



April 29, 2019

Via ECFS

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Subject: *Mean Opinion Score Testing for High-Latency Bidders (WC Docket No. 10-90)*

Dear Ms. Dortch:

This letter builds on the points made in the April 5, 2019, meeting that Hughes Network Systems, LLC ("Hughes") had with staff from the Wireline Competition Bureau regarding prospective improvements to the Commission's rules for verifying that high-latency bidders in future support auctions provide high-quality voice service.¹ These new rules should apply only to future auctions.²

In that meeting, Hughes proposed a framework for calibrated subjective testing paired with objective monitoring. Under Hughes's proposal, high-latency support recipients would perform annual subjective Mean Opinion Score ("MOS") testing using the controlled environment described in the ITU-T P.800 protocol with a requirement to meet an average MOS Of 3.8.³ These annual tests would be combined with ongoing monitoring and reporting on the network characteristics that bear on conversation quality to ensure that no deterioration occurs.⁴ These include: (i) CODEC selection and bitrate; (ii) network delay (latency); (iii) variation in network delay (jitter); and (iv) packet loss.⁵

Viasat, Inc. ("Viasat") has proposed a framework whereby high-latency support recipients would perform subjective MOS testing outside of a controlled laboratory setting with a requirement to meet a score of 4.0 at least 80 percent of the time.⁶

¹ See Letter from Jennifer A. Manner, Hughes, to Marlene H. Dortch, FCC, WC Docket No. 10-90 (filed April 9, 2019) ("Hughes April 9 Ex Parte").

² Requirements in place at the time of prior auctions must be retained. See Hughes Petition for Clarification or in the Alternative, Reconsideration, WC Docket No. 10-90 (filed Sept. 18, 2018); Opposition of Hughes Network Systems, LLC to Petition for Reconsideration by Viasat, Inc., WC Docket No. 10-90 (filed Nov. 7, 2018) at 3; Reply of Hughes Network Systems, LLC to Oppositions and Comments on Petitions for Reconsideration, WC Docket No. 10-90 (filed Nov. 19, 2018) at 8; *see also, e.g.*, Letter from Jennifer A. Manner, Hughes, to Marlene H. Dortch, FCC, WC Docket No. 10-90 (filed Dec. 7, 2018).

³ Hughes April 9 Ex Parte at attachment.

⁴ *Id.*

⁵ *Id.*

⁶ See Letter from Matthew T. Murchison, counsel to Viasat, to Marlene H. Dortch, FCC, WC Docket No. 10-90 (filed April 11, 2019).

With regard to the required MOS to be achieved in the testing, Hughes agrees that Viasat's proposal, to require achievement of a score of 4.0 at least 80 percent of the time, is a reasonable approach, and would not object to the adoption of that metric. However, Hughes has significant concerns about other aspects of Viasat's proposal. In particular, Hughes does not believe it is appropriate to require ETCs to achieve any metric on a subjective test such as the MOS test using recruited customer subjects in an uncontrolled, non-laboratory environment. The ITU P.800 protocol requires substantial preparation and safeguards to minimize external factors when capturing subjective evaluations, in order to provide reliable and consistent data – in particular, the selection of subjects, the education of the test subjects as to how to perform the test, the noise levels of the test environment, and consistency of the hardware tested are all topics discussed in detail in the ITU-T P.800 document.⁷ While controlling for factors such as these is crucial to a fair testing framework, it is also burdensome, which is why Hughes's framework calls for annual subjective testing combined with more frequent network monitoring to ensure that the characteristics that bear on voice quality do not change between tests. For these reasons, Hughes does not believe it would be appropriate for the Commission to require all high-latency bidders to comply with the framework that Viasat has proposed.

At the same time, Hughes has no objection to the Commission adopting a testing framework in which both of these approaches would be incorporated into the Commission's rules and high-latency support recipients could select either approach in order to demonstrate their compliance. Under this "either/or" approach, high-latency support recipients could demonstrate their compliance with voice quality requirements by showing a MOS of 4.0 or better at least 80 percent of the time either (a) annually in laboratory-controlled tests, as Hughes has proposed, with more frequent network monitoring to ensure voice quality factors remain unchanged; or (b) in more frequent subjective tests using customers as subjects outside of a laboratory environment, as Viasat has proposed.

Please direct any questions regarding this filing to the undersigned.

Sincerely,

/s/

Jennifer A. Manner
Senior Vice President, Regulatory Affairs

cc: Suzanne Yelen
Alexander Minard
Cathy Zima
Stephen Wang
Alec MacDonell

⁷ See ITU-T Recommendation P.800, Methods for Subjective Determination of Transmission Quality (1996) at Annex A.