

**FCC FACT SHEET**\*

**Measuring CAF Recipients' Broadband Performance**  
Order on Reconsideration - WC Docket No. 10-90

**Background:** The Federal Communications Commission provides billions of dollars annually in Connect America Fund, or CAF, high-cost universal service support to carriers to deploy modern, high-speed broadband networks to unserved Americans in order to help close the digital divide. In exchange for receiving CAF funding, these carriers must not only build the physical networks connecting rural Americans, but they must also make sure those networks are fast and responsive so that rural Americans are not consigned to second-rate service. To ensure that these networks meet those standards, carriers must test the speed and latency of their broadband service and certify and report the results each year to the Universal Service Administrative Company and the relevant state or Tribal government. In 2018, the Commission's Wireline Competition Bureau, Wireless Telecommunications Bureau and Office of Engineering and Technology (collectively, the Bureaus) adopted a uniform set of testing methodologies for all carriers receiving CAF support to use for speed and latency testing. Several carriers and industry associations sought review of the Bureaus' order.

The *Order on Reconsideration* would resolve those petitions and make targeted modifications to the testing procedures adopted by the Bureaus to ensure that carriers are accountable to taxpayers, consumers, and the Commission and are deploying networks that perform at the required levels, while also making sure that the approach is flexible enough for carriers of any size to comply with the testing rules without unnecessary costs and burdens.

**What the Order on Reconsideration Would Do:**

- Review the Bureaus' overall approach to performance testing for carriers receiving high-cost universal service support to ensure that those standards strike a balance between promoting accountable and effective use of universal service funds while providing the flexibility carriers need in light of carriers' different sizes, networks, and technical abilities.
- Affirm the overall approach adopted by the Bureaus, while making certain, targeted refinements, including:
  - Linking the start of carriers' network performance testing to coincide with the timing of their specific deployment obligations;
  - Providing a "pre-testing" period so that carriers can begin performance testing and address testing issues without any penalties before the formal testing and reporting period begins; and
  - Allowing greater flexibility for carriers to choose the endpoints for testing their networks' performance.

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

In the Matter of
Connect America Fund
WC Docket No. 10-90

ORDER ON RECONSIDERATION\*

Adopted: []

Released: []

By the Commission:

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\* This document has been circulated for tentative consideration by the Commission at its October 2019 open meeting. The issues referenced in this document and the Commission’s ultimate resolution of those issues remain under consideration and subject to change. This document does not constitute any official action by the Commission. However, the Chairman has determined that, in the interest of promoting the public’s ability to understand the nature and scope of issues under consideration, the public interest would be served by making this document publicly available. The FCC’s ex parte rules apply and presentations are subject to “permit-but-disclose” ex parte rules. See, e.g., 47 C.F.R. §§ 1.1206, 1.1200(a). Participants in this proceeding should familiarize themselves with the Commission’s ex parte rules, including the general prohibition on presentations (written and oral) on matters listed on the Sunshine Agenda, which is typically released a week prior to the Commission’s meeting. See 47 CFR §§ 1.1200(a), 1.1203.

## I. INTRODUCTION

1. The Federal Communications Commission has long recognized that “[a]ll Americans [should] have access to broadband that is capable of enabling the kinds of key applications that drive our efforts to achieve universal broadband, including education (e.g., distance/online learning), health care (e.g., remote health monitoring), and person-to-person communications (e.g., VoIP or online video chat with loved ones serving overseas).”<sup>1</sup> To that end, the Commission has invested significant Universal Service Fund support for the deployment of broadband-capable networks in high cost, rural areas.

2. But only fast and responsive networks will allow Americans to fully realize the benefits of connectivity. That is why the Commission requires recipients of universal service support in high cost areas to deploy broadband networks capable of meeting minimum service standards. These standards protect taxpayers’ investment and ensure that carriers receiving this support deploy networks that meet the performance standards they promised to deliver to rural consumers. At the same time, the Commission recognizes that each carrier faces unique circumstances, and that one set of prescriptive rules may not make sense for every one of them. To accommodate this practical reality, the Commission’s rules provide flexibility, taking into account the operational, technical, and size differences among providers when establishing minimum standards, to ensure that even the smallest rural carriers can meet testing requirements without facing excessive burdens.

3. In this *Order on Reconsideration*, we review performance measures established by the Wireline Competition Bureau (WCB), the Wireless Telecommunications Bureau, and the Office of Engineering and Technology (collectively the Bureaus) for recipients of Connect America Fund (CAF) high-cost universal service support to ensure that those standards strike the right balance between ensuring effective use of universal service funds while granting the flexibility providers need given the practicalities of network deployment in varied circumstances.<sup>2</sup> Several petitions for reconsideration and applications for review of the *Performance Measures Order* propose changes to these performance measures. Here, we reject these proposed changes where we find that the Bureaus’ approach strikes the right balance. Where we find that the Bureaus’ approach does not—for example, where we conclude that greater flexibility is warranted than was offered under the Bureaus’ original methodology—we adjust our rules accordingly. Finally, we clarify the Bureaus’ approach where doing so will help resolve stakeholder confusion.

## II. BACKGROUND

4. The *USF/ICC Transformation Order* requires eligible telecommunications carriers (ETCs) receiving high-cost universal service support to provide broadband service in their supported areas that meets certain basic performance requirements.<sup>3</sup> ETCs must offer broadband with latency suitable for real-time applications, such as Voice over Internet Protocol (VoIP), and meet specific minimum speed standards depending upon the program from which they receive support.<sup>4</sup> To ensure that

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<sup>1</sup> 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, 17694, paras. 86-87 (2011) (*USF/ICC Transformation Order*), *aff’d sub nom. In re FCC 11-161*, 753 F.3d 1015 (10<sup>th</sup> Cir. 2014) (citations omitted).

<sup>2</sup> *Connect America Fund*, WC Docket No. 10-90, Order, 33 FCC Rcd 6509 (WCB/WTB/OET 2018) (*Performance Measures Order* or *Order*).

