

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

In the Matter of)	
)	
Establishment of a Model for Predicting)	ET Docket No. 10-152
Digital Broadcast Television Field Strength at)	
Individual Locations)	

**COMMENTS OF THE
NATIONAL ASSOCIATION OF BROADCASTERS AND
THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION**

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Summary

As explained herein, NAB and MSTV believe the modifications proposed in this docket are not warranted. The Commission has repeatedly recognized that the methodology in the ILLR model, as modified over time, has proven successful in providing an accurate and reliable predictor of signal strength. It has been well accepted by both the broadcast and DBS industries. Given its proven track record, any need to expend Commission and industry resources to make and implement marginal refinements is highly dubious.

Significantly, there is no statutory requirement that the Commission undertake this rulemaking. While the Commission does have an obligation to establish procedures for continued refinement of the ILLR model using additional data as it becomes available, the modifications proposed in this rulemaking do not purport to do this. Rather, they propose basic and fundamental changes to the prediction model that go far beyond refinements and alter the very science used by the ILLR model.

Both Congress and the Commission have established high standards in considering whether to adopt modifications to the ILLR model. The test is whether the proposed refinement will produce predictions that are closer to the results of actual field testing in predicting whether households actually are served by local affiliates. In applying this standard, the Commission has wisely and appropriately applied a cost/benefit test to proposed modifications, refusing to adopt those that, at best, would provide only marginally more accurate predictions unlikely to change the final determination—whether a household is, or is not, served by a local television station.

The modifications proposed in the *Notice* are problematic on a number of levels:

Neither the details nor the source code underlying the proposal have been made publicly or privately available. Moreover, the source code appears to be a proprietary copyrighted work

product. Accordingly, there is no meaningful way to begin to evaluate the proposed modifications.

The proposed modifications have not been peer reviewed by the scientific and engineering communities, and there is no evidence that the results obtained are accurate and can be replicated. Moreover, because the existing Longley-Rice model is a reference benchmark used worldwide, adoption of the proposed modifications could create a model in the U.S. different from that employed elsewhere.

Neither the *Notice* nor the proponent of the proposed modifications provides any evidence that the modifications would actually increase the accuracy of the ILLR model. The data provided shows virtually all of the prediction errors in the proposed model to be positive, which will do nothing to more accurately predict eligibility to receive distant signals—the whole point of the exercise.

For these reasons, further consideration of the modification proposed in the *Notice* is not warranted.

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The National Association of Broadcasters (“NAB”)¹ and the Association for Maximum Service Television (“MSTV”)² hereby submit these comments in response to the Further Notice of Proposed Rulemaking (“*Notice*”) released on November 23, 2010, in the above-captioned proceeding. In the *Notice* the Commission seeks comment on a proposal by Sidney Shumate to modify the digital Individual Location Longley-Rice (“ILLR”) model set forth in newly-adopted OET Bulletin No. 73, The ILLR Computer Program for Predicting Digital Television Signal Strengths at Individual Locations.

¹ The National Association of Broadcasters is a nonprofit trade association that advocates on behalf of free, local radio and television stations and also broadcast networks before Congress, the Federal Communications Commission and other federal agencies, and the Courts.

² The Association of Maximum Service Television is a nonprofit trade association that advocates, on behalf of local radio and television stations and broadcast networks, before Congress, the Commission and other federal agencies, and the courts.

I. Background

The Commission originally adopted the ILLR model in CS Docket No. 98-201 as an aid to the broadcast and satellite industries by providing a reliable and accurate means of predicting whether an individual household was “served” or “unserved” by local television signals affiliated with a particular network. The prediction was a tool to determine the household’s eligibility under the Satellite Home Viewer Act (“SHVA”) to receive a distant signal of a station affiliated with the same network.³ Soon thereafter, Congress codified the use of the ILLR model when it enacted the Satellite Home Viewer Improvement Act of 1999 (“SHVIA”). In SHVIA, Congress also instructed the Commission to improve the ILLR model by ensuring that the model appropriately took into account terrain, building structures, and other land cover variations, and it directed the Commission to “establish procedures for the continued refinement in the application of the model by the use of additional data as it becomes available.”⁴ The Commission did both, incorporating U.S. Geological Survey (“USGS”) Land Use and Land Cover (“LULC”) clutter losses into the model and leaving the docket open to receive additional data should it become available.⁵

In the Satellite Home Viewer Extension and Reauthorization Act of 2004 (“SHVERA”), Congress directed the Commission, *inter alia*, to develop a predictive methodology for determining whether a household is unserved by an adequate digital signal under the satellite

³ See *Satellite Delivery of Network Signals to Unserved Households for Purposes of the Satellite Home Viewer Act*, CS Docket No. 98-201, 14 FCC Rcd 2654 (1999).

