WILTSHIRE & GRANNIS LLP

April 14, 2014

BY ELECTRONIC FILING

Marlene H. Dortch
445 12th Street, S.W.
Room TW-A325
Washington, DC 20554

Re: Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations, ET Docket No. 10-152

Dear Ms. Dortch:

DIRECTV, LLC ("DIRECTV") hereby requests that the Commission's Office of Engineering and Technology ("OET") employ its new *TVStudy* software to update the predictive model used for determining distant signal eligibility for satellite video subscribers.

OET released the *TVStudy* software last year.[1] This software updates and improves the "Longley Rice" predictive model specified in OET-69, which is used to predict television coverage across geographic areas.[2] The Commission intends to use this updated and improved model in connection with the upcoming incentive auctions.[3]

Just as it promises to improve the OET-69 model, this new software appears likely to improve the *individual location* Longley Rice ("digital ILLR") model used to predict eligibility for distant network signals. (This individual location model is contained in OET Bulletin No.

---

[1] *Public Notice*, "Office of Engineering and Technology Releases and Seeks Comment on Updated OET-69 Software," ET Docket No. 13-26, GN Docket No. 12-268, DA 13-138 (Feb. 4, 2013) ("*OET Public Notice*").

[2] Office of Engineering and Technology, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, OET BULLETIN NO. 69 (Feb. 6, 2004), *available at* http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet69/oet69.pdf.

[3] *OET Public Notice* at 1.

73.)[4] The Commission should fulfill its ongoing and acknowledged obligation to refine the digital ILLR model by updating it using the *TVStudy* software (or an appropriate variant thereof).[5]

I. The Commission Has a Continuing Obligation to Improve Digital ILLR's Accuracy

This request relates to a series of statutory provisions governing the satellite provision of distant network broadcast signals. Satellite subscribers are eligible to receive such signals if, among other criteria, they cannot receive sufficiently strong *local* network signals off air. Such households are known as "unserved households," because they are "unserved" by the local station in question.[6] A satellite carrier can determine whether a household is "unserved" through signal testing.[7] It can also employ a Commission-prescribed predictive model to determine whether a household is presumptively "unserved."[8] That model is the digital ILLR.[9]

This statutory regime, however, is no better than the predictive model upon which it rests. As the Commission told Congress, "[a]ny predictive model that is prescribed should provide

---

4 Office of Engineering and Technology, *The ILLR Computer Program for Predicting Digital Television Signal Strengths at Individual Locations*, OET BULLETIN NO. 73 (Nov. 23, 2010), *available at* http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet73/oet73.pdf.

5 *Establishment of a Model for Predicting Digital Broadcast Television Field Strength Received at Individual Locations*, 25 FCC Rcd. 16426, ¶ 54 (2010) ("*Predictive Model Order*") ("We continue to believe the most efficient, effective, fair, transparent and timely approach for revising the digital TV ILLR model if new information becomes available is to hold open the docket in this proceeding and then conduct further rulemaking as proposed in the *Notice*. . . . Parties with new data, analysis or other information relating to improving the predictive model will be able to submit requests to modify the model in the instant docket.").

6 17 U.S.C. § 119(d)(10)(A) (defining an "unserved household" as one that, *inter alia*, "cannot receive, through the use of an antenna, an over-the-air signal containing the primary stream, or, on or after the qualifying date, the multicast stream, originating in that household's local market and affiliated with that network of . . . if the signal originates as a digital signal, intensity defined in the values for the digital television noise-limited service contour, as defined in regulations issued by the Federal Communications Commission (section 73.622(e) of title 47, Code of Federal Regulations), as such regulations may be amended from time to time").

7 47 U.S.C. § 339(a)(2)(D)(ii).

8 *See id*. § 339(a)(2)(D)(i).

9 47 C.F.R. § 73.683(d).

output that is as accurate as possible."[10] This is why Congress directed the Commission to promulgate a model that "reliably" determines eligibility.[11] A "reliable" model is one that predicts subscribers to be served when they are in fact served, and to be unserved when they are in fact unserved.