<sup>3</sup> See *USF/ICC Transformation Order*, 26 FCC Rcd at 17705-06, para. 109. 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 CAF. See *id.* at 17695 n.126.

<sup>4</sup> See, e.g., *Connect America Fund; ETC Annual Reports and Certifications*, Report and Order, 29 FCC Rcd 15644, 15649, para. 15 (2014) (*December 2014 CAF Phase II Order*) (requiring speeds of 10/1 Mbps); *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) (*CAF Phase II Auction Order*) (allowing bids of different performance tiers with speeds of 1 Gbps/500 Mbps, 100/20 Mbps, 25/3 Mbps, and 10/1 Mbps); *Connect*

(continued....)

these services are meeting the required standards, recipients of high-cost support must test their broadband networks for compliance with the appropriate 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. Results are subject to verification.<sup>5</sup>

5. After multiple rounds of comments,<sup>6</sup> the Bureaus adopted performance requirements that established a uniform framework for measuring the speed and latency performance for recipients of CAF support to serve fixed locations.<sup>7</sup> As part of the *Order*, the Bureaus adopted a series of testing parameters and requirements to ensure that carriers of all sizes would be able to comply with performance testing requirements cost effectively.

6. Notably, the Bureaus required ETCs to perform speed and latency tests from the customer premises of an active subscriber to a remote test server located at or reached by passing through an FCC-designated Internet Exchange Point (IXP) and set a daily test period (requiring carriers to conduct tests between 6:00 p.m. and 12:00 a.m. local time) for such tests. The Bureaus required a specified number of speed and latency tests during each testing window: (1) for speed testing, the *Order* required a minimum of one download test and one upload test per testing hour at each subscriber test location; and (2) for latency testing, the *Order* required carriers to conduct a minimum of one discrete test per minute at each subscriber test location. The Bureaus required that carriers test a maximum of 50 subscriber locations per required service tier offering per state, with accommodations based on the number of subscribers a carrier has in a state, and that carriers conduct such testing on a quarterly basis (i.e., one week of testing in each quarter of the calendar year).

7. To recognize the varying circumstance different carriers faced, the Bureaus adopted three alternative methodologies carriers could use to demonstrate their compliance with network performance requirements: (1) testing infrastructure from the Measuring Broadband America (MBA) initiative, in which a number of providers already participate; (2) existing network management systems and tools (off-the-shelf testing); or (3) provider-developed self-testing configurations (provider-developed self-testing or self-testing).

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*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) (*Rural Broadband Experiments Order*) (making available support through the rural broadband experiments for services providing speeds of 100/25 Mbps, 25/5 Mbps, and 10/1 Mbps).

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

<sup>6</sup> *USF/ICC Transformation Order*, 26 FCC Rcd at 18045-46, paras. 1013-1017; *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*); *Comment Sought on Performance Measures for Connect America High-Cost Universal Service Support Recipients*, Public Notice, 32 FCC Rcd 9321 (WCB 2017) (*2017 Performance Measures Public Notice*).

<sup>7</sup> See generally *Performance Measures Order*, 33 FCC Rcd 6509. The 2011 *USF/ICC Transformation FNPRM* had directed the Bureaus to work together to refine the performance standards for implementation. *USF/ICC Transformation Order*, 26 FCC Rcd at 17680, 17708, paras. 48, 112 (“We delegate authority to the Bureaus to finalize performance measures as appropriate consistent with the goals we adopt today.”); 47 CFR § 54.313(a)(6). Prior to the adoption of the *Performance Measures Order*, the Wireline Competition Bureau in 2013 had addressed certain requirements for price cap carriers accepting CAF Phase II support, specifying that they must certify that 95% or more of all peak period measurements (also referred to as observations) of network round trip latency are at or below 100 milliseconds (ms) between the customer premises and an FCC-designated IXP. *Connect America Fund*, Report and Order, 28 FCC Rcd 15060, 15070-71, para. 23 (WCB 2013) (*CAF Phase II Price Cap Service Obligation Order*).

8. To achieve full compliance with the latency and speed standards, the *Order* required that 95% of latency measurements during testing windows fall below 100 milliseconds round-trip time, and that 80% of speed measurements be at 80% of the required network speed. In addition, the *Order* established a framework of support reductions in the event that a carrier's performance testing did not demonstrate compliance with the speed and latency standards to which each carrier is subject.

9. Finally, the Bureaus specified the scope of ETCs subject to the standards specified in the *Performance Measures Order*. In particular, as the Bureaus made clear, the testing regime and standards apply to recipients of several Connect America Fund (CAF) high-cost universal service support programs, including price cap carriers receiving CAF Phase II model based support, rate-of-return carriers, rural broadband experiment (RBE) support recipients, Alaska Plan carriers, and CAF Phase II auction winners.<sup>8</sup> And the Bureaus established a deadline of July 1, 2020 for carriers subject to the *Order* to report the results of testing.

10. Several providers and associations petitioned the Bureaus to reconsider these adopted requirements, and others applied to the Commission for review.<sup>9</sup>

### III. DISCUSSION

11. In this *Order on Reconsideration*, we reexamine each of the above-described performance measure requirements. As a result, we adopt several modifications to the performance measure requirements. We believe these changes will alleviate concerns expressed by carriers by increasing the time for carriers to meet certain deadlines and further minimizing the costs associated with compliance, yet still ensure that carriers meet their performance obligations. In short, the refinements to our approach adopted in this Order will further the overarching goal of the *Performance Measures Order*; namely, to ensure that carriers deliver broadband services with the speed and latency required while providing flexibility to enable carriers of all sizes to choose how to conduct the required performance testing in the manner most appropriate for each individual carrier.