⁴ 47 U.S.C. § 339(c)(3) (1999).

⁵ See *Establishment of an Improved Model for Predicting the Broadcast Television Field Strength Received at Individual Locations*, ET Docket No. 00-11, 15 FCC Rcd 12118 (2000).

act's "unserved household" definition.⁶ The Commission conducted an exhaustive inquiry into the adequacy of its digital signal strength standard in 47 C.F.R. § 73.622(e)(1) and testing procedures in 47 C.F.R. § 73.686(d) for purposes of transitioning the satellite law's distant network signal scheme to a DTV world and recommended to Congress a digital ILLR model for use in such a world.⁷

Finally, in the Satellite Television Extension and Localism Act of 2010 ("STELA"), Congress directed the Commission to develop and prescribe a predictive model for determining the ability of individual locations to receive signals in accordance with the signal intensity standard in 47 C.F.R. § 73.622(e)(1) and, in doing so, to rely on the digital ILLR model the Commission had recommended to Congress in 2005.⁸ With the adoption of OET Bulletin 73 in this docket,⁹ the Commission has fulfilled this task. STELA, like SHVERA before it, continues to contain the provision originally enacted as part of SHVIA directing the Commission to "establish procedures for the continued refinement in the application of the model by the use of additional data as it becomes available."

⁶ See 47 U.S.C. § 339(c)(1)(B)(iv).

⁷ See *Satellite Home Viewer Extension and Reauthorization Act of 2004, Study of Digital Television Field Strength Standards and Testing Procedures*, Report to Congress, ET Docket No. 05-182, FCC 05-199 (Dec. 9, 2005).

⁸ See 47 U.S.C. § 339(c)(3)(A).

⁹ See *Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations*, Report and Order, ET Docket No. 10-152, FCC 10-194 (Nov. 23, 2010).

II. The Current ILLR Model Is Time-Tested, Has a Proven Track Record, and Is Well-Accepted by the Affected Industries

As the Commission has repeatedly recognized, the “methodology in the ILLR model as modified over time has been time-tested and proven successful,”¹⁰ with the ILLR model itself having “proven over time to be an accurate and reliable predictor of signal strength and . . . well accepted by both the broadcast and DBS industries.”¹¹

The success of the ILLR model has been a critical element in Congress’s policies to promote local-into-local satellite service, from the initial creation of a royalty-free statutory copyright license in SHVIA, to the implementation of the “if local, no distant” policy in SHVERA, and finally to the incentives provided to DISH Network to offer local-into-local service in all 210 DMAs in STELA. Today, DISH, in fact, offers local-into-local service in every television market, and DIRECTV offers local-into-local service in at least 163 television markets providing local service to approximately 96% of the nation’s television households.¹²

¹⁰ *Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations*, Report and Order, ET Docket No. 10-152, FCC 10-194 (Nov. 23, 2010), at ¶ 18.

¹¹ *Satellite Home Viewer Extension and Reauthorization Act of 2004, Study of Digital Television Field Strength Standards and Testing Procedures*, Report to Congress, ET Docket No. 05-182, FCC 05-199 (Dec. 9, 2005), at ¶ 133; *see also id.* at ¶ 142 (stating that the ILLR model “has served the industry well as it has proven to be highly accurate over time”). *See also Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations*, Notice of Proposed Rulemaking, ET Docket No. 10-152, FCC 10-133 (July 28, 2010), at ¶ 12 (“The SHVIA ILLR model has proven over time to be an accurate and reliable predictor of analog TV signal strength and has been well accepted by both the broadcast and DBS industries.”).

¹² *See* DIRECTV, Inc., *Satellite Television Extension and Localism Act of 2010 (STELA) Section 305 Report* (filed Nov. 23, 2010) (reporting that DIRECTV provides local-into-local satellite service in 162 DMAs). Since the filing of this report, DIRECTV has launched local-into-local satellite service in at least one additional market, the Salisbury DMA.

The Commission has correctly recognized that the success of local-into-local satellite service has meant a corresponding decline in the very *raison d'être* of the ILLR model: “[W]hen the satellite television providers offer local-into-local signals for most, if not all, TV designated market areas, . . . the requirements of [the satellite laws] with respect to distant signal retransmission will be moot in most cases.”¹³ “We therefore anticipate that the new digital ILLR model will be needed far less frequently than the analog SHVIA ILLR model was used in previous years.”¹⁴

Given the ILLR model’s proven track record, and its declining significance in the regime governing satellite retransmission of television signals, the need to expend Commission and industry resources to make and implement marginal refinements is highly dubious. Moreover, Congress has expressed its desire to eliminate the satellite distant signal license entirely,¹⁵ and this would obviously further reduce, if not eliminate altogether, the use of the ILLR model in this context.

