PrimeTime 24 wants to provide network programming by satellite to a household within the Grade B area of the Longley-Rice propagation maps. Alternatively, PrimeTime 24 may obtain a written waiver from the affected station. In the absence of either a waiver or signal test results showing the household is unserved, PrimeTime 24 is prohibited from providing network service by satellite to any household with the Longley-Rice predicted Grade B area. *Id.*

²³⁷See, e.g., NAB Reply at 44; Media Venture Management Comments at 3; ETAI at 26; Network Affiliate Associations Reply at 71.

Primestar/Netlink includes a "loser pays" arrangement that does not require civil litigation.²³⁸ A few of the satellite carriers criticize the SHVA's current loser pays requirement, arguing that it does not adequately decrease the motivation for broadcasters to bring numerous challenges against satellite carriers.²³⁹ They advocate a "challenger pays" mechanism in which the party challenging a predictive model's presumptive result would bear the cost of the test regardless of the outcome.²⁴⁰ Broadcast industry commenters oppose "challenger pays" as unfair.²⁴¹

92. The loser pays mechanism is part of the SHVA, and the Commission has no authority to change this mechanism or to promulgate regulations that conflict with it. We believe that the Commission's endorsement of a more reliable predictive model in this *Order* will allow the existing loser pays mechanism in the SHVA to work more effectively in civil actions.

III. FUTURE OPTIONS

93. The resolution of the issues surrounding delivery of broadcast network signals over satellite should not end with this *Order*. There are several, often competing, public policies involved in the future actions that we discuss below. The value of local broadcasting in this country has been recognized time and again by Congress and the Commission. Local television stations play a vital role in delivering news, weather, and public affairs information to their local communities. The growing competition between DBS and cable, however, benefits consumers by giving them more choices to watch what they want and by creating new and higher-quality services. DTH satellite carriers have proven to be the most successful competitors to incumbent cable companies, but they still serve only 9 million households, which is only between 10% and 15% of the multichannel video programming market.²⁴² One significant reason consumers give for not considering satellite programming service is the difficulty of getting seamless broadcast network service. Congress has informally asked for our opinion on options to improve the SHVA and Communications Act to better serve consumers. In response to these requests, we identify some possible changes Congress could consider. This list is not meant to be exhaustive.

²³⁸ See, e.g., Association of America's Public Television Stations Comments at 10; Network Affiliate Assn Reply at 68-72 and Exhibit B, Primestar/Netlink Agreement at Schedule 7; see also ¶66 *supra*.

²³⁹ See, e.g., DirecTV Reply at 14.

²⁴⁰ See, e.g., DirecTV Comments at 26; DirecTV Reply at 13-14; NRTC Comments at 23; SBCA Comments at 18.

²⁴¹ See, e.g., NAB Reply at 45-46; Network Affiliate Assn Reply at 63-68 (satellite carriers' attempt to turn loser pays into "challenger pays" is another example of overreaching and greed; presumption would shift the burden of proving eligibility onto local stations and away from satellite carriers contrary to the SHVA; would give satellite carriers an incentive to be unreasonable because there would be no economic downside to forcing a broadcaster to test an "obviously served" household that had been predicted as unserved).

²⁴² See Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming, *Fifth Annual Competition Report*, CS Docket No. 98-102, FCC 98-335 at ¶¶ 6, 12 (1998).

A. Local-into-Local

94. Congress could consider changes to copyright law to allow satellite companies to provide local television stations to local markets. Cable companies already do this, to their distinct advantage *vis a vis* the satellite carriers. Broadcasters support local-into-local legislation because they do not fear losing their audiences -- and the advertising dollars that follow.²⁴³ Some satellite carriers accept local-into-local legislation because it gives them a limited right to provide their subscribers with services those subscribers want.²⁴⁴ Local-into-local satisfies consumers' demands for broadcast network service via satellite without harming localism. Local-into-local also makes satellite carriers more attractive to consumers, thus increasing their competitive standing with cable companies. However, local-into-local cannot provide the solution for every community in the immediate future, due to limitations in the satellites' capacity to carry every local channel. EchoStar recently predicted that with new spectrum, and without full must-carry requirements, it will only be able to serve 20 major cities within the next three years.²⁴⁵ Those cities cover about half the United States' population. Smaller cities would not be able to receive service, even under the best scenario, for about 5 years. Viewers who live in communities where local-into-local service is unavailable will need other solutions, including DirecTV's practice of selling over-the-air antennas with their satellite dishes. However, for those that can receive local network stations via satellite, local-into-local provides a partial solution that should address the needs of consumers and the broadcast and satellite industries, as well as promote competition to cable.

B. Change from the Grade B Signal Intensity Standard

95. We have noted that the Grade B signal intensity standard was originally designed to depict a television station's service area, and that it may not address all the factors that determine the quality of a consumer's television picture. This is especially true if one assumes that consumers have higher expectations for their television picture than they did in the 1950s and that environmental changes increase the effects of the factors that Grade B cannot easily address, such as ghosting and signal interference. Although we believe that the Grade B standard is still useful for determining signal strength and signal intensity, there may be a better, but still objective, standard that could be developed for identifying unserved households. The SHVA, however, prevents the Commission from exploring an alternative standard because it explicitly requires the use of Grade B to measure signal intensity and determine whether a household is unserved. This undertaking would demand considerable time and significant government and industry resources.

C. 90-Day Waiting Period

96. Before receiving satellite-delivered broadcast networks, the SHVA requires an unserved consumer who subscribes to cable to terminate that service and wait for 90 days. Once the cable service ends, the consumer then would face 90 days with no acceptable network service -- nothing over cable,

²⁴³See, e.g., NAB Comments at 51; Walt Disney Co. Comments at 27-28; Cordillera Communications Comments at 15.