#### A. End Points for Testing

12. Under the *Performance Measures Order*, all high-cost support recipients serving fixed locations must perform speed and latency tests from the customer premises of an active subscriber to a

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<sup>8</sup> *Performance Measures Order*, 33 FCC Rcd at 6509, para. 1. We also note that entities receiving support through New York's New NY Broadband Program are subject to performance testing. *See Connect America Fund; ETC Annual Reports and Certifications*, Order, 32 FCC Rcd 968, 993, para. 70 (2017) (stating "like all ETCs receiving Connect America support, [NY Broadband Program] recipients will be required to submit annual reports pursuant to section 54.313 of the Commission's rules") (citations omitted).

<sup>9</sup> Hughes Network Systems, LLC, Petition for Clarification, or in the Alternative, Reconsideration, WC Docket No. 10-90 (Sept. 19, 2018) (Hughes PFR); Micronesian Telecommunications Corporation, Petition for Partial Reconsideration, WC Docket No. 10-90 (Sept. 19, 2018) (MTC PFR); Viasat, Inc., Petition for Reconsideration of Viasat, Inc., WC Docket No. 10-90 (Sept. 19, 2018) (Viasat PFR); USTelecom – The Broadband Association, ITTA – The Voice of America's Broadband Providers, and the Wireless Internet Service Providers Association, Petition for Reconsideration and Clarification, WC Docket No. 10-90 (Sept. 19, 2018) (USTelecom/ITTA/WISPA PFR); NTCA – The Rural Broadband Association, Application for Review and Request for Clarification of NTCA – The Rural Broadband Association, WC Docket No. 10-90 (Sept. 19, 2018) (NTCA AFR); WTA – Advocates for Broadband, Application for Review, WC Docket No. 10-90 (Sept. 19, 2018) (WTA AFR). Because both petitions for reconsideration and applications of review were filed that address many of the same issues, the Bureaus referred the petitions to the Commission for consideration and the Commission will address both the petitions and the applications in this Order, with the exception the issues related to the Mean Opinion Score (MOS) testing. *See* 47 CFR § 1.429(a) ("Where action was taken by a staff official under delegated authority, the petition may be acted on by the staff official or referred to the Commission for action."). Those issues have been addressed by the Wireline Competition Bureau. *See Connect America Fund*, Order on Reconsideration, WC Docket No. 10-90, DA 19-9811 (WCB rel. Sept. 12, 2019).

remote test server located at or reached by passing through an FCC-designated IXP.<sup>10</sup> In the *USF/ICC Transformation Order*, the Commission decided that speed and latency should be measured on each ETC's access network from the end-user interface to the nearest Internet access point, i.e., the Internet gateway, which is the closest peering point between the broadband provider and the public Internet for a given consumer connection.<sup>11</sup> Subsequently, in the *CAF Phase II Price Cap Service Obligation Order*, the Wireline Competition Bureau stated that latency should be tested to an IXP, defined as occurring in any of ten different U.S. locations, almost all of which are locations used in the MBA program because they are geographically distributed major peering locations.<sup>12</sup> The Bureaus expanded the list to permit testing to six additional metropolitan areas to ensure that most mainland U.S. locations are within 300 miles of an FCC-designated IXP and that all are within approximately 500 air miles of one.<sup>13</sup> Further, the Bureaus permitted providers to use any FCC-designated IXP for testing purposes, rather than limiting testing to the provider's nearest IXP.<sup>14</sup> Providers serving non-contiguous areas greater than 500 air miles from an FCC-designated IXP were also permitted to conduct testing between the customer premises and the point at which traffic is aggregated for transport to the continental U.S.<sup>15</sup>

13. We agree with the Bureaus that the speed and latency of networks of carriers receiving support through the various high-cost support mechanisms should be tested between the customer premise of an active subscriber and an FCC-designated IXP.<sup>16</sup> This approach is consistent with the Commission's determination in the *USF/ICC Transformation Order* that "actual speed and latency [must] be measured on each ETC's access network from the end-user interface to the nearest Internet access point."<sup>17</sup> Measuring the performance of a consumer's connection to an IXP better reflects the performance that a carrier's customers experience. As we observed when we first adopted performance measures for CAF Phase II model-based support recipients, "[t]esting . . . on only a portion of the network connecting a consumer to the Internet core will not show whether that customer is able to enjoy high-quality real-time applications because it is network performance from the customer's location to the destination that determines the quality of the service from the customer's perspective."<sup>18</sup>

14. We therefore disagree with those commenters arguing that we should require testing over a shorter span. For example, NTCA seeks modification of the testing requirements to account for performance only on "portions of the network owned by the USF recipient and the next-tier ISP from which that USF recipient procures capacity directly."<sup>19</sup> NTCA argues that requiring testing to an FCC-designated IXP imposes liability on a carrier for conditions beyond its control and violates the Act by applying obligations to parts of the network that are not supported by USF funding.<sup>20</sup> Alternatively, NTCA requests that the Commission provide a "safe harbor" to protect a carrier from off-network issues

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<sup>10</sup> *Performance Measures Order*, 33 FCC Rcd at 6516, para. 18.

<sup>11</sup> *USF/ICC Transformation Order*, 26 FCC Rcd at 17706, para. 111.

<sup>12</sup> *CAF Phase II Price Cap Service Obligation Order*, 28 FCC Rcd at 15071, para. 23 n.63. WCB's list of locations included New York City, NY; Washington, DC; Atlanta, GA; Miami, FL; Chicago, IL; Dallas-Fort Worth, TX; Los Angeles, CA; San Francisco, CA; Seattle, WA; and Denver, CO.

<sup>13</sup> *Performance Measures Order*, 33 FCC Rcd at 6516, para. 20. The expanded list added Salt Lake City, UT; St. Paul, MN; Helena, MT; Kansas City, MO; Phoenix, AZ; and Boston, MA.

<sup>14</sup> *Id.*

<sup>15</sup> *Id.* at 6517, para. 21.

<sup>16</sup> *See id.* at 6516, para. 18.