¹³ *Satellite Home Viewer Extension and Reauthorization Act of 2004, Study of Digital Television Field Strength Standards and Testing Procedures*, Report to Congress, ET Docket No. 05-182, FCC 05-199 (Dec. 9, 2005), at ¶143.

¹⁴ *Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations*, Report and Order, ET Docket No. 10-152, FCC 10-194 (Nov. 23, 2010), at ¶ 11.

¹⁵ See *Satellite Television Extension and Localism Act of 2010*, §§ 302, 303, Pub. L. No. 111-175, 124 Stat. 1218, 1255-56 (2010).

III. STELA Does Not Require Implementation of the Proposed Modifications to the ILLR Model

Neither STELA nor its predecessors require the Commission to undertake this proceeding to consider, or implement, Mr. Shumate's proposed modifications to the ILLR model. *First*, Section 339(c)(3) only requires the Commission to "establish procedures for the continued refinement in the application of the model by the use of additional data as it becomes available." The Commission has already (and long ago) complied with this requirement. This statute does not require that the Commission consider or adopt any particular refinement in the model.

Second, the statute contemplates refinement "by the use of additional data." This language originated in SHVIA when the Commission was directed to ensure that the model took account of terrain and land cover variations, which the Commission did by incorporating USGS LULC factors. Mr. Shumate's proposal goes beyond just refining the ILLR model through use of additional data; it fundamentally changes the nature of the ILLR model and its underlying mathematical calculations. This is not the type of refinement contemplated by the statutory requirement.

Third, the Commission has wisely and appropriately applied a cost/benefit test in considering proposals to modify the ILLR model when those proposals would make the model

only marginally more accurate. For example, in rejecting a proposal to include surface refractivity in the ILLR model, the Commission stated:

While we agree that it would be desirable to include surface refractivity in the ILLR model as a geographic variable, we believe the effects on the precise signal strength predictions made by the ILLR model would be too small to make a difference, as a practical matter, in the determination of served/unserved status of individual locations.¹⁶

Similarly, in rejecting a proposal to change the UHF dipole planning factor as a result of the DTV transition, the Commission stated:

While the geometric frequency of the UHF band will indeed change from 615 MHz to 573 MHz at the end of the transition when all UHF DTV stations will operate in the channels 14-51 core spectrum, as indicated by the Network Affiliates, we do not believe that a change in the UHF dipole planning factor value is warranted. . . . Given that the difference in the current UHF dipole factor and the dipole factor for the core spectrum UHF channels is only .6 dB and the fact that changing this planning factor would not actually affect the minimum threshold level of signal needed to receive individual stations, we find that this planning factor should not be changed. We conclude that the interests of maintaining stability in the service areas of TV stations outweigh the benefits of providing a small apparent reduction in the level of signal needed to receive UHF DTV stations.¹⁷

And, in this very docket, the Commission has already rejected Mr. Shumate's proposal to scrap preset values of LULC attenuation in the ILLR model and replace them with clutter height and density factors, finding that "it would not be practical to introduce clutter height and density

¹⁶ *Establishment of an Improved Model for Predicting the Broadcast Television Field Strength Received at Individual Locations*, ET Docket No. 00-11, 15 FCC Rcd 12118 (2000), at ¶ 18.

¹⁷ *Satellite Home Viewer Extension and Reauthorization Act of 2004, Study of Digital Television Field Strength Standards and Testing Procedures*, Report to Congress, ET Docket No. 05-182, FCC 05-199 (Dec. 9, 2005), at ¶ 95.

factors into the clutter calculations of the ILLR software at this time as suggested by Mr. Shumate.”¹⁸

In short, the statute does not require adoption of refinements that claim to improve the ILLR model or may allegedly do so, and the Commission has rejected even refinements that are, admittedly, improvements to the model.

IV. Both Congress and the Commission Have Established High Standards to Refine the ILLR Model

Appropriately, both Congress and the Commission have set the bar high for any modifications to the ILLR model. In adopting the refinement provision in SHVIA, the Conference Report states:

The linchpin of whether particular proposed refinements to the ILLR model result in greater accuracy is whether the revised model’s predictions are closer to the results of actual field testing in terms of predicting whether households are served by a local affiliate of the relevant network.¹⁹

And Senator Leahy, the Senate architect behind many of the iterations of the satellite laws, stated:

¹⁸ *Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations*, Report and Order, ET Docket No. 10-152, FCC 10-194 (Nov. 23, 2010), at ¶ 46.