²⁴⁴In testimony before the Antitrust Subcommittee of the Senate Judiciary Committee on January 27, 1999, EchoStar's Charlie Ergen stated that surveys have found 8 of 10 potential satellite customers don't buy because they will not be able to receive local signals. *Reported in Communications Daily*, January 28, 1999.

²⁴⁵Charlie Ergen Testimony before the Antitrust Subcommittee of the Senate Judiciary Committee, January 27, 1999, *as reported in Communications Daily*, January 28, 1999.

unattainable over-the-air, and not yet available via satellite. This requirement discourages a potential satellite consumer from terminating his or her cable service. We believe that elimination of the waiting period should be considered.

D. Predictive Model and Loser Pays Mechanism

97. The "loser pays" mechanism in the SHVA holds promise for helping to resolve or avoid the disputes that arise under the law, but it currently applies only when the parties are engaged in civil litigation over the eligibility of subscribing households to receive broadcast network programming via satellite. We believe the loser pays mechanism would be more effective if it also applied before litigation commences and if used in conjunction with a predictive model. Initially, we suggest that clear statutory acceptance of prediction models for creating rebuttable presumptions of service or lack of service would add certainty to the entire SHVA process. The ILLR that we endorse in this *Order* will reduce mistakes when predicting a household's status as served or unserved and will therefore allow parties to be more confident in the predicted result and less inclined to conduct or demand a test. A broadly applied loser pays mechanism that allocates the cost of testing on the party in error, in conjunction with this more reliable prediction model, would likely give satellite carriers an economic incentive to avoid enrolling consumers who are predicted to be served, and to discourage broadcasters from challenging subscribers who are predicted as unserved. Less testing means less burden and inconvenience for the industries and consumers. Fewer challenges and disputes would reduce the number of consumers who are angered and inconvenienced by the operation of the SHVA.

IV. PROCEDURAL MATTERS

98. To minimize possible confusion in connection with the injunction scheduled to take effect on February 28, 1999, that will affect more than 700,000 satellite subscribers, this *Report and Order* will become effective upon publication in the Federal Register. We find good cause exists under the Administrative Procedure Act ("APA") to have the rule adopted in this *Report and Order* take effect upon publication in the Federal Register pursuant to section 553(d)(3) of the APA.²⁴⁶ We believe that making the *Report and Order* and rule effective upon publication in the Federal Register will eliminate any confusion should the court in *CBS et al. v. PrimeTime 24* wish to issue a supplemental order in light of the conclusions in this *Order*.²⁴⁷

99. *Paperwork Reduction Act of 1995 Analysis.* The requirements adopted in this *Report and Order* have been analyzed with respect to the Paperwork Reduction Act of 1995 (the "1995 Act") and found to impose new or modified information collection requirements on the public. The Commission has requested Office of Management and Budget ("OMB") approval, under the emergency processing provisions of the 1995 Act (5 C.F.R. § 1320.13), of the information collection requirements contained in this *Report and Order*.

100. *Regulatory Flexibility Act Analysis.* The regulatory flexibility analysis is found in Appendix A, attached.

²⁴⁶The APA generally requires publication in the Federal Register of substantive rules 30 days prior to their effective date but permits substantive rules to become effective with less than 30 days advance publication for good cause. 5 U.S.C. § 553(d)(1) and (3). See also 47 C.F.R. 427(b).

²⁴⁷See *CBS v. PrimeTime 24*, Final Ruling, slip op. at 5-6.

101. *Ordering Clauses.* **IT IS ORDERED**, pursuant to Sections 1, 4(i), 4(j) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), and 154(j); and Section 119(d)(10)(a) of the Copyright Act, 17 U.S.C. § 119(d)(10)(a), the terms and rule of this *Report and Order* **ARE ADOPTED**. The amendments to 47 C.F.R. § 73.686 shall become effective upon date of publication of this *Report and Order* in the Federal Register.

102. **IT IS FURTHER ORDERED** that the Commission's Office of Public Affairs, Reference Operations Division, **SHALL SEND** a copy of this Report and Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration in accordance with paragraph 603(a) of the Regulatory Flexibility Act, Pub. L. No. 96-354, 94 Stat. 1164, 5 U.S.C. §§ 601 et seq. (1981).

FEDERAL COMMUNICATIONS COMMISSION



Magalie Roman Salas
Secretary



Appendix A

Final Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act ("RFA") an Initial Regulatory Flexibility Analysis ("IRFA") was incorporated into the Notice of Proposed Rulemaking ("*NPRM*") in this proceeding. The Commission sought written public comment on the possible impact of the proposed policies and rules on small entities in the *NPRM*, including comments on the IRFA. This Final Regulatory Flexibility Analysis ("FRFA") in this Report and Order ("Order") conforms to the RFA.

A. Need for and Objective of the Rules

1. In this Order, the Commission responds to Petitions for Rulemaking filed by the National Rural Telecommunications Cooperative and EchoStar Communications Corporation requesting that the Commission address the methods for determining whether a household is "unserved" by network television stations for purposes of the 1988 Satellite Home Viewer Act.²⁴⁸

B. Legal Basis

2. This Order is authorized under Sections 1, 4(i), 4(j) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), and 154(j) and Section 119(d)(10)(a) of the Copyright Act, 17 U.S.C. § 119(d)(10)(a).