<sup>17</sup> *See USF/ICC Transformation Order*, 26 FCC at 17706, para. 111.

<sup>18</sup> *CAF Phase II Price Cap Service Obligation Order*, 28 FCC Rcd at 15073-74, para. 31.

<sup>19</sup> NTCA AFR at 6.

<sup>20</sup> *Id.* at 2-6.

that affect its test measurements.<sup>21</sup> WTA similarly contends that testing to an FCC-designated IXP makes carriers responsible for portions of the connection over which they have no control.<sup>22</sup> WTA instead proposes a two-tiered framework consisting of a network-only test for purposes of high-cost compliance and customer-to-IXP testing to respond to customer complaints, with unresolved network-only problems being subject to non-compliance support reductions.<sup>23</sup> Finally, Vantage Point seeks clarity on the initiation point for performance testing within the customer premises, and contends that the endpoint for testing should be at or reached by passing through a carrier's next tier ISP.<sup>24</sup>

15. We disagree with petitioners that testing to an FCC-designated IXP, rather than the edge of a carrier's network, makes a carrier responsible for network elements it does not control, and we reject testing only on a carrier's own network as inadequate. As the Bureaus explained, carriers—even smaller ones—do have some influence and control over the type and quality of Internet transport they purchase.<sup>25</sup> We expect a carrier to purchase transport of a sufficient quality that enables it to provide the requisite level of service expected by consumers and required by the Commission's rules. However, in the event a carrier fails to meet its performance obligations because the only transport available would demonstrably degrade the measured performance of the carrier's network, the carrier can seek a waiver of the performance measures requirements.<sup>26</sup> We are similarly unpersuaded by WTA's two-tiered testing proposal. Adopting WTA's proposal to conduct its required tests over only half of the full testing span would only provide us with insight into the customer experience on half of the network between the customer and the IXP. Given that our aim is to ensure that customers are able to enjoy high-quality real-time applications, we decline to adopt WTA's proposed approach.

16. Finally, we provide additional clarity on both the initiation point and endpoint for testing. As we have noted above, one of the chief purposes for implementing performance requirements is to ensure that customers are receiving the expected levels of service that carriers have committed to providing. Testing from any place other than the customer side of any carrier network equipment used in providing a customer's connection may skew the testing results and not provide an accurate reflection of the customer's broadband experience. As Vantage Point notes, testing in this manner would make it "difficult to ensure that the test was being performed on the network path actually used by the customer."<sup>27</sup> Thus, we clarify that testing should be conducted from the *customer side* of any network equipment that is being used.

17. *Definition of FCC-designated Internet Exchange Point.* Given our commitment to testing the performance of connections between consumers and FCC-designated IXPs, we also take this opportunity to clarify which facilities qualify as FCC-designated IXPs for purposes of performance testing.

18. USTelecom, ITTA, and WISPA request clarification that ETCs are permitted to use "the nearest Internet access point," as specified in the *USF/ICC Transformation Order*, which may not

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<sup>21</sup> *Id.* at 6-8.

<sup>22</sup> WTA AFR at 15-16.

<sup>23</sup> Letter from Gerard J. Duffy, Counsel, WTA, to Marlene S. Dortch, Secretary, FCC, WC Docket No. 10-90, at 2 (Apr. 4, 2019) (WTA Apr. 4, 2019 *Ex Parte*); Letter from Gerard J. Duffy, Counsel, WTA, to Marlene S. Dortch, Secretary, FCC, WC Docket No. 10-90, at 1-2, 4 (May 6, 2019) (WTA May 6, 2019 *Ex Parte*) at 1.

<sup>24</sup> Letter from Larry D. Thompson, CEO, Vantage Point, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 2-3 (Aug. 28, 2018) (Vantage Point Aug. 28, 2018 *Ex Parte*).

<sup>25</sup> *Performance Measures Order*, 33 FCC Rcd at 6516, para. 19.

<sup>26</sup> See 47 CFR § 54.313(a)(6).

<sup>27</sup> Vantage Point Aug. 28, 2018 *Ex Parte* at 2.

necessarily be a location specified in the *Order*.<sup>28</sup> They also seek clarification that ETCs may test to servers that are within the provider's own network (i.e., on-net servers).<sup>29</sup> In subsequent filings, the petitioners suggest that there should be a criteria-based approach to defining the testing endpoint.<sup>30</sup> Specifically, they propose that testing occur "from the end-user interface to the first public Internet gateway in the path of the CAF-supported customer that connects through a transitive Internet Autonomous System," (ASN) and "that the Commission establish a safe harbor where the transitive Internet AS which the gateway hosts includes one or more router(s) that advertise(s) [ASN] organizations that are listed on the Center for Applied Internet Data Analysis (CAIDA) 'AS Organization Rank List.'" <sup>31</sup> The petitioners propose that testing occurring through a "safe harbor" ASN "would be considered valid without further inquiry."<sup>32</sup>

19. We conclude that the *Order*'s designation of certain metropolitan areas as qualifying IXPs is too ambiguous. It is not clear where the boundaries of a designated IXP metropolitan area begin and end. Thus, drawing on the petitioners' proposal, we now provide a revised definition of FCC-designated IXP that is more specific and better designed to account for the way Internet traffic is routed. For testing purposes, we define an FCC-designated IXP as any building, facility, or location housing a public Internet gateway that has an active interface to a qualifying ASN. Such a building, facility, or location could be either within the provider's own network or outside of it. We use the term "qualifying ASN" to ensure that the ASN can properly be considered a connection to the public Internet. We note that in the *USF/ICC Transformation Order*, the Commission found that the Internet gateway is the "peering point between the broadband provider and the public Internet" and that public Internet content is "hosted by multiple service providers, content providers and other entities in a geographically diverse (worldwide) manner."<sup>33</sup> The criteria we use to determine FCC-designated IXPs are designed to ensure that the peering point is sufficiently robust such that it can be considered a connection to the public Internet and not simply another intervening connection point. We designate 44 major North American ASNs using CAIDA's ranking of Autonomous Systems and other publicly available resources as "safe harbors."<sup>34</sup> We direct the Bureaus to update this list of ASNs periodically using the CAIDA ranking of

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<sup>28</sup> USTelecom/ITTA/WISPA PFR at 19-21. *See also* Comments of AT&T, WC Docket No. 10-90, at 2-6 (Nov. 7, 2018) (AT&T PFR Comments).

