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

In the Matter of	)	
	)	
Establishment of a Model for Predicting	)	ET Docket No. 10-152
Broadcast Television Field Strength	)	
Received at Individual Locations	)	ET Docket No. 06-94
	)	
Measurement Standards for Digital	)	
Television Signals Pursuant to the	)	
Satellite Home Viewer Extension and	)	
Reauthorization Act of 2004	)	

ENGINEERING STATEMENT OF
MEINTEL, SGRIGNOLI, & WALLACE, LLC

1. At the request of the Broadcaster Associations,[1] the undersigned have prepared this Engineering Statement in connection with the Commission's inquiries into establishing a model for predicting broadcast digital television reception and into adopting measurement

[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. The ABC Television Affiliates Association is a nonprofit trade association representing television stations affiliated with the ABC Television Network. The CBS Television Network Affiliates Association is a nonprofit trade association representing television stations affiliated with the CBS Television Network. The FBC Television Affiliates Association is a nonprofit trade association representing television stations affiliated with the FOX Television Network. The NBC Television Affiliates is a nonprofit trade association representing television stations affiliated with the NBC Television network. 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. Collectively, the four network affiliate trade associations represent approximately 750 television stations affiliated with the four major broadcast television networks.

standards for over-the-air digital television signals.[2] The credentials and experience of the undersigned are set forth in Exhibit A. As detailed there, we have, among other things, 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. We attempt in this Engineering Statement to provide the Commission with the benefit of this experience.

2. In this proceeding, the Commission proposes to modify its rules concerning prediction and measurement of over-the-air broadcast signals in light of several provisions of the Satellite Television Extension and Localism Act of 2010 ("STELA").[3]

ILLR Model for DTV Field Strength Prediction in the Context of STELA

3. The Commission seeks comment on its tentative conclusion that the ILLR model can be modified and utilized to determine whether a household is "unserved" by a local network station for purposes of distant signal network eligibility. We agree with the Commission's tentative conclusion that use of the ILLR model, with the Commission's proposed modifications, would meet the objectives of this rulemaking.

4. The ILLR model has been used for various purposes and has gained acceptance from the engineering and scientific communities. It is a time-tested model and should well serve the purposes intended by Congress in the STELA.

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[2] *Notice of Proposed Rulemaking* and Further Notice of Proposed Rulemaking, ET Docket Nos. 10-152 and 06-94 ("*Notice*").

[3] The Satellite Television Extension and Localism Act of 2010 ("STELA") § 203, Pub. L. No. 111-175, 124 Stat. 1218, 1245 (2010).

5. As noted in the NPRM at ¶ 9, to date no difficulties have been encountered with using the ILLR model in the analog realm or in the "interim" digital model. We expect that to continue.

6. As the Commission concluded in the SHVERA proceeding in ET Docket 05-182, the ILLR model provides a good compromise in balancing the parameters used in the model.

7. As noted in the NPRM, the Commission intends in STELA, as it did in the SHVERA proceeding, to keep the record open. Thus, parties with new science or data regarding use of the ILLR model will be able to bring this new information to the Commission for consideration, without the need to petition for a new rulemaking proceeding. Hence, all parties will have a readily available avenue for seeking changes to the model.

Utilizing Outdoor Antennas for DTV Field Strength Prediction in the Context of STELA

8. The Commission should continue to assume use of outdoor antennas. The DTV Transition was premised on that assumption. It would make no sense to abandon this assumption in the context of satellite television because, as we have noted in previous proceedings, the DBS satellite television service relies on precisely located and pointed outdoor antennas. Thus, the application of an indoor antenna for use in the STELA context would be discriminatory.

9. "Indoor Planning Factors" have never been accepted by the engineering and scientific communities due to the many variables that are involved with indoor reception. It is difficult to imagine how any assumptions the Commission might make about indoor reception would be sustainable from an engineering and scientific standpoint.

10. We agree with the NPRM that assuming an indoor antenna would be problematic from both a modeling and a measurement perspective. There is great variability in the types and performance of indoor antennas. This firm has conducted extensive testing on indoor antennas

that are available to consumers in the market. We have found that there are *very* wide differences in performance not only from model to model but within different units of the same model. Therefore, we do not see how arriving at a "median" or "average" antenna could be achieved.

11. Predicting the field strength delivered to an indoor DTV set would be fraught with peril, given factors such as building attenuation, height loss, and antenna performance. Arriving at reasonable assumptions about these various parameters would be a difficult task as they vary depending on the type of construction materials used in the home, the height of the room to be measured relative to the ground level, and where the antenna is placed in the room to be measured or predicted (interior versus exterior rooms). There would be scant scientific data to support these assumptions. To proceed with a scientifically-based set of Indoor Planning Factors, the Commission would need to undertake an extensive research and development effort.