C. Summary of Significant Issues Raised by the Public Comments in Response to the IRFA.

3. Small Cable Business Association (SCBA) filed comments regarding the possible impact of this proceeding on small cable operators. SCBA contends that since small cable and satellite carriers draw from the same customer base, any Commission action broadening the "unserved" household definition could adversely affect small cable operators. SCBA contends that its members represent an important link in the distribution of local programming, especially in rural areas, and should not be overlooked in this proceeding. SCBA does not object to satellite delivery of broadcast network signals, so long as satellite providers are required to provide carriage of all broadcast signals within a single community. National Association of Broadcasters (NAB), and others, maintain that any expansion of unserved viewers could have a substantial impact on television broadcast stations serving smaller markets. The ability of these stations to purchase programming and to serve their viewers would be impacted by lower advertising revenues should the Commission's actions dramatically expand the numbers of unserved households in their market place. National Rural Telecommunications Cooperative urges the Commission to revisit the conclusion in its IRFA that because small businesses do not have the financial resources necessary to become DBS licensees, none will be affected by the proposed action.

²⁴⁸17 U.S.C. § 119.

D. Description and Estimate of the Number of Small Entities To Which the Rules Will Apply

4. The RFA directs the Commission to provide a description of and, where feasible, an estimate of the number of small entities that will be affected by the proposed action.²⁴⁹ The RFA defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small business concern" under Section 3 of the Small Business Act.²⁵⁰ Under the Small Business Act, a small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.²⁵¹ The action taken in this Order will affect television broadcasting licensees and DTH satellite operators.

5. *Television Stations.* The rules in this Order will apply to television broadcasting licensees, and potential licensees of television service. The SBA defines a television broadcasting station that has no more than \$10.5 million in annual receipts as a small business.²⁵² Television broadcasting stations consist of establishments primarily engaged in broadcasting visual programs by television to the public, except cable and other pay television services.²⁵³ Included in this industry are commercial, religious, educational, and other television stations.²⁵⁴ Also included are establishments primarily engaged in television broadcasting and that produce taped television program materials.²⁵⁵ Separate establishments primarily engaged in producing taped television program materials are classified under another SIC number.²⁵⁶ There were 1,509 television broadcasting stations operating in the nation in 1992.²⁵⁷ That number has remained fairly constant as indicated by the approximately 1,579 operating full power

²⁴⁹5 U.S.C. § 604(a)(3).

²⁵⁰5 U.S.C. § 604(a)(3).

²⁵¹15 U.S.C. § 632.

²⁵²13 C.F.R. § 121.201, Standard Industrial Code ("SIC") 4833 (1996).

²⁵³Economics and Statistics Administration, Bureau of Census, U.S. Department of Commerce, 1992 CENSUS OF TRANSPORTATION, COMMUNICATIONS AND UTILITIES, ESTABLISHMENT AND FIRM SIZE, Series UC92-S-1, Appendix A-9 (1995) ("1992 CENSUS OF TRANSPORTATION*").

²⁵⁴*Id.* See also OMB SIC Manual at 283, which describes "Television Broadcasting Stations (SIC Code 4833) as:

Establishments primarily engaged in broadcasting visual programs by television to the public, except cable and other pay television services. Included in this industry are commercial, religious, educational and other television stations. Also included here are establishments primarily engaged in television broadcasting and which produce taped television program materials.

²⁵⁵1992 CENSUS OF TRANSPORTATION, Series UC92-S-1, Appendix A-9.

²⁵⁶*Id.* SIC 7812 (Motion Picture and Video Tape Production); SIC 7922 (Theatrical Producers and Miscellaneous Theatrical Services (producers of live radio and television programs).

²⁵⁷FCC News Release No. 31327, Jan. 13, 1993.

television broadcasting stations in the nation as of May 31, 1998.²⁵⁸ In addition, as of October 31, 1997, there were 1,880 low power television broadcasting ("LPTV") broadcasting stations that may also be affected by our proposed rule changes.²⁵⁹ For 1992²⁶⁰ the number of television broadcasting stations that produced less than \$10.0 million in revenue was 1,155 establishments.²⁶¹

6. *DBS and other DTH satellite operators.* The Commission has not developed a definition of small entities applicable to geostationary or non-geostationary orbit fixed-satellite or DBS service applicants or licensees. Therefore, the applicable definition of small entity is the definition under the SBA rules applicable to Communications Services, Not Elsewhere Classified. This definition provides that a small entity is one with \$11.0 million or less in annual receipts.²⁶² The number of employees working for a "small entity" must be 750 or fewer. According to Census Bureau data, there are 848 firms that fall under the category of Communications Services, Not Elsewhere Classified that could potentially fall into the DTH category. Of those, approximately 775 reported annual receipts of \$11 million or less and qualify as small entities.²⁶³ The proposed action in this Order applies to entities providing DTH service, including licensees of DBS services and distributors of satellite programming. There are four licensees of DBS services under Part 100 of the Commission's rules.²⁶⁴ Three of those licensees are currently operational, and each of those licensees has annual revenues in excess of the threshold for a small business.

E. Description of Projected Reporting, Record-keeping, and Other Compliance Requirements

7. The rules adopted today impose no requirement to file any information with the Federal Communications Commission. Parties who choose to conduct individual household measurements are required to reduce to memorialize their test observations and results.

F. Steps Taken to Minimize Significant Economic Impact on Small Entities, and Significant Alternatives Considered

8. We believe that the rules we adopt today will have minimal impact on small television stations' ability to serve the public. The rule we adopt today has no impact on the number of viewers who are "unserved" or unable to receive the relevant television broadcast stations' signals, thus mitigating

²⁵⁸See *Broadcast Station Totals As Of May 31, 1998*, FCC News Release, June 19, 1998.

²⁵⁹Given the nature of LPTV stations, we will presume that all LPTV's qualify as small entities.

²⁶⁰Census for Communications' establishments are performed every five years ending with a "2" or "7". See Economics and Statistics Administration, Bureau of Census, U.S. Department of Commerce.

²⁶¹The amount of \$10 million was used to estimate the number of small business establishments because the relevant Census categories stopped at \$9,999,999 and began at \$10,000,000. No category for \$10.5 million existed. Thus, the number is as accurate as it is possible to calculate with the available information.