<sup>29</sup> USTelecom/ITTA/WISPA PFR at 21; AT&T PFR Comments at 4-5; Comments of Midcontinent Communications in Support of USTelecom and WISPA's Petition for Reconsideration and Clarification, WC Docket No. 10-90, at 1-4 (Nov. 7, 2018) (Midcontinent PFR Comments); Reply of USTelecom, ITTA, and WISPA to Opposition to Petition for Reconsideration and Clarification, WC Docket No. 10-90, at 3-4 (Nov. 19, 2018) (USTelecom/ITTA/WISPA PFR Reply).

<sup>30</sup> *See, e.g.*, Letter from Michael J. Jacobs, Vice President, Regulatory Affairs, ITTA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (May 9, 2019) (ITTA/USTelecom/WISPA May 9, 2019 *Ex Parte*); Letter from Stephen E. Coran, Lerman Senter PLLC, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (May 13, 2019) (ITTA/USTelecom/WISPA May 13, 2019 *Ex Parte*); Letter from Michael J. Jacobs, Vice President, Regulatory Affairs, ITTA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (June 6, 2019) (ITTA/USTelecom/WISPA June 6, 2019 *Ex Parte*).

<sup>31</sup> *See* ITTA/USTelecom/WISPA June 6, 2019 *Ex Parte* at 2.

<sup>32</sup> *Id.* at 2.

<sup>33</sup> *USF/ICC Transformation Order*, 26 FCC Rcd at 17706, para. 111.

<sup>34</sup> Appendix A provides a list of qualifying ASNs. An ASN is determined to be qualifying if it appears on the CAIDA AS Rank List and meets the following criteria: (1) it is a "transit/access" ASN; (2) it is flagged in the United States, Canada, or Mexico; (3) it has a Transit Degree of 100 or greater; (4) it peers with two or more of the top 300 USA-flagged ASNs on CAIDA's AS Rank List; and (5) at least one of these peered ASNs is ranked in the top 100. We do exclude 4 ASNs that meet these criteria where analysis of PeeringDB and its website indicates that the ASNs do not peer with a significant portion of the public Internet. They are: Akamai (32787); Florida International

(continued....)

ASNs, PeeringDB,<sup>35</sup> and other publicly available resources. Providers may test to any building, facility, or location housing a public Internet gateway that has an active interface to one of these qualifying ASNs or may petition the Bureaus to add additional ASNs to the list.<sup>36</sup> The Bureaus will determine whether any ASN included in a carrier petition is sufficiently similar to qualifying ASNs that it should be added to the list of qualifying ASNs.

### **B. Daily Test Period**

20. The Bureaus also established a daily testing period for speed and latency tests, requiring carriers to conduct tests between 6:00 p.m. and 12:00 a.m. local time, including weekends.<sup>37</sup> The testing window the Bureaus adopted reflects a slight expansion of the testing window used for the MBA.<sup>38</sup> The Bureaus reasoned that MBA data indicated a peak period of Internet usage every evening but noted that they would revisit this requirement periodically “to determine whether peak Internet usage times have changed substantially.”<sup>39</sup>

21. Petitioners and commenters urge the Commission to reconsider the daily test period requirement to account for the usage patterns of rural consumers, as well as the conditions and characteristics of rural areas. WTA notes that the MBA data cited by the Bureaus likely reflect the usage patterns of urban consumers, rather than consumers in rural areas that “are typically making personal and business use of their household Internet connections throughout the day.”<sup>40</sup> WTA contends that there is likely to be increased congestion on rural networks during the time period adopted by the Bureaus, potentially resulting in an inaccurate or unrepresentative testing of the carrier’s service.<sup>41</sup> WTA also argues that mandating testing during evening hours and weekends requires rural carriers to adjust their regular daytime schedule, creating staffing and financial hardships and potentially preventing them from responding to other customer service issues.<sup>42</sup> ITTA supports this point, noting that “evening and weekend test hours require RLECs to re-schedule one or more technicians from their regular daytime maintenance and installation duties and pay them premium or overtime wages.”<sup>43</sup> ITTA also challenges the expansion of the daily test period from 7 p.m. to 11 p.m. to 6 p.m. to 12 a.m.,<sup>44</sup> and requests flexibility as to the specific hours that testing may be conducted.<sup>45</sup>

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University (20080); WoodyNet (Packet Clearing House) (42); and eBay (backbone for eBay Inc.) (62955). See AS Rank, Center for Applied Internet Data Analysis (Mar. 1, 2019), <http://as-rank.caida.org>.

<sup>35</sup> PeeringDB contains peering and peering related information, including interconnection data for networks, clouds, services, and enterprise, as well as interconnection facilities that are developing at the edge of the Internet.” See <https://www.peeringdb.com/>.

<sup>36</sup> We note that we are not requiring the carrier’s network to interconnect with the qualifying ASN at the building, facility, or location.

<sup>37</sup> *Performance Measures Order*, 33 FCC Rcd at 6520, para. 30.

<sup>38</sup> *Id.*, 33 FCC Rcd at 6520, para. 30.

<sup>39</sup> *Id.*

<sup>40</sup> WTA AFR at 9.

<sup>41</sup> *Id.*

<sup>42</sup> *Id.* at 10.

<sup>43</sup> Comments of ITTA – The Voice of America’s Broadband Providers, WC Docket No. 10-90, at 7 (Nov. 7, 2018) (ITTA PFR Comments).