¹⁹ H.R. CONF. REP. NO. 106-464, at 104 (1999). *See also* 145 CONG. REC. H11796 (Nov. 9, 1999) (same) (Joint Explanatory Statement of the Committee of Conference, H.R. 1554, Intellectual Property and Communications Omnibus Reform Act of 1999, of which Title I is the Satellite Home Viewer Improvement Act of 1999); 145 CONG. REC. S14712 (Nov. 17, 1999) (same) (reporting section-by-section analysis of S. 1948, Intellectual Property and Communications Omnibus Reform Act of 1999, of which Title I is the Satellite Home Viewer Improvement Act of 1999).

The FCC has properly recognized that reducing one type of errors, underprediction, while increasing another type of errors, overprediction, does not increase accuracy, but simply puts a thumb on the scale in favor of one side or the other. The issue under Section 119(a)(2)(B)(ii) is the overall accuracy of the model, as tested against available measurement data, with regard to whether a household is, or is not, capable of receiving a Grade B intensity signal from at least one affiliate of the network in question.²⁰

From the initial adoption of the ILLR model, the Commission, too, has recognized: “Importantly, our model should not increase or decrease the number of truly unserved households.”²¹ Later, in its *2005 Report to Congress*, the Commission further stated:

Any predictive model that is prescribed should provide output that is as accurate as possible; anything less would diminish its value as a tool for determining whether a household is able to receive off-the-air digital television signals. . . . This has been borne out by the data on the record of its performance, which shows that using the values adopted by the Commission the ILLR model produces approximately an equal number of over predictions as under predictions.²²

²⁰ 145 CONG. REC. S15022-23 (Nov. 19, 1999) (statement of Sen. Leahy). Obviously, the policy objective of accuracy in determining whether a household is or is not served by a local station affiliated with the relevant network is not affected by whether the accuracy applies to analog or digital television signals. Thus, Senator Leahy’s references to analog Grade B intensity should be fully applicable to digital noise-limited signal intensity.

²¹ *Satellite Delivery of Network Signals to Unserved Households for Purposes of the Satellite Home Viewer Act*, CS Docket No. 98-201, 14 FCC Rcd 2654 (1999), at ¶ 71.

²² *Satellite Home Viewer Extension and Reauthorization Act of 2004, Study of Digital Television Field Strength Standards and Testing Procedures*, Report to Congress, ET Docket No. 05-182, FCC 05-199 (Dec. 9, 2005), at ¶ 148. See also *Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations*, Report and Order, ET Docket No. 10-152, FCC 10-194 (Nov. 23, 2010), at ¶ 46 (“Analysis of the data on the model’s performance shows that using the values used in the SHVIA ILLR model produce approximately an equal number of over-predictions as under-predictions.”).

Data, in fact, have shown the ILLR model's accuracy rate to be almost 95%.²³

In "establish[ing] procedures for the continued refinement" of the ILLR model, the Commission has set a high standard to even trigger a further rule making:

We will initiate a further rule making, i.e., a standard notice-and-comment procedure, to improve the accuracy of the ILLR model upon the filing a petition for such rule making that is supported by high quality engineering studies containing conclusions based on reliable and publicly available measurement data. The highly technical nature of the comments reinforces our view that engineering studies of such high quality are requisite.²⁴

Even before the ILLR refinement provision was codified in SHVIA, the Commission was confronted with a proposal by a satellite carrier to modify the ILLR model to incorporate LULC data. While the Commission recognized that such data could improve the ILLR model, the Commission rejected the proposal at that time because it did not meet the high standards of the scientific method and public transparency and review that it believed were necessary:

We specifically invited interested parties to develop such an application. Before such an application can be used, however, it is necessary that some consensus be developed as to the specifics of the technique involved so that the process is generally understood, the results can be replicated by all who would use the process, and any disputes as to accuracy of the technique can be addressed. Neither DIRECTV, nor any other party, may unilaterally incorporate LULC data into the Commission's ILLR until an application has been publicly reviewed. We again encourage any interested party to develop an application and offer it for comment. Because DIRECTV has not fully offered the details of its

²³ See *Satellite Home Viewer Extension and Reauthorization Act of 2004, Study of Digital Television Field Strength Standards and Testing Procedures*, Report to Congress, ET Docket No. 05-182, FCC 05-199 (Dec. 9, 2005), at ¶ 143.

²⁴ *Establishment of an Improved Model for Predicting the Broadcast Television Field Strength Received at Individual Locations*, ET Docket No. 00-11, 15 FCC Rcd 12118 (2000), at ¶ 21.

application, such review is not possible here. We therefore deny DIRECTV's *Petition for Reconsideration*.²⁵

V. The Proposed Modifications Should Be Rejected Because They Lack Necessary Indicia of Improving the ILLR Model

Mr. Shumate's latest proposals to modify the ILLR model deal with alleged deficiencies in the model with respect to diffraction losses and the use of additional losses in the line of sight range above and beyond the free space loss and two-ray loss. These modifications are basic and fundamental changes to the prediction model that go beyond refinements and do not satisfy the high standards for improving the ILLR model.

