



PUBLIC NOTICE

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COMMENT SOUGHT ON PERFORMANCE MEASURES FOR CONNECT AMERICA HIGH-COST UNIVERSAL SERVICE SUPPORT RECIPIENTS

WC Docket No. 10-90

Comments Due: December 6, 2017

1. In this Public Notice, the Wireline Competition Bureau (WCB), the Wireless Telecommunications Bureau (together, the Bureaus), and the Office of Engineering and Technology (OET) seek to update the record regarding performance measures for certain Connect America high-cost universal service support recipients, including price cap carriers, rate-of-return carriers, rural broadband experiment (RBE) support recipients, and Connect America Phase II auction winners. Performance measures are critical to ensuring that consumers will be getting the level of service that providers have committed to deploy with universal service high-cost support.

2. **Background.** In the *USF/ICC Transformation Order*, the Commission required that, as a condition of receiving high-cost universal service support, eligible telecommunications carriers (ETCs) offer broadband service in their supported areas that meets certain performance requirements.¹ Initially, as a condition of receiving support for voice telephony, ETCs subject to broadband performance obligations were generally required to “offer broadband at actual speeds of at least 4 Mbps downstream and 1 Mbps upstream, with latency suitable for real-time applications, such as VoIP, and with usage capacity reasonably comparable to that available in comparable offerings in urban areas.”² The Commission has since adopted a new minimum speed standard of 10 Mbps downstream and 1 Mbps upstream³ and calculates a baseline performance data usage allowance annually.⁴ In addition, the

¹ See *Connect America Fund et al.*, WC Docket No. 10-90 et al., Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17705-06, para. 109 (2011) (*USF/ICC Transformation Order and FNPRM*), *aff’d sub nom. In re FCC 11-161*, 753 F.3d 1015 (10th Cir. 2014). As in the *USF/ICC Transformation Order*, we use the term high-cost support or high-cost funding to include all existing high-cost universal service mechanisms, as well as, the Connect America Fund. See *id.* at 17695 n.126. This Public Notice seeks comment on measuring performance of fixed, not mobile, service. For high-cost support mechanisms specifically dedicated to mobile services—Mobility Fund Phase I, Tribal Mobility Fund Phase I, and Mobility Fund Phase II—the Commission adopted different performance benchmarks. See *id.* at 17791-93, paras. 359-368; *Connect America Fund; Universal Service Reform – Mobility Fund*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 2152, 2188-90, paras. 86-87 (2017).

² *USF/ICC Transformation Order*, 26 FCC Rcd at 17726, para. 160. These requirements do not apply to Mobility Fund recipients.

³ *Connect America Fund; ETC Annual Reports and Certifications*, Report and Order, 29 FCC Rcd 15644, 15649, para. 15 (2014). Although the Commission adopted 10 Mbps downstream and 1 Mbps upstream as a minimum speed standard for recipients of high-cost support, depending on the outcome of the Commission’s competitive bidding processes, some recipients may bid and receive support to offer faster speeds or, potentially, higher-latency service. See *Connect America Fund; ETC Annual Reports and Certifications; Rural Broadband Experiments*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 5949, 5957, para. 15 (2016) (allowing

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Commission required that recipients of high-cost support test their broadband networks for compliance with speed and latency metrics and certify and report the results to the Universal Service Administrative Company (USAC) and the relevant state or tribal government on an annual basis, with those results subject to audit.⁵ In the 2011 *USF/ICC Transformation FNPRM*, the Commission sought comment on the specific methodology ETCs should use to measure the performance of their broadband services and the format in which funding recipients should report their results.⁶ The Commission directed the Bureaus and OET to work together to refine the methodology for implementation.⁷

3. Subsequently, in October 2013, WCB further defined the service obligations of price cap carriers that accept Phase II model-based support through the state-level commitment process.⁸ It concluded that price cap carriers must be prepared to demonstrate a provider round-trip latency of 100 milliseconds (ms) or less to meet the Commission's latency requirement. To show compliance with latency obligations, a price cap provider must certify that 95 percent or more of all peak period measurements (also referred to as observations) of network round trip latency are at or below 100 ms when measured during the peak period between the customer premises and the nearest designated Internet core peering interconnection point (IXP). The measurements must be conducted over a minimum of two consecutive weeks during peak hours for at least 50 randomly-selected customer locations within the census blocks of each state for which the provider is receiving model-based support. Such measurements may be made using existing network management systems, ping tests,⁹ or other commonly available network measurement tools. Alternatively, carriers participating in the Measuring Broadband America (MBA) program may use the results from that testing to support their certification that they meet the latency requirement, so long as they deploy at least 50 Whiteboxes¹⁰ to customers within the Phase II-funded areas within each state and certify that 95 percent or more of the measurements taken during peak periods for a period of two weeks were at or below 100 ms. The provider is responsible for the hardware and administrative costs of these Whiteboxes to the extent such Whiteboxes are in addition to those deployed as part of the MBA testing.