<sup>44</sup> *Id.* at 7-8. See also Letter from Michael J. Jacobs, VP, Regulatory Affairs, ITTA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 2 (Feb. 11, 2019).

<sup>45</sup> USTelecom/ITTA/WISPA PFR at 23-24; USTelecom/ITTA/WISPA PFR Reply at 5.

22. We decline to revisit the daily testing period at this time. WTA provides no data to support its claim that rural consumers are more active users of broadband service during daytime hours than urban consumers. Moreover, our review of MBA data from more rural areas indicates that these areas have similar peak periods to urban areas.<sup>46</sup> As we have stated many times, a primary goal for universal service is to ensure that customers in rural areas receive the same level of service as those in urban areas.<sup>47</sup> By establishing the same testing window for urban and rural areas, we can confirm that consumers in rural areas are not receiving substandard service as compared to consumers in urban areas during the same time periods. Additionally, WTA's concern that testing during the peak period may degrade a consumer's broadband experience is unfounded.<sup>48</sup> As we previously observed, the small amount of data required for speed testing will have no noticeable effect on network congestion.<sup>49</sup> We remind carriers that we provide them the flexibility to choose whether to stagger their tests over the course of the testing period, so long as they do not violate any other testing requirements.<sup>50</sup>

23. We also disagree with WTA and ITTA that the current daily testing period will require rural carriers to devote additional personnel hours to implement the Commission's performance testing requirements. Once the testing regime is implemented and carriers have installed the necessary technology and software to test the speed and latency of their networks on a routine basis, we do not anticipate that extensive staffing will be required to monitor the testing process. Because the technological testing options that we have allowed carriers to use are all relatively automated, carriers should not have to adjust schedules to ensure staffing during evenings and weekends. Additionally, we note that the Bureaus expanded the testing period from 7 p.m. to 11 p.m. to 6 p.m. to 12 a.m. based on several comments from parties that requested a longer testing period.<sup>51</sup> Adding one additional hour on both the front and back end of the testing period allows a carrier's testing to capture the ramp up and ramp down periods before and after peak time, providing a more accurate picture of whether customers are receiving the required level of service. We also remind parties that the Bureaus committed to revisiting periodically the daily testing window to ensure that the established hours continue to reflect the usage habits of consumers.<sup>52</sup>

### C. Specific Speed Test Requirements

24. The Bureaus required a specified number of speed tests during each testing window. In particular, the *Order* required a minimum of one download test and one upload test per testing hour at each subscriber test location.<sup>53</sup> Providers were required to start separate download and upload speed tests at the beginning of each test hour window, and, after deferring a test due to crosstalk (e.g., traffic to and

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<sup>46</sup> FCC staff analyzed MBA usage data from August 2018 through February 2019 and compared the data from more urban areas to that of more rural areas. The usage patterns were similar when comparing urban and rural areas, and all showed higher usage during the same peak times. Staff analysis categorized subscriber locations as urban or more rural based in part upon the state in which the subscriber was located, but more importantly the distance from the subscriber location to a city with a sizeable population. See Raw Data - Measuring Broadband America - Eighth Report, FCC, <https://www.fcc.gov/reports-research/reports/measuring-broadband-america/raw-data-measuring-broadband-america-eighth#block-menu-block-4>.

<sup>47</sup> See, e.g., *USF/ICC Transformation Order*, 26 FCC Rcd at 17679, paras. 43-45. See also 47 U.S.C. § 254(b)(3).

<sup>48</sup> WTA AFR at 9.

<sup>49</sup> *Performance Measures Order*, 33 FCC Rcd at 6520-21, para. 32.

<sup>50</sup> *Id.* at 6521, para. 33.

<sup>51</sup> See, e.g. CAF II Performance Certification – AT&T Proposal, Hany Fahmy, Ph.D., Assistant Vice President – Global Public Policy, External and Legislative Affairs, AT&T, WC Docket No. 10-90, Advantages of 18-hour measurements vs. 7-11 pm (June 16, 2016).

<sup>52</sup> *Performance Measures Order*, 33 FCC Rcd at 6520, para. 30.

<sup>53</sup> *Id.*, 33 FCC Rcd at 6519, para. 28.

from the consumer's location that could impact performance testing), providers were required to reevaluate whether the consumer load exceeds the crosstalk threshold every minute until the speed test can be run or the one-hour test window ends.<sup>54</sup>

25. In their Petition for Reconsideration, USTelecom, ITTA, and WISPA request clarification that recipients are afforded flexibility in commencing hourly tests. They argue that “[i]t is not clear from the *Order* . . . whether ‘the beginning’ of a test hour window requires a recipient to commence testing at the top of the hour, or whether testing must commence for all test subscribers at exactly the same time.”<sup>55</sup> The petitioners state that carriers should only be required to complete the test within the hour, and they should be able to retry tests as frequently as their systems allow until a successful test is administered, rather than retrying deferred tests every minute.<sup>56</sup> Noting that “there should be no practical difference as to whether testing occurs at the top, middle, or closer to [the] end of a testing window,” NTCA, NRECA, and UTC support the petitioners’ request that “the Commission reconsider the discrete and specific times at which testing is to be conducted within each hour.”<sup>57</sup> Vantage Point likewise proposes that the Commission permit carriers to distribute speed tests within testing hours in a way that minimizes network impact; otherwise, Vantage Point asserts, requiring all speed testing to start at the beginning of each hour would significantly burden test servers such that test results would not be representative of customers’ normal experience.<sup>58</sup>

26. We clarify that providers do not have to begin speed tests at the beginning of each test hour, as petitioners suggest. In particular, we agree with Vantage Point that providing greater flexibility in this regard will further minimize the impact of any potential burden on the test servers during speed testing.<sup>59</sup> However, to ensure that there is enough data on carriers’ speed performance, providers must still conduct and report at least one download test and one upload speed test per testing hour at each subscriber test location, with one exception. A carrier that begins attempting speed tests within the first fifteen minutes of a testing hour, and repeatedly retries and defers the test at one-minute intervals due to consumer load meeting the adopted crosstalk thresholds (i.e., 64 Kbps for download tests or 32 Kbps for upload tests),<sup>60</sup> may report that no test was successfully completed during the test hour because of crosstalk.<sup>61</sup> A provider that does not attempt a speed test within the first 15 minutes of the hour and/or chooses to retry tests in greater than one-minute intervals must, however, conduct and report a successful speed test for the testing hour regardless of crosstalk. Although this approach continues to differ slightly from MBA practice,<sup>62</sup> we believe that it minimizes the possibility of network congestion at the beginning of the testing hour while ensuring that the Commission will have access to sufficient testing data.