It is very important that neither the details nor the source code underlying Mr. Shumate's proposal have been made publicly available for public review. Although Mr. Shumate offered to provide the code upon Commission request on an *ex parte* basis in the 2010 proceeding in ET Docket No. 10-152 to develop the digital ILLR model,²⁶ it appears that the Commission never made such a request. There is no indication in the public record that the Commission has the code available for public inspection. Just as the Commission rejected DIRECTV's early LULC proposal, it is simply premature to consider any proposal for modification of the ILLR model when the details have not even been made available by the Commission prior to the deadline for initial public comment.

²⁵ *Satellite Delivery of Network Signals to Unserved Households for Purposes of the Satellite Home Viewer Act*, Order of Reconsideration, CS Docket No. 98-201, FCC 99-278 (Oct. 7, 1999), at ¶ 8.

²⁶ See *Petition for Rulemaking and Comment* filed by Mr. Sidney E. Shumate, ET Docket Nos. 00-11 & 10-152 (filed Aug. 24, 2010), at 9.

Indeed, Mr. Shumate’s final source code is not even available for private review. NAB and MSTV’s consulting engineers, Meintel, Sgrignoli, & Wallace (“MSW”), had obtained an early version of the code that was actually two separate sets of code. The provided documentation indicated that one set of code (itwom2.0.cpp) is a “drop-in” replacement for the ITM model (the underlying model used in the current ILLR model) in the publicly available SPLAT²⁷ program, while the second (itwom2.0h.cpp), although not clearly indicated in the documentation, appeared to be what would be provided to the Commission. The code in itwom2.0.cpp contained an error and did not initially compile using a standard UNIX C++ compiler, whereas the code in itwom2.0h.cpp did compile. Both sets of code contain four different versions of the “point-to-point” routine that would be called to perform the required computations. MSW contacted Mr. Shumate to determine if the previously obtained code was the most current version and if it is what would be provided to the Commission. In response, Mr. Shumate informed MSW that he was continuing to work on the code.²⁸ Therefore, it is plainly premature to consider Mr. Shumate’s proposed modifications to the ILLR model when the details have yet to be finalized.

It is also of concern that Mr. Shumate’s source code appears to be proprietary and copyrightable work product. This is very different than the current ILLR model, including its use of USGS LULC data. It is potentially problematic that the Commission would modify the

²⁷ SPLAT is an RF Signal Propagation, Loss, And Terrain analysis tool for spectrum between 20 MHz and 20 GHz that is available at www.splat.com.

²⁸ See Engineering Statement of Meintel, Sgrignoli, & Wallace, LLC (attached hereto).

ILLR model, whose use is required by statute, to require the use of a private and proprietary subroutine in order for broadcasters and satellite carriers to comply with the law.

Even if Mr. Shumate were to make his source code publicly available in this proceeding and, in addition, were to provide a free and universal copyright license for its use, his proposed modifications have not been peer-reviewed by the scientific and engineering communities. For instance, Mr. Shumate proposes changes to the diffraction section of the ILLR model. These changes essentially alter the science used by the ILLR model to predict attenuation losses. Changing the science of propagation prediction requires in-depth evaluation and review by independent propagation experts and the scientific community. Such review is essential before accepting these changes. In this regard, merely *presenting* a number of papers at a scientific conference, as it appears Mr. Shumate has done, does not constitute peer review.

Mr. Shumate's proposal is different in kind, not just degree, from earlier proposals to refine the ILLR model. This is not simply accounting for land cover variations by incorporating clutter loss factors or adding other *data* to the model; rather, this proposal would actually alter the fundamental manner in which the signal intensity predictions are calculated. Together these are strong reasons why the scientific and engineering communities are unlikely to confer broad consensus on the proposed modifications and why a reference benchmark should not be altered. At this time, there is no way to know whether Mr. Shumate's proposed modifications do what he claims they do, whether any results obtained can be replicated by any user, whether there are errors in his mathematical calculations and/or in the source code implementing those calculations, or whether there is any consensus to the accuracy of the techniques to be employed.

Tellingly, NTIA would not adopt Mr. Shumate's proposed modifications to the underlying Longley-Rice model.²⁹ Moreover, as Mr. Shumate acknowledges, the underlying Longley-Rice model is "a reference benchmark used worldwide, and to change it now would raise liability and political issues that would not be welcome"³⁰

Most importantly, there is no evidence whatsoever that the proposed modifications would actually increase the *accuracy* of the ILLR model. Mr. Shumate has claimed that, across 1069 test measurements, the average error of the existing ILLR model is +6.61 dBu whereas the average error of his ITWOM model is +1.93 dBu.³¹ Relying on just 1069 test measurements to validate the accuracy of the proposed changes in a model that is applied nationwide in a country as varied as this is plainly insufficient and technically unsound. Moreover, not only is this alleged result unverifiable at the present time, but it provides no information as to whether the proposed modifications result in fewer false positives of predicted television service than the 95% correct prediction rate for the existing ILLR model.³²

²⁹ See Petition for Rulemaking and Comment filed by Mr. Sidney E. Shumate, ET Docket Nos. 00-11 & 10-152 (filed Aug. 24, 2010), at 6.