²⁶²13 C.F.R. § 121.201, SIC Code 4899.

²⁶³1992 CENSUS OF TRANSPORTATION. Series UC92-S-1, Table 2D, Employment Size of Firms: 1992, SIC Code 4899.

²⁶⁴47 C.F.R. 100 *et seq.*

any economic impact in the market place. The rule will primarily affect DTH satellite operators, carriers and distributors, as well as full power commercial stations that are affiliates of national networks. The latter businesses generally do not fall into the category of small entities. Any adverse effect on the satellite industry is primarily the result of SHVA itself, and the actions we take represent our efforts to maximize competition including competition by small businesses consistent with faithfully interpreting the Act.

G. Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rule Changes

9. None.

Appendix B

§73.686(d) Collection of field strength data to determine television signal intensity at an individual location – cluster measurements.

(1) *Preparation for measurements.*

(i) *Testing antenna.* The test antenna shall be a standard half-wave dipole tuned to the visual carrier frequency of channel being measured.

(ii) *Testing locations.* At the location, choose a minimum of five locations as close as possible to the specific site where the site's receiving antenna is located. If there is no receiving antenna at the site, choose the minimum of five locations as close as possible to a reasonable and likely spot for the antenna. The locations shall be at least three meters apart, enough so that the testing is practical. If possible, the first testing point should be chosen as the center point of a square whose corners are the four other locations. Calculate the median of the five measurements (in units of dBu) and report it as the measurement result.

(iv) *Multiple Signals.* If more than one signal is being measured (i.e., signals from different transmitters), use the same locations to measure each signal.

(2) *Measurement Procedure.* Measurements shall be made in accordance with good engineering practice and in accordance with this section of the Rules. At each measuring location, the following procedure shall be employed:

(i) *Testing Equipment.* Measure the field strength of the visual carrier with a calibrated instrument with a bandwidth of at least 450 kHz, but no greater than one megahertz. Perform an on-site calibration of the instrument in accordance with the manufacturer's specifications. The instrument must accurately indicate the peak amplitude of the synchronizing signal. Take all measurements with a horizontally polarized dipole antenna. Use a shielded transmission line between the testing antenna and the field strength meter. Match the antenna impedance to the transmission line, and, if using an unbalanced line, employ a suitable balun. Take account of the transmission line loss for each frequency being measured.

(ii) *Weather.* Do not take measurements in inclement weather or when major weather fronts are moving through the measurement area.

(iii) *Antenna Elevation.* When field strength is being measured for a one-story building, elevate the testing antenna to 6.1 meters (20 feet) above the ground. In situations where the field strength is being measured for a building taller than one-story, elevate the testing antenna 9.1 meters (30 feet) above the ground.

(iv) *Antenna Orientation.* Orient the testing antenna in the direction which maximizes the value of field strength for the signal being measured. If more than one station's signal is being measured, orient the testing antenna separately for each station.

(3) *Written Record shall be made and shall include at least the following:*

- (i) A list of calibrated equipment used in the field strength survey, which for each instrument, specifies the manufacturer, type, serial number and rated accuracy, and the date of the most recent calibration by the manufacturer or by a laboratory. Include complete details of any instrument not of standard manufacture.
- (ii) A detailed description of the calibration of the measuring equipment, including field strength meters, measuring antenna, and connecting cable.
- (iii) For each spot at the measuring site, all factors which may affect the recorded field, such as topography, height and types of vegetation, buildings, obstacles, weather, and other local features.
- (iv) A description of where the cluster measurements were made.
- (v) Time and date of the measurements and signature of the person making the measurements.
- (vi) For each channel being measured, a list of the measured value of field strength (in units of dBu and after adjustment for line loss and antenna factor) of the five readings made during the cluster measurement process, with the median value highlighted.

Appendix C

COMMENTS

- | | | | |
|-----|--|-----|--|
| 1. | ABC, CBS, Fox, and NBC
Television Network Affiliate Assn | 30. | Brueggeman, William |
| 2. | Aeder, Michael | 31. | Bushway, Courtney D. |
| 3. | A. H. Belo Corporation | 32. | Cadavid, Carlos |
| 4. | Alexander, Dennis Jay | 33. | California Oregon Broadcasting |
| 5. | Allum, Raymond G. | 34. | Cantella, Vince |
| 6. | Association for Maximum Service
Television (MSTV) | 35. | Cantisano, Richard |
| 7. | Association of America's Public
Television Stations (APTS) | 36. | Capital of Texas Public
Telecommunications Council |
| 8. | Association of Local Television
Stations, Inc. (ALTV) | 37. | Capitol Broadcasting Co., Inc. |
| 9. | Arkansas Broadcasters Association | 38. | Caprez, Randy R. |
| 10. | Bailey, Michael E. | 39. | Catamount Broadcast Group |
| 11. | Baldrige, Susan | 40. | Cathey, Ben H. |
| 12. | Ball, Pamela | 41. | CBS Corporation |
| 13. | Bandy, Bo | 42. | Cedar Rapids Television Company |
| 14. | Bandy, James D. | 43. | Cheever, Susan |
| 15. | Barlean, John | 44. | Chitty, Louis |
| 16. | Belina, Greg | 45. | Clark, Danny |
| 17. | Bell, Randy | 46. | Clark, Ross L. |
| 18. | Benedek Broadcasting Corporation,
Chronicle Broadcasting Company,
Draper Communications, Inc., LIN
Television Corporation, Midwest
Television, Inc., Paxton Media
Group, Inc., Post-Newsweek Stations,
Inc., Raycom Media, Inc., and
Spartan Communications, Inc. (joint
comments) | 47. | Clear Channel Communications |
| 19. | Biby Engineering Services P.C. | 48. | Coffield, Frank |
| 20. | Blake, Baird A. | 49. | Coggins, Kevin |
| 21. | Blankenship, Penny | 50. | Conditt, Rebecca |
| 22. | Bloom, Ray | 51. | Cordillera Communications, Inc.,
Cosmos Broadcasting Corporation,
Cox Broadcasting, Inc., Independence
Television Company & Media
General Broadcasting, Inc. |
| 23. | Boline, John | 52. | Corporation for General Trade |
| 24. | Bowes, John E. | 53. | Davidson, Donald |
| 25. | Bowman, Noel | 54. | Deaner, Mark E. |
| 26. | Brechner Stations | 55. | Decisionmark Corp. |
| 27. | Brian, Tom | 56. | DirecTV, Inc. |
| 28. | Brooks Broadcasting LLC | 57. | Dreyer, John H. |
| 29. | Brooks, Robert | 58. | Echostar Communications Corp. |
| | | 59. | Ekart, Gary |
| | | 60. | Elam, John |
| | | 61. | Electronics Technicians Assn, Int'l. |
| | | 62. | Ellsworth, Benjamin |
| | | 63. | Entravision Holdings LLC |
| | | 64. | Farris, Jr., Carl S. |
| | | 65. | Festog, David |