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<sup>54</sup> *Id.*, 33 FCC Rcd at 6519-20, paras. 28-29.

<sup>55</sup> USTelecom/ITTA/WISPA PFR at 23.

<sup>56</sup> *Id.* at 24.

<sup>57</sup> NTCA/NRECA/UTC Opposition at 18. Opposition of NTCA–The Rural Broadband Association, National Rural Electric Cooperative Association (NRECA) and Utilities Technology Council to Petitions for Reconsideration, WC Docket No. 10-90 at 18 (Nov. 7, 2018) (NTCA/NRECA/UTC Opposition).

<sup>58</sup> Vantage Point Aug. 28, 2018 *Ex Parte* at 3-4.

<sup>59</sup> *See id.* at 4.

<sup>60</sup> *Performance Measures Order*, 33 FCC Rcd at 6519-20, para. 28.

<sup>61</sup> As noted in the *Performance Measures Order*, this outcome is unlikely: “a significant majority of MBA speed tests are completed within their designated 1-hour window despite consumer load.” *Id.*, 33 FCC Rcd at 6519 n.86. Although carriers will not be required to submit information on all speed testing attempts made during an hour, carriers must retain and be able to produce this information upon request in the event of an audit.

<sup>62</sup> *See id.*

#### D. Specific Latency Test Requirements

27. The *Order* established specific test intervals within the daily test period for latency testing, requiring carriers to conduct “a minimum of one discrete test per minute, i.e., 60 tests per hour, for each of the testing hours, at each subscriber test location, with the results of each discrete test recorded separately.”<sup>63</sup> Recognizing that crosstalk could negatively affect the test results, the Bureaus provided flexibility for carriers to postpone a latency test in the event that the consumer load exceeded 64 Kbps downstream and to reevaluate the consumer load before attempting the next test.<sup>64</sup>

28. Several parties express concern with these requirements and request reconsideration of the latency testing framework. USTelecom, ITTA, and WISPA jointly contend that the Bureaus failed to provide adequate notice for the frequency of latency testing and did not justify departing from the MBA practice of combining speed and latency testing under a unified framework.<sup>65</sup> These parties further argue that requiring latency testing once per minute will be administratively burdensome for carriers by preventing them from combining the instructions for testing into a single process and potentially overloading and disrupting some testing methods.<sup>66</sup> Instead, USTelecom, ITTA, and WISPA propose that the number of latency tests should be reduced to match the frequency of speed testing.<sup>67</sup> Midcontinent also supports aligning the frequency of speed and latency testing requirements.<sup>68</sup>

29. AT&T also contends that testing once per minute “is unnecessary and arbitrary and capricious” and likewise argues that the Commission should permit carriers to test latency only once per hour.<sup>69</sup> AT&T supports its proposal by providing internal data purporting to demonstrate no material difference between testing latency once per minute versus testing once per hour.<sup>70</sup> As a result, AT&T proposes that the Commission require a minimum of one latency test per hour, but provide flexibility to allow carriers to test more frequently if they desire.<sup>71</sup> ITTA concurs with AT&T’s proposed approach.<sup>72</sup>

30. Conversely, NTCA, NRECA, and UTC support the latency testing framework adopted by the Bureaus. These parties observe that aligning the frequency of speed and latency tests would “risk undermining the Commission’s statutory mandate to ensure reasonably comparable services in rural and urban areas” because speed does not require as frequent testing as latency in order to demonstrate

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<sup>63</sup> See *id.*, 33 FCC Rcd at 6519, para. 27.

<sup>64</sup> *Id.*

<sup>65</sup> USTelecom/ITTA/WISPA PFR at 5-8.

<sup>66</sup> *Id.* at 9.

<sup>67</sup> *Id.* at 6-8. See also Letter from Kevin G. Rupy, Vice President, Law & Policy, USTelecom, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 1-2 (July 31, 2018) (USTelecom July 31, 2018 *Ex Parte*).

<sup>68</sup> Midcontinent PFR Comments at 1-4.

<sup>69</sup> AT&T PFR Comments at 6-8.

<sup>70</sup> Letter from Cathy Carpino, Assistant Vice President – Senior Legal Counsel, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (Apr. 12, 2019) (public version) (AT&T Apr. 12, 2019 *Ex Parte*); Letter from Cathy Carpino, Assistant Vice President – Senior Legal Counsel, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 2 (May 21, 2019) (public version) (AT&T May 21, 2019 *Ex Parte*). AT&T provided staff with summary results of its latency testing of almost 100 subscribers in its Connect America Fund Phase II eligible areas that obtain broadband service via wireline and fixed wireless technologies.

<sup>71</sup> AT&T May 21, 2019 *Ex Parte*.