³⁰ Petition for Rulemaking and Comment filed by Mr. Sidney E. Shumate, ET Docket Nos. 00-11 & 10-152 (filed Aug. 24, 2010), at 6.

³¹ See Petition for Rulemaking and Comment filed by Mr. Sidney E. Shumate, ET Docket Nos. 00-11 & 10-152 (filed Aug. 24, 2010), at 7.

³² As a practical matter, only false positive prediction results matter in the "unserved household" eligibility scheme. If a household is falsely predicted to receive a television signal, then that household is presumptively ineligible to receive a distant network signal, even though in reality the household cannot actually receive the local television signal. The household is therefore potentially left without any television service from the relevant network. The only way to correct a false positive prediction error is for the subscriber to request a site measurement test, which results in additional economic costs to the parties. In contrast, a false negative has virtually no practical effect. If a household is falsely predicted to be unable to receive a local
(continued . . .)

Mr. Shumate provides two charts to compare visually the alleged variance in the errors of the existing ILLR model versus the errors in his ITWOM model in the case of 102 measurement readings for WPGH-TV.³³ The ITWOM chart shows virtually all of its prediction errors to be positive, whereas the existing ILLR (ITM) chart shows the majority of prediction errors to be positive but also numerous prediction errors to be negative. Since the goal of the prediction methodology is to get the prediction of *eligibility* correct, Mr. Shumate's charts, at best, suggest (as limited by visual inspection since no underlying data have been provided) that his proposed modifications might theoretically predict somewhat more precisely the field strength at an individual location but do *not* necessarily more *accurately* predict eligibility under the statutory scheme. Indeed, a methodology that virtually uniformly over-predicts signal strength, even if by only 2 dBu on average, is a methodology that will almost certainly under-predict eligibility and therefore will be *less accurate* than the current ILLR model.³⁴ Thus, at the present time, Mr. Shumate's proposal fails to satisfy the "linchpin" of the refinement provision.³⁵

(continued . . .)

television signal (although in reality the household actually can receive the local television signal), then Decisionmark/TitanTV will inform the satellite carrier that the household was predicted to be eligible to receive a distant network signal, the satellite carrier may commence providing the distant network signal to the subscriber, and the local affiliate will never know a mistake has been made.

³³ See Petition for Rulemaking and Comment filed by Mr. Sidney E. Shumate, ET Docket Nos. 00-11 & 10-152 (filed Aug. 24, 2010), at 8.

³⁴ See Engineering Statement of MSW (attached hereto).

³⁵ H.R. CONF. REP. NO. 106-464, at 104 (1999).

Conclusion

The proposed modifications to the digital ILLR model as set forth in the *Notice* have not been made publicly available prior to the comment deadline, have not been peer-reviewed, and are not generally accepted by the scientific and engineering communities. They have been rejected by the NTIA and appear, based on the limited information released so far, to result in a prediction methodology that may be less accurate than the current model in balancing over-predictions and under-predictions of eligibility for distant network signals. Given these shortcomings, further consideration of the proposed modifications to the current ILLR model—with its 95% accuracy rate, and with its diminishing use in the context of STELA—is not warranted.

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**ENGINEERING STATEMENT OF
MEINTEL, SGRIGNOLI, & WALLACE, LLC**

1. At the request of the National Association of Broadcasters (“NAB”)¹ and the Association of Maximum Service Television (“MSTV”),² the undersigned have prepared this Engineering Statement in connection with the Commission’s further notice of proposed rulemaking relating to the model for predicting broadcast digital television reception.³ The credentials and experience of the undersigned are on file with the Commission and part of the record of this proceeding. We have conducted thousands of digital signal intensity tests in a variety of locations throughout the United States, helped to design and test state-of-the-art digital television receivers, and developed industry-standard computer-based analysis applications and specialized software concerning RF propagation. This Engineering Statement provides the Commission with the benefit of this experience.

¹ The National Association of Broadcasters is a nonprofit trade association that advocates on behalf of free, local radio and television stations and also broadcast networks before Congress, the Federal Communications Commission and other federal agencies, and the Courts.

² The Association of Maximum Service Television is a nonprofit trade association that advocates, on behalf of local radio and television stations and broadcast networks, before Congress, the Commission and other federal agencies, and the courts.