The Commission, however, has long acknowledged that its predictive model is not always accurate or reliable.[12] Indeed, it once stated that "predictive models are inherently imperfect because they seek to replicate reality without actually measuring or observing it."[13] DIRECTV has long experience with this model, and can state with certainty that it tends to underpredict distant signal eligibility. That is, it predicts many subscribers to be *ineligible* for distant signals when, in reality, they cannot actually receive viewable local signals. The Commission spoke to this possibility three years ago when it solicited ideas for improving the model.[14]

Since 1999, Congress has directed the Commission to provide for the "continued refinement in the application of the model by the use of additional data as it becomes available."[15] By retaining this language and applying it to digital signals in 2010, Congress demonstrated both the importance of accuracy, and its concerns that the existing model is not sufficiently accurate. The Commission affirmed this continuing obligation to refine the model in

---

[10] *Report to Congress on the Satellite Home Viewer Extension And Reauthorization Act of 2004*, Study of Digital Television Field Strength Standards and Testing Procedures, 20 FCC Rcd. 19504, ¶ 148 (2005).

[11] 47 U.S.C. § 339(c)(3)(A).

[12] *See Satellite Delivery of Network Signals to Unserved Households for Purposes of the Satellite Home Viewer Act*, 14 FCC Rcd. 2654, ¶ 71 (1999) ("If a household is unserved in reality, the ILLR prediction model will not change that situation. . . . 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.")

[13] *Id.*, ¶ 72.

[14] *Predictive Model Order*, ¶ 58 ("We are particularly interested in information on any other techniques for improving the degree to which the model accurately represents the propagation of a digital television signal from a transmitter to a specific receive site and any new data that may be available for improving the model's predictions.").

[15] 47 U.S.C. § 339(c)(3)(A).

2010 when it adopted digital ILLR.[16] Notably, the broadcasters appear to concede to the Commission's ongoing obligations in this respect.[17]

II. The Commission Should Update Digital ILLR with the *TVStudy* Software

In releasing its *TVStudy*, software last year, OET stated that the "new software operates on modern computer systems, and it runs much faster, *provides greater accuracy in modeling and analysis*, and is easier to use and more versatile than the existing [OET-69] software."[18] In particular, OET "identified various parameter choices consistent with but not specified in OET-69 that [it believes] are necessary for improved accuracy in [its] modeling and analysis."[19] Specifically, OET lists the following improvements to the prior Longley Rice Model.

- ***Newer Population Data.*** The existing model relies (at least in part) on 1990 (or 2000)[20] population data. *TVStudy* would use 2010 data.[21]

- ***Better Terrain Data.*** The existing model reports land elevations roughly every 300 feet from a database that employs "coarse elevation contours," contains "errors," and is no longer maintained or supported by the U.S. Geological Survey.[22] *TVStudy* would report land elevations roughly every 100 feet, using a new database with more granular elevation data that is less "likely to lead to obsolescence and potentially inaccurate results."[23]

---

16 *Order*, ¶ 3.

17 *See* Reply Comments of the National Association of Broadcasters *et al*., ET Docket No. 13-26, GN Docket No. 12-268 at 8 (filed Apr. 5, 2013) (arguing that, in contrast to the statutory provisions governing incentive auctions, the statute at issue here "contains provisions expressly authorizing the FCC to update its models over time") ("Broadcaster *TVStudy* Reply Comments").

18 *OET Public Notice* at 1 (emphasis added).

19 *Id.* at 3 (emphasis added).

20 *See* Comments of the National Association of Broadcasters *et al*., ET Docket No. 13-26, GN Docket No. 12-268 at 10 (filed Mar. 21, 2013) ("Broadcaster *TVStudy* Comments") (arguing that the Commission's rules require use of 2000 Census data in the Longley Rice methodology).

21 *OET Public Notice* at 4.