12. In addition, extensive testing over the last two years by this firm has confirmed that the noise floor within the home is a very difficult parameter to predict. Noise from consumer electronic devices such as computers, TV sets, DVD players, gaming systems, and other devices has been found to elevate the VHF noise floor within the indoor environment by a considerable amount. Although these devices are generally required to meet the FCC Part 15 Emission Limits, in practice, these devices are usually in very close proximity to the DTV set and indoor antenna that the consumer is using. This scenario can result in situations where the DTV signal may be of adequate field strength, but it is difficult to measure due to the elevated noise floor.

STELA Requires The Use of OET-69 Planning Factors and Outdoor Antennas

13. STELA requires use of outdoor antennas by specifying the use of the noise-limited contours in Sections 73.683(a) and 73.622(e)(1) of the Commission's Rules. These noise-limited contour values are derived from the OET Bulletin 69 planning factors. In turn, the planning factors include the assumption of an outdoor antenna placed at 10 meters (33 feet) above ground level. OET Bulletin 69, Table 4 on Page 6 (HG2). .

14. If the Commission were to adopt a policy based on indoor antennas, television stations would need to significantly increase their transmitted power to continue to serve their existing coverage areas. This additional power would result in increased interference to other full power stations as well as to low-power and translator stations. Stations that are limited by the UHF "power cap" for DTV would be particularly penalized in this scenario.

15. In its 2005 Report to Congress, the Commission found that the DTV planning factor assumptions for antenna gain, orientation, and placement were appropriate and should not be altered.[4] We concur that these assumptions are appropriate for use in the STELA context.

16. The Commission is right to conclude it would be impractical to account for indoor reception conditions in the DTV planning factors, and that it would be impracticable to establish a regime where households with indoor antennas would be subject to different field strength requirements than those with outdoor antennas. Based on the extensive indoor field testing conducted by this firm, indoor reception would be very difficult to predict or measure in a consistent way. By using an outdoor antenna, the Commission establishes a fair and even-handed policy that applies to all households.

[4] 2005 Report at ¶ 40.

Location and Time Variability As Implemented in the Predictive Model

17. We agree with the Commission that the F(50,90) location and time variability factors are appropriate for STELA. NPRM, ¶ 27. This topic was the subject of much discussion in the SHVERA proceeding, and the Commission properly concluded that the arguments for changing these parameters were unpersuasive. Radio signal propagation is, by its very nature, statistical. As noted in the proceeding at that time, changing the time variability statistics, which were the basis of the entire DTV transition, to a higher requirement would unfairly penalize stations and reduce their coverage areas.

18. As we also pointed out in that proceeding, any dips below the minimum required field strength necessary for reception would likely occur only at the outer edges of a station's coverage area. Consumers in these areas can compensate through use of low-noise preamplifiers, higher gain antennas, and lower loss downlead cables (or all of the above) to improve the time variability statistics for their location. Thus, consumers would not be disadvantaged by continued use of the F(50,90) location and time variability factors in the predictive model for use with STELA.

19. Location variability of 50% is appropriate and represents a "median" case for locations. Also, as noted in ¶ 27 of the NPRM, no party proposed changing this parameter in the SHVERA proceeding and the Commission said it knew of no considerations that would lead it to recommend changing it from the current median value.

Multicast Streams

20. At ¶ 17 of the NPRM, the Commission requests comments about the prediction of signals that are "multicast" streams embedded within another signal. The Commission correctly concludes that the same field strength signal level criteria should apply to these signals as for

"Main" or "Primary" DTV Signals defined in Section 73.622 (e)(1). As these signals are the same RF signals, just different packets within the same transport stream of the station, the RF field strength would remain unchanged. The same requirements for reception would apply to multicast streams as to main program streams. All the data are sent at the same RF signal level. For this reason, we see no need to adopt different RF signal level requirements for multicast streams.

Analog LPTV, Class A and Translator Stations

21. The Commission correctly concludes (NPRM, ¶ 30) that the existing predictive methods specified in FCC OET Bulletin 72 should continue to apply. As directed by Congress in the STELA, the Commission is required to account for the continued operation of LPTV, Class A, and translator stations. Therefore, the Commission should consider these stations when determining the eligibility of a household under STELA.