66. Fisher Broadcasting, Inc.
67. Fox Broadcasting Company
68. Fulkerson, Jo
69. Gaines, Richard L.
70. Gant, Susan
71. Garner, James and Claudia
72. Gilmore Broadcasting Corp.
73. Gocom Communications LLC
74. Godfrey, Chuck E.
75. Gonser, Tom
76. Granite Broadcasting Corporation
77. Grant Broadcasting Group
78. Green, Lyman C.
79. Greenwood, Bob and Sally
80. Griffith, Rebecca
81. Grimsley, Robert
82. Grocott, Terry P.
83. Gustafson, David H.
84. Hale, Gerald L.
85. Halstead, Roger D.
86. Hamilton, Ralph B.
87. Hammett & Edison, Inc.
88. Hammonds, Trevor G.
89. Harris, Charles
90. Hassid, Jack
91. Hauser, William
92. Hearst-Argyle Television, Inc.
93. Heaton, Gigi
94. Hegenstaller, Dennis R.
95. Henderson, T.A.
96. Herman, Tommy
97. Herndon, Bill
98. Hoffman, Joseph L.
99. Holston Valley Broadcasting Corp.
100. Hubbard Broadcasting, Inc.
101. Hunt, James B., Governor, N.C.
102. JME Media, Inc.
103. Johnson, Bobby J.
104. Jones, Cecile
105. Jones, Claude P.
106. KASW(TV)
107. KEYC-TV
108. KIEM-TV
109. King, Edward
110. King, John E.
111. Kirchner, Ken
112. Kitchen, Kevin
113. Kiralla, John S.
114. KKCO-TV
115. KLAX-TV
116. Knab, Terry
117. Knief, H.C.
118. Kohl, Steven
119. Kuhn, David
120. Laboone, Michael W.
121. Lacasse, Norman R.
122. Lamco Communications, Inc.
123. Laquintano, Robert
124. Lawrence, David R.
125. Leahy, Patrick (Senator)
126. Lear, James G.
127. Lee Enterprises, Inc.
128. Lefevre, D. Meade
129. Lenchus, Rachelle and Richard
130. Local TV on Satellite (LTVS)
131. Louisiana Television Broadcasting Corp.
132. Lowrie, Max
133. Manning, Peter L.
134. Mansfield, William T.
135. Maranatha Broadcasting Company
136. Marchino, Martha J.
137. Marlowe, Ronald J.
138. McCormack, Donald
139. McGinnis, Jr., Bryan H.
140. McPherson, Jr., William C.
141. Medeiros, Victor
142. Media Venture Management, Inc.
143. Meredith Corporation
144. Miller, Ricky E. and Theresa J.
145. Mobile Video Tapes, Inc.
146. Montclair Communications
147. Montgomery Communications, Inc.
148. Moore, Jr., Donald L.
149. Morgan Murphy Stations
150. Moyer, John
151. Mt. Mansfield Television, Inc.
152. Named State Broadcasters Assn
153. Natl Assn of Broadcasters (NAB)
154. National Broadcasting Co. (NBC)
155. National Communications, Inc.
156. National Football League

157. National Rural Electric Coop. Assn.
158. National Rural Telecommunications Cooperative (NRTC)
159. Nelson, Bill
160. New Mexico Broadcasters Assn.
161. Newton, Mark
162. NOE Corp. LLC
163. North Carolina and Virginia Assn of Broadcasters
164. Northpoint Technology
165. Ohanesian, Jay
166. Oliver, Dylan
167. Orton, Ralph
168. Pappas Telecasting, Inc., Morris Network, Inc., and Pikes Peak Broadcasting Company
169. Pegasus Communications Corp.
170. Peters, Jeremy
171. Porgal, John M.
172. Post Company
173. Potaracke, Kelly
174. Powell, C. Randy
175. Primestar Partners L.P.
176. PrimeTime 24 Joint Venture
177. Professional Service Assn. (PSA)
178. Radosta, Dino J.
179. Ragan, Jim
180. Rasbury, Murry P.
181. Raymond, Harry E.
182. Retlaw Enterprises, Inc.
183. Rhodes, Richard and Sharon
184. Ripley, Richard
185. Robinson, Alan T.
186. Roney, T.J.
187. Rovira-Burset, Raul A.
188. Sanderson, E.H.
189. Satellite Broadcasting and Communications Assn. (SBCA)
190. Schick, Cynthia
191. Schmidt, J.E.
192. Schultz, William M.
193. Seelinger, Brian M.
194. Shapiro, Edward L.
195. Shockley Communications Corp.
196. Small Cable Business Assn (SCBA)
197. Small, Robert
198. Smith, Debra
199. Snell, Jr., Donald F.
200. Stewart, David
201. Superstar/Netlink Group, LLC
202. Sutton, Robert
203. Swain, Keith L.
204. Tanner, Garth
205. Taylor, George W.
206. Tennant, Raymond C.
207. Texas Television, Inc.
208. Thompson, Dave
209. Traweek, Gary
210. Trodick, Marie J.
211. TV-67, Inc.
212. Vachal, Joel T.
213. Vanpool, Gary C.
214. Virginia Broadcasting Corporation
215. Wade, Randy
216. Wallace, Jessica
217. Wallace, Vaughn
218. Walt Disney Company
219. Warren, Ronald
220. Waterman Broadcasting Corp of Florida
221. Watson, Joe D.
222. WB Television Network
223. Wedel, James
224. Weigel Broadcasting Co.
225. West, Jeff
226. Wheaton, Gordon
227. Wiegand, John V.
228. Williams, Gary O.
229. Wilmington Telecasters, Inc.
230. Withers Broadcasting Companies
231. Woodruff, Rick
232. Wright, John
233. WWNY-TV
234. Young, William A.