22 *Id.*

23 *Id.*

- ***Better Information About Broadcast Stations.*** *TVStudy* would correct inaccurate entries in the FCC's broadcast station database that "can lead to incorrect or nonsensical results."[24]

- ***More Accurate Information About Antenna Tilt.*** Broadcast antennas are often "tilted" toward population centers and away from the sky, either electrically or mechanically. The existing model assumes a particular tilt. *TVStudy* would use the actual figures for electrical tilt.[25]

- ***More Accurate Depression Angle.*** The existing model contains a software error preventing it from accurately calculating the angle between the transmitter and the receive site. It calculates station antenna height based on height *above ground* rather than height *above sea level*. Thus, for example, an antenna on a mountain may be assumed to be thirty feet high rather than three thousand and thirty feet high. *TVStudy* would correct this error.[26]

- ***More Precise Geographical Coordinate.*** The existing model "rounds" location data to the nearest second of latitude and longitude. *TVStudy* would specify locations to the nearest 0.0004 seconds, creating data three orders of magnitude more precise.[27]

- ***Better Calculation Grids.*** The existing model establishes "calculation grids" for each station measured. *TVStudy* would instead create a "global calculation grid" for all stations. This allows the comparison of results between stations and speeds calculations.[28]

Broadcasters do not seriously contest the improved accuracy of these changes. In their initial comments upon release of the *TVStudy* software (and again in their most recent attack on *TVStudy*), the Broadcasters focused exclusively on the alleged *legality* of employing *TVStudy* in the incentive auction proceeding.[29] Only briefly in reply comments did Broadcasters argue that

---

[24] *Id.*

[25] *Id.* OET posits that it would be too difficult to obtain accurate figures for mechanical tilt. *Id.*

[26] *Id.* at 5.

[27] *Id.*

[28] *Id.*

[29] *See* Broadcaster *TVStudy* Comments (arguing that the proposed changes violate the Spectrum Act, violate the Commission's Rules and are otherwise arbitrary and capricious); *see also* Comments of

there was "no evidence" that *TVStudy* would increase accuracy.[30] There, however, the Broadcasters appeared to take issue principally with the treatment of so-called "flagged" error cells.[31] We understand that digital ILLR already incorporates the changes proposed by *TVStudy* in this regard, so Broadcaster objections on this point appear to have no relevance here.

Broadcasters do object to one other aspect of *TVStudy*, namely, the use of finer terrain resolution.[32] They claim in a single paragraph and with no empirical support that more accurate terrain data leads to "less accurate" results.[33] This claim appears based on a paper by broadcast engineer Sidney Shumate. Mr. Shumate does not, however, say that more accurate data leads to less accurate results—a conclusion that seems at war with itself. Rather, he says only that "because of limitations in the software . . . the use of a more detailed terrain database *does not significantly improve* the results."[34] *TVStudy*, however, proposes improvements in the software along with the use of more accurate terrain data, and additional improvements can be made as *TVStudy* is "refined" for use with digital ILLR. This being the case, we would have every reason to expect that use of more accurate terrain data will lead to more accurate results.

* * *

The Commission has a mandate from Congress to continually refine digital ILLR to ensure that its predictions of what households are unserved, and therefore eligible to receive distant signals, are as accurate as possible. To that end, the Commission should use its *TVStudy* software to improve and refine digital ILLR.

---

the National Association of Broadcasters, EN Docket No. 13-26, GN Docket No. 12-268 (filed Apr. 4, 2014) (making similar arguments).

30 Broadcaster *TVStudy* Reply Comments at 9 *et seq.*

31 OET-69 assumes coverage for particular terrain profile results lying outside the range of collected data. Digital ILLR, however, ignores such results. The Commission asks how *TVStudy* should handle such situations. *OET Public Notice* at 6.

32 Broadcaster *TVStudy* Reply Comments at 13.

33 *Id.* (emphasis in original).

34 *Longley-Rice and ITU-P.1546 Combined: A New International Terrain-Specific Propagation Model* at 7 (emphasis added), *attached to* Reply Comments of Sidney Shumate, ET Docket No. 13-26, GN Docket No. 12-268 at 8 (filed Apr. 5, 2013).

Respectfully submitted,

/s/
William M. Wiltshire
Michael Nilsson

Counsel to DIRECTV, Inc.