4. The Bureaus and OET subsequently released a Public Notice seeking comment on outstanding questions regarding the methodology for measuring broadband services' performance, among

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bids of different performance tiers with speeds of 1 Gbps/500 Mbps, 100/20 Mbps, 25/3 Mbps, and 10/1 Mbps). *See also, e.g., Connect America Fund; ETC Annual Reports and Certifications*, Report and Order and Further Notice of Proposed Rulemaking, 29 FCC Rcd 8769, 8779-80, paras. 24-29 (2014) (making available support through the rural broadband experiments for services providing speeds of 100/25 Mbps, 25/5 Mbps, and 10/1 Mbps).

⁴ *See, e.g., Wireline Competition Bureau Announces Results of 2017 Urban Rate Survey for Fixed Voice and Broadband Services, Posting of Survey Data and Explanatory Notes, and Required Minimum Usage Allowance for ETCs Subject to Broadband Public Interest Obligations*, Public Notice, 32 FCC Rcd 1358, 1359-60 (WCB 2017).

⁵ *USF/ICC Transformation Order*, 26 FCC Rcd at 17705-06, para. 109.

⁶ *Id.* at 18045-46, paras. 1013-1017.

⁷ *Id.* at 17708, para. 112; 47 CFR § 54.313(a)(11).

⁸ *Connect America Fund*, Report and Order, WC Docket No. 10-90, Report and Order, 28 FCC Rcd 15060 (WCB 2013) (*Phase II Price Cap Service Obligation Order*).

⁹ A ping test is a method of determining connectivity and reaction time of a computer connection. *See* Ookla Speedtest, What is "ping", "download speed", and "upload speed"?, *available at* <https://support.speedtest.net/hc/en-us/articles/203845290-What-is-ping-download-speed-and-upload-speed->.

¹⁰ A Whitebox is an industry-approved measuring device to measure performance of a broadband connection. *See* Measuring Broadband America, Requirements, What it takes to get involved, *available at* <https://www.measuringbroadbandamerica.com/fixed-broadband/fixed-broadband-requirements/>.

other things.¹¹ Specifically, the Bureaus and OET sought to further develop the record on how compliance with speed obligations should be determined for high-cost support recipients that serve fixed locations. The Bureaus and OET also sought comment on whether the same testing methodologies adopted for price cap carriers accepting model-based Phase II support should be applied to other support recipients, such as rate-of-return providers and those that are awarded Connect America support through a competitive bidding process.¹² In addition, the Bureaus and OET raised the possibility of a platform that could be administered by either a single entity (e.g., USAC) or multiple service vendors, who could deploy Whiteboxes to consumers throughout Connect America-supported areas, and could reduce the costs of measuring broadband performance.¹³

5. **Discussion.** The previous Public Notice was released almost three years ago. Since then, technology has continued to improve. In particular, USTelecom and price cap carriers have explained that new customer premises equipment (CPE) for broadband services may include software that allows carriers to conduct tests, for speed, latency, and other measures, across their networks to a core peering IXP without customer involvement.¹⁴ Providers using different types of CPE that do not include such software may also use small computing devices, such as a Raspberry Pi, to achieve comparable functionality.¹⁵

6. We thus seek to refresh the record regarding performance measures for Connect America high-cost universal service support recipients, including price cap carriers, rate-of-return carriers, RBE support recipients, and Connect America Phase II auction winners. In particular, we seek comment on whether the Commission should require the same testing method options and parameters for all high-cost recipients of support to serve fixed locations. If not, what different options or parameters should we consider, and why?

7. We seek comment on our previous proposal to require all ETCs subject to fixed broadband performance obligations to use testing parameters for speed similar to those adopted for latency for price cap carriers.¹⁶ We proposed then to adopt a methodology that would require measurements to be made once hourly during peak periods, 7:00 pm to 11:00 pm daily local time, over four consecutive weeks; require 95 percent of the observations to be at or above the specified minimum speed; define the endpoints for the measurement as the customer premises to Commission-designated IXP locations; require testing to occur at least annually; and require a minimum of 50 randomly selected customer locations to be tested within the geographic area being funded in a given state. We also sought comment on whether internal network management system tools should be used to measure speed performance, or whether external measurement tools such as Speedtest/Ookla or Network Diagnostic Tests by M-Labs should be used. Are there better and more reliable methods of measuring speed? What differences in operational methods might exist in using these different approaches? What variances in

¹¹ *Wireline Competition Bureau, Wireless Telecommunications Bureau, and the Office of Engineering and Technology Seek Comment on Proposed Methodology for Connect America High-Cost Universal Service Support Recipients to Measure and Report Speed and Latency Performance to Fixed Locations*, Public Notice, 29 FCC Rcd 12623 (WCB 2014) (2014 Broadband Measurement and Reporting Public Notice).