³ Federal Communications Commission, ET Docket No. 10-152, Report and Order and Further Notice of Proposed Rulemaking (released November 23, 2010).

2. In this proceeding, the Commission requests additional information and comment regarding possible modifications to the existing ILLR model utilized for the purpose of determining eligibility to receive distant television signals in the context of satellite viewers.

The Commission received several comments in the proceeding regarding possible changes to the propagation prediction model that is used for determining eligibility for distant network signals.

3. In particular, Mr. Sidney E. Shumate (Shumate) filed comments, on behalf of Givens & Bell, Inc., suggesting specific changes to the model as well as completely new core calculation routines for use by the Commission for the purposes of determining distant signal eligibility. This Engineering Statement is primarily focused on those modifications and changes proposed by Mr. Shumate.

The Shumate Proposal Cannot Be Properly Evaluated

4. For the reasons set forth below, the Shumate proposal cannot be properly evaluated.

5. As noted in Mr. Shumate's Comments in this docket, the initial preliminary copies of the source code were to be made, and subsequently were made, available during October 18-22, 2010 at the IEEE Broadcast Technology Society Symposium. The code distributed by Mr. Shumate and obtained by MSW was actually two separate sets of code. The provided documentation indicates that one set (itwom2.0.cpp) is a "drop-in" replacement for the ITM model (the underlying model used in the current ILLR model) in the SPLAT⁴ program while the second (itwom2.0h.cpp), although not clearly indicated in the documentation, appears to be what is intended to be provided to the FCC in this proceeding.

⁴ SPLAT is an RF Signal Propagation, Loss, And Terrain analysis tool for the spectrum between 20 MHz and 20 GHz available at www.splat.com.

6. Initial attempts to compile and run the software distributed by Mr. Shumate were unsuccessful, and the source code in itwom2.0.cpp was found to have errors which prevented the standard UNIX C++ compiler from properly working. The code in itwom2.0h.cpp did compile.

7. Both sets of code contain four different versions of the “point-to-point” routine that would be called to perform the required computations; however, the documentation is confusing as to exactly which version is being proposed to the FCC for inclusion in this proceeding.

8. During our attempts to get the source code software to run, Mr. William Meintel of our office contacted Mr. Shumate via electronic mail. Mr. Shumate indicated that work was still being done on the software and that the “final” source code was not yet completed and was not ready for evaluation. Mr. Shumate indicated that the “final” code would be completed and filed as comments in this proceeding. Therefore, we are not able to evaluate any of the proposed changes by the deadline for initial comment.

9. As a result, no proper evaluation of the Shumate model can be performed due to the lack of sufficient information and details of the new source code and modified calculations.

The ILLR Model Has a Successful Track Record and Needs No Modifications

10. We have had extensive experience with the ILLR model and its application for both digital and analog television. As noted in our Engineering Statement in SHVERA,⁵ we have analyzed the results of the ILLR model against those of measured signal levels in a variety of locations, environments, terrain, and frequency bands. In our experience, as we noted in our statement, the results of the existing ILLR model accurately determined the eligibility of those

⁵ MSW Engineering Statement in SHVERA Comments of NAB at ¶76.

locations, in the context of distant signals, in 94.4% of the cases. Given the high correlation of the predictions with the measurements, further refinements to the model would, at best, potentially result in only a very small incremental improvement and would not likely yield drastically different results from those of the existing model.

11. The core calculations of the model have been used successfully by the affected industries and consumers for many years prior to the STELA, and it is unnecessary to re-visit the ILLR model at this point in time.

12. We are not aware of any instances of widespread errors or problems with regard to accurate and reliable predictions of signal levels for eligibility determination using the existing ILLR model. That is to say, we have not seen any situations where use of the existing ILLR model created large areas or populations that were predicted to be served by the model, but measurements determined that the model was in error and these homes were, in fact, unserved.

13. Furthermore, given the existing local-into-local services available to consumers from the Satellite Carriers, there are a very small number of potential households for which the model remains relevant and a substantially smaller number still that could benefit from any potential marginal improvements in the prediction model.

14. We understand and agree with the Commission's desire to have an accurate and reliable model. As we have experienced, we have that model today in the existing ILLR model.

There Is No Evidence That the Shumate Modifications Would Increase the Accuracy of the ILLR Model

15. In Mr. Shumate's Comments he provides a graph that indicates the alleged error of the predicted versus measured field strength for 102 measurements for WPGH-TV. It is not known if these measurements were of analog signals or digital television signals. The

comparison of 102 measurements in Pittsburgh with the predicted values using Mr. Shumate's model does not provide a statistically valid sample size to justify the modification of the ILLR model. He further states that he has conducted an additional comparison with 1,069 measurement data points contained in the FCC ECFS system published in February 1996. However, he provides no details about the specifics of these measurement points, including the cities, terrain environment, frequency band (VHF or UHF), whether the comparison is for analog or digital signals, and other important considerations for evaluating the results. Hence, selecting a sample of 1,069 test measurements to validate the accuracy of the proposed changes in the model to be applied nationwide is not sufficient or technically sound to support his claim of average error of only +1.93 dBu.