22. It is appropriate to continue use of the SHVIA ILLR model for LPTV, Class A, and translator stations that continue to operate in analog. This model has worked well to date, and there is no need to change it. For LPTV, Class A and Translator stations operating in digital, we agree that, as noted in the NPRM at ¶ 14, the same noise-limited contour field strength value should apply to these stations as to full-power stations, since they use the same transmission system as those stations.

23. Many areas, particularly in the mountain West, rely on LPTV, Class A, and translator stations to relay programming from network stations to areas that are terrain shielded or otherwise obstructed from the parent station. In many cases, these categories of stations are a critical component of the station's coverage area. If the Commission failed to account for these stations' coverage, the viability of their continued operation would be jeopardized.

24. We are unaware of any problems created by consideration of LPTV, Class A, and translator stations in the context of SHVIA or SHVERA. Accordingly, we see no need to make any changes with regard to these stations in the context of STELA.

On-Site Measurements of DTV Field Strength

25. We now address three issues that were not addressed in the SHVERA NPRM regarding on-site measurements.

26. What Stations Should Be Measured? We agree with the Commission that STELA mandates limiting the stations to be measured to those located in the DMA in which the household is located.

27. What Type of Antenna Should Be Used? As noted in our Engineering Statement filed with the Initial Comments of the Broadcasters in the SHVERA proceeding,[5] we believe that use of a calibrated gain antenna would yield the most accurate results. (A gain antenna will be directional by definition.)

28. There are several reasons the Commission should adopt a calibrated gain antenna for on-site measurements. First, by providing some gain, a stronger signal level can be delivered to the measuring equipment. This will permit the use of a wider variety of test equipment and give testers a variety of measurement options. Second, a gain antenna is less susceptible to the effects of multipath. Third, a gain antenna (such as a Scala CL-1469) is less costly and more robust (sturdy) than a calibrated half-wave dipole antenna. Finally, a gain antenna, unlike a dipole, does not require adjustment of the elements for each station measured. Therefore, by using the gain antenna, measurements can be completed much faster, more accurately, and with less cost.

[5] Comments of the National Association of Broadcasters in ET Docket No. 05-182 (filed June 17, 2005) (Attachment 1 at 60).

29. Multicast Signals. We concur with the Commission's tentative conclusion that no special testing procedures are needed to measure network signals that are transmitted on multicast streams. As this signal is part of the RF signal transmitted by the desired station, the field strength values proposed in the NPRM are appropriate.

30. The Commission has been using the proposed on-site measurement procedures as part of its interim method. We are unaware of any issues or complaints with regard to its accuracy or effectiveness; it has worked well to date. Hence, we endorse adoption of the proposed procedures in STELA.

Indoor On-Site Measurements of DTV Field Strength

31. The Commission states at ¶ 36 of the NPRM that it proposes to continue the existing measurement procedures based on outdoor antennas. It also states that implementation of an indoor measurement regime would be problematic. For many reasons, we concur.

32. It is difficult to imagine an indoor measurement procedure that could accurately account for the wide variety of antennas, possible antenna locations (rooms), antenna orientations, and the dynamic signal conditions within a home. We know of no means by which to characterize a "median" case for all of these factors, nor to develop a "typical" antenna performance characteristic. Based on our extensive experience in making indoor DTV signal measurements, we can confirm that the indoor environment is a very difficult one to characterize in a way that would be applicable in the context of STELA. We urge the Commission to refrain from attempting to characterize an indoor reception environment.

33. Further, to conduct measurements based upon the use of an indoor antenna would penalize broadcasters that have transitioned to DTV having relied upon the Commission's use of

outdoor antennas for all of its DTV related planning, channel allocations, power levels, and coverage predictions.

34. Allowing such dubious measurements would also open up the possibility for testers, consumers, or others to "game" the system by choosing antennas, room locations, and other parameters that favored the desired outcome. The Commission can avoid such actions by retaining the current outdoor measurement methods and policies, which are fair and have yielded few problems in practice.

Respectfully submitted:

/s/

William Meintel

/s/

Gary Sgrignoli

/s/

Dennis Wallace

August 23, 2010

Exhibit A

Qualifications of the Firm

Meintel, Sgrignoli, & Wallace

The firm of Meintel, Sgrignoli, & Wallace is a consulting firm that specializes in Digital and Analog Television and Radio Transmission Systems, Consumer and Professional Electronics, as well as Technical Software applications and Propagation Studies. The firm's principals have been engaged in the practice of engineering for well over fifteen years. The firm has provided technical and policy consulting on a number of issues related to Digital Television. The following are biographies of each of the partners of the firm.