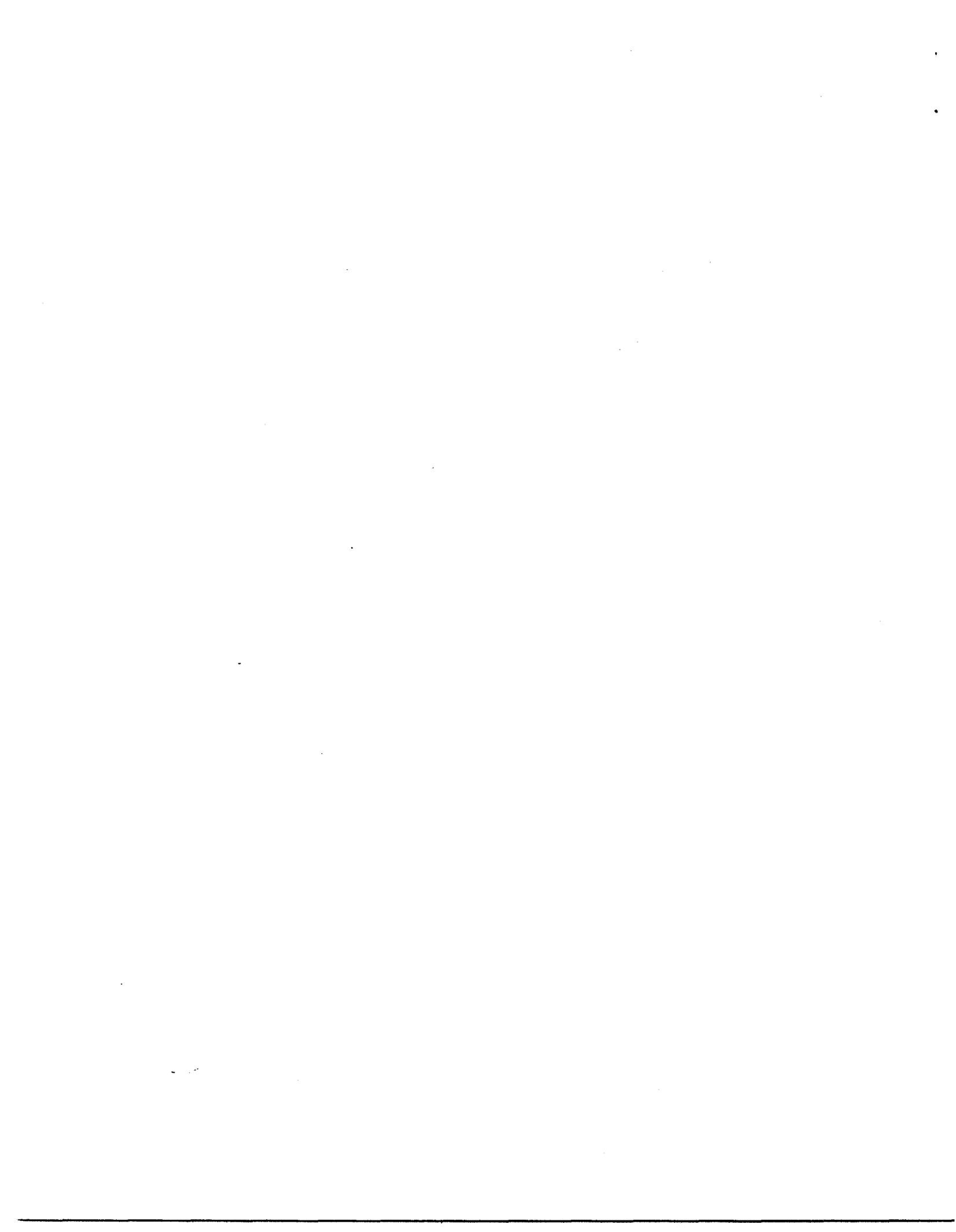


REPLY COMMENTS

1. ABC, CBS, Fox, and NBC Television Network Affiliate Associations
2. ACC Satellite TV
3. Association for Maximum Service Television (MSTV)
4. Association of Local Television Stations, Inc. (ALTV)
5. Bassett, Keith W.
6. Comanche County Memorial Hospital
7. DirecTV, Inc.
8. Echostar Communications Corporation
9. Granite Broadcasting Corporation
10. Gray Communications System, Inc.
11. KXLT-TV
12. McClure, Mary
13. Mt. Mansfield Television, Inc.
14. National Association of Broadcasters (NAB)
15. National Rural Telecommunications Cooperative (NRTC)
16. Nebraska Television Network
17. New Mexico Broadcaster Association
18. Pappas Telecasting, Inc., Morris Network, Inc., and Pikes Peak Broadcasting Company
19. Pegasus Communications Corporation
20. Primestar Partners L.P.
21. PrimeTime 24 Joint Venture
22. Professional Service Association
23. Satellite Broadcasting and Communications Association (SBCA)
24. South Sacramento/Greenhaven Chamber of Commerce
25. Superstar/Netlink Group LLC
26. United Way of Lawton-Fort Sill
27. U.S. Copyright Office