16. It is important that the Commission evaluate the efficacies of the prediction tool as a whole. In this regard, the precision of the model's field strength prediction is but one measure of its utility in the STELA application. The Commission should also consider how often this predicted field strength value is high or low compared with measured data. While precision is, of course, a highly desirable characteristic in this application, accuracy in predicting eligibility is even more important, and the Commission must also consider whether any errors result in predictions of high or low signal levels. It is especially important in the context of STELA that the prediction errors be balanced, to the extent possible, so that they do not prejudice one party over the other.

17. Mr. Shumate provides two charts to compare visually the alleged variance in the errors of the existing ILLR model versus the errors in his ITWOM model in the case of 102

measurement readings for WPGH-TV.⁶ The ITWOM chart shows virtually all of its prediction errors to be positive, whereas the existing ILLR (ITM) chart shows the majority of prediction errors to be positive but also numerous prediction errors to be negative. Since the goal of the prediction methodology is to get the prediction of *eligibility* correct, Mr. Shumate's charts, at best, suggest (as limited by visual inspection since no underlying data have been provided) that his proposed modifications might theoretically predict somewhat more precisely the field strength at an individual location but do *not* necessarily more *accurately* predict eligibility under the statutory scheme. Indeed, a methodology that virtually uniformly over-predicts signal strength, even if by only 2 dBu on average, is a methodology that will almost certainly under-predict eligibility and therefore will be *less accurate* than the current ILLR model.

18. It is important to strike a proper balance in the prediction errors of any model. The ILLR model effectively distributes errors in its accuracy, and, as we noted in the SHVERA proceeding,⁷ it does an excellent job of balancing the over-predictions with the under-predictions.

Any Proposed Modifications or Changes to the ILLR Model Should Be Peer-Reviewed

19. Any changes in the model need to be exhaustively evaluated and tested to ensure that they do, in fact, improve the model and do not actually result in less accurate or less reliable results. It would be premature for the Commission to adopt any of the proposed changes, as outlined by Mr. Shumate, without an extensive peer analysis of the proposed changes.

20. Since this analysis is incapable of being performed, due to the specifics of the proposal not being made publicly available, no such peer analysis can be performed at this time.

⁶ Petition for Rulemaking and Comment filed by Mr. Sidney E. Shumate, ET Docket Nos. 00-11 & 10-152, at page 8 (filed August 24, 2010).

⁷ MSW Engineering Statement in SHVERA Comments of NAB at ¶¶77-78.

21. The Commission should also undertake an independent review of the changes and conduct research regarding their validity. This is particularly important if changes in the actual point-to-point calculations are contemplated. This change would require an exhaustive research effort to determine the best practices of any proposed changes.

22. Any analysis of the proposed changes and modifications should include an extensive comparison to measured field data over an extended period of time. This data should include a variety of terrain environments (flat, hilly, mountainous), terrain data resolution, vegetation and foliage density, frequency bands (Low-VHF, High-VHF, and UHF), RF path lengths, the number of path obstructions, as well as a variety of both transmit and receive antenna heights.

23. This evaluation should include data not from just one city or one type of environment and should include thousands of measured locations to increase the accuracy of any statistical analysis.

24. The core calculations in the ILLR model have been used for various purposes and have gained acceptance from the engineering and scientific communities. It is a time-tested model that well serves the purposes intended by Congress in STELA. Hence, any changes to this time-tested method should be contingent upon acceptance by the engineering and scientific communities.

25. Only after this additional data collection has been completed and evaluated can serious consideration and peer-review of the Shumate proposal be undertaken.

Conclusions

26. As the Commission concluded in the SHVERA proceeding in ET Docket 05-182, the ILLR model provides a good balance between over-predicting and under-predicting signal

strength and achieves a good compromise in balancing the parameters used in the model.⁸

Mr. Shumate's proposal would potentially alter the fundamental manner in which the signal intensity prediction under this model is calculated.

27. We believe that the Commission should reject the proposed modifications to the existing ILLR model. Given the model's successful track record with regard to eligibility determinations, there is no apparent justification to fix what is not broken.

Respectfully submitted:

/s/

William Meintel

/s/

Gary Sgrignoli

/s/

Dennis Wallace

January 21, 2011

⁸ Report to Congress, The Satellite Home Viewer Extension and Reauthorization Act of 2004; Study of Digital Television Field Strength Standards and Testing Procedures (2005 Report), ET Docket No. 05-182, at ¶143 (released December 4, 2005).