¹² *Id.*

¹³ *See id.* at 12628, para. 20.

¹⁴ *See* Letter from Kevin Rupy, Vice President, Law & Policy, USTelecom, to Marlene Dortch, Secretary, FCC, WC Docket No. 10-90, at 7 (filed May 23, 2017) (USTelecom *Ex Parte*); Letter from Mary Henze, Assistant Vice President, Federal Regulatory, to Marlene Dortch, Secretary, FCC, WC Docket No. 10-90, at 1-2 (filed June 20, 2016) (AT&T *Ex Parte*).

¹⁵ *See* USTelecom *Ex Parte* at 8. Raspberry Pi is a series of small, inexpensive single-board computers originally developed to provide computer science training in schools and developing countries. The devices have found a wide variety of applications for small, inexpensive Internet appliances.

¹⁶ *See* 2014 Broadband Measurement and Reporting Public Notice, 29 FCC Rcd at 12626-27, paras. 5-12.

speed measurements, if any, might be expected with these different methods?

8. USTelecom has submitted a proposal for a general broadband speed and latency measurement reporting and compliance framework with three main parts.¹⁷ First, USTelecom suggests that the group of locations tested only include locations with an active subscriber.¹⁸ USTelecom also suggests that the number of subscribers/locations included for a particular year's tests should be the lesser, in each state, of (a) 20 percent of the HUBB input locations or (b) 50 subscribers. Second, USTelecom proposes that ETCs conduct speed and latency tests between the hours of 6:00 am and 12:00 am local time at the ETC's choice of time of year.¹⁹ USTelecom specifically suggests that, for each subscriber location, an ETC should be required to perform four speed tests each day, once during each of four testing windows: (a) 6:00 am to 10:30 am, (b) 10:30 am to 3:00 pm, (c) 3:00 pm to 7:30 pm, and (d) 7:30 pm to 12:00 am.²⁰ Finally, USTelecom recommends that ETCs report and certify their results for each state by selecting one of five levels of compliance for both download and upload speed and latency. Pursuant to USTelecom's proposal, certifying "full" compliance would mean that 95 to 100 percent of all of an ETCs' measurements during the test period meet the required speed, and certifying subsequent "tiers" would mean that an ETC is compliant at decreasing levels below 95 percent of all of an ETC's measurements.²¹

9. We seek comment on USTelecom's proposal for a broadband measurement reporting and compliance framework as well as the specific parameters that would be appropriate for such testing.

- *Test Definition.* We seek comment specifically on what should constitute a "test" within USTelecom's proposed framework or a similar framework. Is there an industry standard or other published specification that is best suited to achieve the Commission's universal service goals and Connect American Fund performance objectives?
- *Daily Test Window.* We seek comment on USTelecom's recommendation to expand the testing period to 18 hours rather than require testing during typically peak times as previously proposed. USTelecom indicates that expanding the testing window would encompass the multiple usage cycles that are typical of networks serving both business and residential customers and weekday/weekend traffic.²² USTelecom further states that "a longer testing timeframe would mitigate concerns over consumer impact and potential degradation in speed, capacity, and/or functionality that may result from more compressed testing."²³ We seek comment on our prior proposal for peak period testing as well as USTelecom's proposal to better understand potential benefits and drawbacks of each.
 - We seek comment on whether to adopt our earlier proposal to require testing during peak periods. Toward that end, we note that the *Phase II Price Cap Service Obligation Order* requires that latency measurements used in assessing adequate network performance be taken during peak periods, rather than non-peak periods. Additionally, according to the Commission's 2016 MBA Report, "[f]ocusing on peak usage period provides the most useful information because it

¹⁷ See USTelecom *Ex Parte* at 2-6.

¹⁸ See *id.* at 2-3.

¹⁹ See *id.* at 3-4.

²⁰ See *id.* at 4.

²¹ See *id.* at 4-6.

²² See *id.* at 4.

²³ See *id.*

demonstrates the performance users can expect when the Internet in their local area is experiencing highest demand from users.”²⁴ How should we determine when the “peak period” occurs? For example, should we rely on historical data showing that the peak period typically falls during the evening hours? Does USTelecom’s proposal to expand the testing period better reflect actual usage? Alternatively, should we require taking measurements throughout the entire day and then determine when the busy period actually occurred during that day? Additionally, in areas where there is seasonal fluctuation in traffic load, should we require testing during the busy season?