SUPPLEMENTAL FILINGS

1. ABC, CBS, Fox, and NBC Television Network Affiliate Associations (joint filing)
2. National Association of Broadcasters (NAB)



LATE-FILED COMMENTS

1. Allison, Lynda
2. Austin, Ada
3. Ball, Penny
4. Ballard, Wynette
5. Barcus, Ralph E.
6. Barker, Francis
7. Barnes, Billy T.
8. Beard, Marcia
9. Blackledge, John
10. Blum, Vera
11. Blythe, Norma L.
12. Bostuck, William
13. Bowman, Jim
14. Bradley, Mrs. Homer C.
15. Brown, Sharon
16. Burgess, Sharon
17. Carlson, Christopher
18. Cary, Emily
19. Clark, Mr. & Mrs. James
20. Cook, Jim
21. Corbitt, James E.
22. Courtney, Robert
23. Cox, Don A. & Joyce A.
24. Craig, Joe & Rose
25. Crouse, Mrs. L.R.
26. Cyrus, Christopher A.
27. Daly, Robert
28. Daniels, Raymond
29. Davis, Pamela & Anthony
30. DeForest, Robert & Norma
31. Doty, Harvey L.
32. Doyle, Sanford D.
33. Duchemin, Masena & James
34. Engley, Thomas W.
35. Entman, F.V.
36. Erler, Paul W.
37. Farber, James F.
38. Ferree, Connie
39. Fike, Mabel M.
40. Fisher, Thomas F.
41. Fisk, Orville & Barbara
42. Floyd, Cathy L.
43. Foley, Kathleen
44. Frantz, Harold E.
45. Fulks, Charles O.
46. Gallagher, Charles A.
47. Grand, Cey J.
48. Green, Mr. & Mrs. Austin
49. Griffey, Clyde L. & Cecilia P-N
50. Grissom, Shirley
51. Guynn, Ruth
52. Hedrick, James E.
53. Heit, Raymond & Shirley
54. Helleseth, T.L.
55. Herman, Gary & Glenna
56. Hiddleston, W.M.
57. Hodges, Ann V.
58. Hoffman, Donald R. & Patricia A.
59. Hoholek, Dolores
60. Hollar, Turner
61. Holloway, James
62. Holmberg, Mr. & Mrs. Henry
63. Hooks, Elizabeth
64. Hopkins, Larry W.
65. Hosler, Wilbur & Violet
66. James, Trenton & Clark
67. Janson, Frederick C. Sr.
68. Jensen, Russell L.
69. Johnson, Ann
70. Johnson, J. Wayne
71. Johnson, Martha
72. Jones, Mark
73. Judge, Ralph D. & Sophia V.
74. K&B Electronics
75. Keaton, Mrs. Rose
76. Keller, Dona J.
77. Kieffer, Don
78. Kinnis, Kevin
79. Koci, Paul
80. Kuehnl, Mrs. Shirley
81. Kurtz, David
82. Kyler, Donald
83. LaFever, Howard & Laura
84. Landon, James A.
85. Layton, Edna
86. Leaks, Robert
87. Little, Bill & Maxine
88. Lockard, Gary O.

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- | | | | |
|------|--------------------------------|------|----------------------------|
| 89. | Long, Carl R. | 135. | Schlenker, Ralph |
| 90. | Luce, Jack E. & Cynthia K. | 136. | Schuster, D. |
| 91. | Madsen, T.O. | 137. | Sheets, Mr. & Mrs. Stanley |
| 92. | Martin, James | 138. | Shipley, Robert |
| 93. | Martin, Robert A. | 139. | Shipman, Roberta & Robert |
| 94. | Mazzeo, Robert J. (M.D.) | 140. | Siebert, Carolin |
| 95. | McAlary, Shelly | 141. | Splan, Mrs. Florence |
| 96. | McAlister, John H. | 142. | Steele, Kenneth |
| 97. | McBride, Lauren | 143. | Stewart, Sandra |
| 98. | McGarver, Herbert | 144. | Stromberg, Paul |
| 99. | McHale, Patricia & Charles | 145. | Suit, Jim |
| 100. | McKenzie, Bonnie | 146. | Suma, Mark Daniel |
| 101. | McLoughlin, David | 147. | Tackett, Vilma |
| 102. | McMullin, Frank | 148. | Tamosaitis, John |
| 103. | McNeil, Stanley D. | 149. | Teaster, Lucille |
| 104. | Meeks, James G. | 150. | Thomas, Joe W. |
| 105. | Meigs, Rebecca H. | 151. | Thompson, Rector A. |
| 106. | Menton, William G. | 152. | Totman, Stan & Betty |
| 107. | Miller, Dale | 153. | Trent, Billy Earl |
| 108. | Miller, Forrest D. | 154. | Troy, James R. |
| 109. | Miller, Frank N. | 155. | Tuttle, George Sr. |
| 110. | Miller, Harold A. | 156. | Twaddle, Michael L. |
| 111. | Millhouse, Mr. & Mrs. Richard | 157. | Tyrone, Jimmy W. |
| 112. | Mitchell, Clair W. | 158. | VanHorn, Robert & Lorraine |
| 113. | Morse, Charles H. | 159. | Wagoner, Brenda |
| 114. | Nichols, Lori | 160. | Warren, Joyce E. |
| 115. | O'Dell, Janice G. | 161. | Wetmore, Vernon |
| 116. | Page, Desiree M. | 162. | Whipple, Harrison |
| 117. | Parks, Mr. & Mrs. Joel | 163. | Wildberger, Owen & Susan |
| 118. | Patchen, Don & Betty | 164. | Williams, Marcellus J. |
| 119. | Perrin, Ron & Jeri | 165. | Wilkinson, Jahnice J. |
| 120. | Perry, Earl | 166. | Wilson, Larry & Gina |
| 121. | Peterson, Mr. & Mrs. Talbert | 167. | Wilson, William B. |
| 122. | Polhamus, Carol M. | 168. | Woepfel, David W. |
| 123. | Print, Mr. & Mrs. Howard B. II | 169. | Wolford, Brenda L. |
| 124. | Pruitt, Nellie | 170. | Wood, Edna |
| 125. | Puma, Morris M. | | |
| 126. | Putnam, Joe & Judy | | |
| 127. | Pyle, Shirley S. | | |
| 128. | Robertson, Jimmy R. | | |
| 129. | Root, Charles | | |
| 130. | Rutland, Mark & Robin | | |
| 131. | Sabitus, Mary | | |
| 132. | Selwood, Eugene | | |
| 133. | Scheck, Clifford | | |
| 134. | Schlappi, Carl W. & Opal J. | | |