William Meintel

Bill Meintel holds a degree in Electrical Engineering and has 42 years experience in the communications field. After graduation, Bill was employed by the Federal Communications Commission, first as a field engineer and then in the Mass Media Bureau's Policy and Rules Division. While in Policy and Rules, Bill served as the division's computer expert and directed the development of several major computer modeling projects related to spectrum utilization and planning.

He entered private practice in 1989, and has been heavily involved in technical consulting, computer modeling and spectrum planning for the broadcast industry. In April 2005, Bill merged his consulting practice into the firm Meintel, Sgrignoli, & Wallace.

Bill has written numerous DTV propagation software applications including those used by the FCC for their DTV application processing. Recently, Bill provided a software application to Qualcom for use in the planning and deployment of their mobile video services in the US on Channel 55. In addition, Bill has undertaken numerous studies of DTV station locations, DMA boundaries, and DTV coverage for NAB and other clients.

Mr. Meintel co-authored a report for the NAB on spectrum requirements for Digital Audio Broadcasting (DAB), created a plan for independent television broadcasting for Romania and has been extensively involved in spectrum planning for digital television (DTV) in both the US and internationally. Mr. Meintel wrote the software to conduct DTV interference analysis and OET-69 studies for the FCC. Bill is a member of IEEE and Tau Beta Pi.

Gary Sgrignoli

Gary received his BSEE and MSEE degrees from the University of Illinois (Champaign-Urbana), and was a design engineer with Zenith Electronics Corporation in their Research and Development group for 27 years before leaving to become a DTV broadcast consulting engineer. In April 2005, Gary merged his consulting practice (Sgrignoli Consulting) into the firm Meintel, Sgrignoli, & Wallace, where he is a partner and principal engineer.

Gary has worked in the R&D design area on television "ghost" canceling, cable TV scrambling, and cable TV two-way data systems before turning to digital television transmission systems. Since 1991, he has been extensively involved in the 8-VSB *digital* transmission system *design*,

its prototype *implementation*, and its *lab* and *field* tests. He holds 35 U.S. patents (many related to DTV and 8-VSB transmission), is a recipient of the prestigious IEEE Matti S. Siukloa award, and was selected as SBE Educator of the Year for 2005.

Gary was involved with the DTV Station Project in Washington DC, helping to develop DTV RF test plans. He has also been involved with numerous television broadcast stations around the country, training them for DTV field testing and data analysis, and has participated in numerous DTV over-the-air demonstrations with the Grand Alliance and the ATSC, both in the U.S. and abroad. In addition to publishing technical papers and giving presentations at various conferences (NAB, BTS, ICCE, SBE, NTA, CBA), he has presented many VSB transmission system seminars around the country since 1998. Gary is a member of the IEEE and the SBE.

Dennis Wallace

Dennis Wallace has an extensive background in Digital Television Systems. Dennis managed all the Laboratory RF Testing of the Grand Alliance ATSC HDTV System, having served as the RF Systems Engineer at the Advanced Television Test Center (ATTC). He managed test plans, configurations, and operations for Grand Alliance Testing and several Data-casting Systems. Prior to joining ATTC, Dennis held positions in Field Operations Engineering, Applications Engineering, and was Product Manager for two Television transmitter manufacturers.

In July 1997, Dennis founded Wallace & Associates a broadcast engineering and consulting firm specializing in Digital Television, RF Propagation Measurements, Spectrum Policy issues, and Technical Consulting. His clients include major broadcast groups, The DTV Station Project, ATTC, Trade Associations, and both Professional and Consumer Electronics Manufacturers. In April 2005, the firm was merged with the practices of William Meintel and Gary Sgrignoli to form the firm of Meintel, Sgrignoli, & Wallace.

He has worked on the Broadcast side, as well, holding Chief Engineer and Operations Manager positions with both radio and television stations.

Dennis has authored several papers on the topics of Digital Television transmission and results of testing of the DTV systems, which have been published in the IEEE Transactions and other publications. Dennis has been a presenter at the IEEE Broadcast Technology Symposium, NAB, and several SBE Conferences, as well as providing DTV presentations for SCTE and IEEE Chapters. He has made extensive field measurements of both Digital and Analog Television and Radio systems including over 5,000 DTV measurements in the field.

In 1999, Mr. Wallace was awarded the prestigious Matti S. Siukola award by the IEEE Broadcast Technology Society. He was also awarded a Technical Emmy Plaque for his work at the ATTC on the development of Digital Television. Mr. Wallace is a Certified Broadcast Television Engineer by the Society of Broadcast Engineers. He is also a member of the IEEE Broadcast Technology Society, SMPTE, an Associate member of the Federal Communications Bar Association, and is active on several industry standards committees and the ATSC.