- We note that USTelecom’s recommendation would allow network providers to include measurements from different periods so that the aggregate result reflects mostly non-peak measurements. How could the use of non-peak measurements help us to assess whether network performance is adequate? If the network performs well for, for example, 20 hours per day, and is congested only four hours per day, would that be acceptable performance? Does adequate performance during non-peak periods indicate or suggest that performance would be adequate during peak periods as well, or is it necessary to measure performance during the periods of heaviest use of the network in order to see how it performs under those conditions? Could including measurements from testing over a longer time frame and from non-peak hours as suggested by USTelecom permit a poorly performing network to appear to have adequate performance?
 - USTelecom indicates that the Commission’s proposal could result in an additional 9 Gbps of traffic at some point during the four-hour test window at the core of the network.²⁵ To what extent would this increase in traffic potentially cause network performance degradation? Would staggered tests throughout the busy period reduce the risk of performance degradation for large networks like AT&T’s and for smaller networks? In addition, is it reasonable to assume that tests from around the country would all impact the same ETC core network facilities? Could the test load be distributed across the ETC’s network, for example, by placing target test servers at or near multiple IXP locations across the country?
 - USTelecom’s estimation regarding network traffic appears to be based on the assumption that all tests will be conducted simultaneously. Is simultaneous testing necessary? Alternatively, could a provider test instead 10 subjects per state at a time for ten-minute intervals spread over a peak busy hour? Is simultaneous testing during peak hours even possible, i.e., given the multiplicity of time zones in the United States, do the peak busy periods all occur at the same time?
 - To the extent we ultimately require testing during peak hours, are there any steps that could be taken to mitigate concerns about consumer impact and potential degradation?
- *Number of Tests.* Would four speed tests per day over the course of the testing period be

²⁴ See FCC Office of Engineering and Technology and Office of Strategic Planning & Policy Analysis, 2016 Measuring Broadband America Fixed Broadband Report at 25 (2016), available at <https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-report-2016>.

²⁵ USTelecom *Ex Parte* at 4; AT&T *Ex Parte* Attach. at 9. The 9 Gbps figure appears to be based on a calculation of 50 test subjects per state in 18 states, multiplied by 10 Mbps per tested customer.

sufficient to determine whether a carrier's network is meeting performance objectives? If not, how many tests would be necessary to make that determination, and when should such tests be performed?

- *Compliance and Certification.* Should we adopt USTelecom's proposed compliance and certification framework outlined by Exhibit A of its May 23, 2017 *ex parte* filing?²⁶ Under USTelecom's proposal, the level of remediation required and support withheld varies according to the performance results.²⁷

10. USTelecom further asks that the Commission permit flexibility in allowing the use of either software installed in CPE itself or equipment directly attached to CPE to conduct required testing.²⁸ Does such software-based testing provide a reliable alternative to the use of Whiteboxes? Does it provide more reliable, detailed results than methods like ping tests? Should we permit this additional option for conducting testing?

11. We also seek comment on whether permitting testing using software installed on the CPE or devices such as a Raspberry Pi would streamline carriers' testing operations. Would using such software or devices involve greater costs for carriers than more manual methods like ping tests? Could such software be programmed to restrict testing to periods of low activity by the consumer, with the potential to defer tests during busy periods? Would this mitigate concerns about potential impact on test subjects? What sources of software exist and how might they be qualified?

12. Regardless of whether CPE is software-enabled to conduct testing or requires attached equipment to do so, the software or attached equipment connects to servers necessary to measure and record testing information. To encourage providers to use more advanced, automated testing, should the Commission implement a performance testing platform specifically for Connect America-supported broadband services and require USAC to provide the server capacity necessary to set up and maintain the necessary testing servers? If USAC were to provide such server capacity, should it charge providers for this service? Would such an option make it feasible for smaller companies to conduct these types of tests? By reducing the need for manual testing (such as ping tests), would this option be more economical for smaller carriers if USAC provides the server capacity necessary?

13. Interested parties may file comments and reply comments on or before the respective dates indicated above. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS), or by filing paper copies.

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <https://www.fcc.gov/ecfs/>
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.
 - All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.

²⁶ See USTelecom *Ex Parte* Exhibit A.

²⁷ *Id.*

²⁸ See *id.* at 6-8.

- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington, DC 20554.

14. People with Disabilities: To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at (202) 418-0530 (voice), (202) 418-0432 (TTY).

15. The proceeding this petition initiates shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.²⁹ Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission’s *ex parte* rules.

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²⁹ 47 CFR §§ 1.1200 *et seq.*