**JOINT STATEMENT OF CHAIRMAN WILLIAM E. KENNARD
AND COMMISSIONER SUSAN NESS**

Today the Commission takes several steps to help ensure that those consumers who cannot receive acceptable over-the-air signals from their local broadcast stations have a lawful alternative means to receive network programming via satellite under the Satellite Home Viewer Act. The Commission's ability to make significant changes in this area is constrained by the terms of the SHVA, which says that only those viewers who cannot receive an "over-the-air signal of grade B intensity" are considered "unserved" and therefore eligible to receive distant network signals. Thus, we could not, and have not, extended the SHVA to permit delivery of satellite network broadcast signals to consumers who *can* receive an adequate local over-the-air signal.

By our action today, however, we have created a more accurate method of identifying those consumers who are truly unserved within the meaning of the statute, and therefore eligible for satellite-delivered network programming. Our action will help not only those individual subscribers who, under other tests, might be considered to be "served" even though they cannot receive an acceptable television picture, but will better enable the DBS industry to become a true competitor to cable, which will help all consumers.

We have tried to be as aggressive as possible -- consistent with Congressional intent -- in protecting American consumers in this order. Some commenters urged that we take the additional step of changing the confidence factor in the predictive model that we endorse from 50% to 90%. If we believed that changing the predictive model to include a 90% confidence factor would ensure that more unserved households would be able to get satellite-delivered network signals, we certainly would have voted to make this change. Indeed, at first blush, the concept of a 90% confidence factor seems appealing. However, as discussed in the Report and Order, adopting a 90% confidence factor would not ensure more accuracy, but rather would significantly overpredict the number of unserved households, undermining Congress's intent in the statute. The model the Commission endorses in this order -- which includes a 50% confidence factor -- is a more sound predictor of who is actually served and unserved. Thus, it is more likely to be relied upon by the parties and in turn will likely result in fewer actual measurements having to be taken, which is, after all, the purpose of using a predictive model.

We have gone as far as we can under the SHVA to enable consumers to receive network programming via satellite. A more comprehensive solution to this problem -- including, for example, allowing delivery of local broadcast signals into local markets -- would require Congressional action. We look forward to working with Congress to facilitate robust competition between DBS and cable service providers, bringing more choices and lower prices in video programming to the American public, while not impairing the viability of over-the-air broadcasting.

We also call on the satellite and broadcast industries to cooperate in ensuring that consumers receive the service which they are entitled to receive under the SHVA.



**STATEMENT OF COMMISSIONER HAROLD FURCHTGOTT-ROTH,
DISSENTING IN PART**

**In re: Satellite Delivery of Network Signals to Unserved Households for Purposes of the
Satellite Home Viewer Act**

I commend the Cable Services Bureau, the Office of Engineering and Technology, the Mass Media Bureau, and the International Bureau for their fine work on this Report & Order. Unfortunately, I cannot join Part III, which makes legislative recommendations to Congress regarding the delivery of network signals via satellite.

As I have previously explained, I do not believe that, absent an express request from Congress, making recommendations about how the law should be changed is an appropriate function for the Federal Communications Commission. *See, e.g.*, 1997 Report on the Status of Competition, 13 FCC Rcd 1034 (1998) (separate statement of Commissioner Harold Furchtgott-Roth). The Commission is bound to take the law as Congress makes it and to implement the law objectively; yet when we criticize extant statutes, enacted by Congress and signed into law by the President, we draw that objectivity into doubt. Moreover, as a creature of Congress' delegated authority, the Commission takes its direction from that body, not the other way around.

Even if it were appropriate for the agency to suggest to Congress how it ought to legislate (or how it has erred by enacting certain legislation), such suggestions could plausibly involve, at most, communications law and policy. This item, however, ventures with its recommendations boldly into copyright law, an area in which the Commission has no expertise or authority, as the item itself implicitly acknowledges. *See supra* at para. 28. We simply do not know where, and on what, we tread when we recommend a particular change in intellectual property rights. We simply do not fully understand what problems such a change might trigger in that body of law. If the Copyright Office made recommendations to Congress on how to write communications statutes, I do not think anyone would give them much weight. It seems to me that the converse is equally true.

For these reasons, I would not have recommended legislative action to Congress in this item, nor would I have indicated that existing statutes are unfair or unwise.