<sup>72</sup> Letter from Mary L. Henze, Assistant Vice President Federal Regulatory, AT&T Services, Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 (Mar. 15, 2019); Letter from Michael J. Jacobs, VP, Regulatory Affairs, ITTA – The Voice of America’s Broadband Providers; Mike Saperstein, VP Law and Policy, USTelecom; and Claude Aiken, President & CEO, WISPA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 4-9 (Apr. 10, 2019) (ITTA/USTelecom/WISPA Apr. 10, 2019 *Ex Parte*).

compliance.<sup>73</sup> In response, USTelecom, ITTA, and WISPA again argue that the Bureaus failed to adequately address the APA's notice obligations or present any legal or factual basis for requiring substantially more latency tests than speed tests.<sup>74</sup>

31. We decline to revise the determination of the Bureaus that carriers must conduct latency testing once per minute. Regarding parties' procedural arguments, we note that, in the two Public Notices seeking comment on the performance measures, the Bureaus specifically explained that adopting MBA testing was under consideration.<sup>75</sup> Indeed, many of the performance testing requirements were derived from or influenced by the Commission's experience with MBA testing. As such, parties had ample notice that the testing regime adopted by the Bureaus, which is a less burdensome variation of the MBA testing, was a potential option. Any argument to the contrary is unfounded.

32. Complaints that the frequency of latency testing will affect network performance also are speculative. The latency testing frequency framework ultimately adopted by the Bureaus is substantially less extensive than the MBA program testing. For example, MBA testing sends approximately 2,000 User Datagram Protocol (UDP) packets per hour, and these 2,000 individual results are summarized as a single reporting record that reflects all 2,000 tests. To be clear, MBA requires latency to be tested *2,000 times per hour*, with results summarized into one record.<sup>76</sup> Conversely, the Bureaus adopted testing of 60 UDP packets per hour that consists of approximately 3% of the typical MBA load.<sup>77</sup> The more intensive MBA test frequency has not been found to pose any technical or other difficulties so there is no reason to believe that the vastly lower frequency of latency testing adopted by the Bureaus will cause concerns. Requiring 60 UDP packets per hour rather than 2,000 balances the need for sufficient testing while minimizing the burden of testing on carriers.

33. We also agree with the Bureaus that the disparity in testing frequency between speed and latency reflects the different type of testing necessary to determine whether carriers are meeting the required benchmarks. The purpose of speed testing is to determine if the network is properly provisioned to furnish the required speed and whether the network provides sufficient throughput to handle uploads and downloads at particular speeds and times. Because of the burden that such testing puts on a carrier's network, the Bureaus adopted the minimum number of tests necessary to ensure that consumers are receiving broadband service at required speed levels. On the other hand, latency testing indicates whether there is sufficient capacity in the network to handle the level of traffic, which is of particular importance when the network is experiencing high traffic load. In this respect, latency is similar to a pulse rate and can vary substantially as a result of several factors. Even if all these factors are unknown, frequently monitoring latency determines the ability of the network to handle various circumstances and factors that are affecting it. As NTCA, NRECA, and UTC explain:

[T]here is logic in a protocol that tests for latency more frequently than speed. The impact of latency is measured in and discernible by milliseconds: the frequency of testing aims to illuminate whether variables that perforate performance are present. In contrast, speed contemplates a steadier aspect of the network facility, and therefore does not require as frequent testing to demonstrate compliance. Therefore, in as much as latency-sensitive services and applications

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<sup>73</sup> NTCA/NRECA/UTC Opposition at 4-5.

<sup>74</sup> USTelecom/ITTA/WISPA PFR Reply at 5-9.

<sup>75</sup> *2014 Broadband Measurement and Reporting Public Notice*, 29 FCC Rcd at 12626-27, paras. 15-19; *2017 Performance Measures Public Notice*, 32 FCC Rcd at 9325-27, para. 9.

<sup>76</sup> See, e.g., 2016 Measuring Broadband America Fixed Broadband Report, Federal Communications Commission Office of Engineering and Technology and Office of Strategic Planning & Policy Analysis at 27, <https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-report-2016> (2016 MBA Report).

<sup>77</sup> *Performance Measures Order*, 33 FCC Rcd at 6520-21, para. 32.

(including but not limited to voice) are affected by millisecond variables, NTCA, NRECA and UTC urge the Commission to maintain its rigorous standards for latency testing.<sup>78</sup>

And, in any event, conducting more tests for latency is to the carrier's benefit, because of the variability of latency and resulting greater likelihood that outlier failures will not affect the overall rate.

34. We appreciate AT&T's willingness to share its internal data and analysis. However, AT&T's data reflect only the capabilities of its own network and consisted of a very small sample set—18 customers for one peak period in one instance and “almost” 100 subscribers for one peak period in the other.<sup>79</sup> We also note that even AT&T's data demonstrated a substantial variation between testing once per hour and once per minute. For example, in its testing, AT&T found that per minute latency testing of customers served by varying technologies showed that 1.17% of tests were higher than 100 ms but once per hour testing showed that 3.04% of tests showed a latency of higher than 100 ms.<sup>80</sup> A difference of 2% when the latency standard is 5% is substantial.

35. Analysis undertaken by Commission staff confirms the importance of more frequent testing to account for the variability associated with latency. Commission staff compared the conclusions that AT&T—and supported by ITTA—drew from its data to what the much larger MBA data demonstrate. This analysis indicates that the risk of false positives and false negatives (i.e., sample test results indicate that a carrier fails, when given overall network performance, it should have passed, or that a carrier passes, when given overall network performance, it should have failed) varies significantly based on the number of measurements per hour. Because the Commission's performance standard for latency requires 95% of the latency measurements to be less than or equal to 100 ms, a carrier would fail the standard if more than 5% of its latency measurements are greater than 100 ms. In general, staff's analysis found that a greater number of measurements reduces the impact of data outliers and makes false positives and false negatives less likely. For example, a single 200 ms data outlier among a sample of 10 latency measurements that otherwise are all under 100 ms would result in the carrier's failing to meet the 95% threshold (i.e., only 9 out of 10 or 90% of the measurements would be at or under 100 ms). However, a single data outlier of 200 ms in a sample of 100 latency measurements would not, in the absence of at least five other measurements exceeding 100 ms, cause the carrier to fail (i.e., 99 out of 100 or 99% of the measurements would be at or under 100 ms).

36. Additionally, staff analysis of MBA data indicated that the distribution of latency among carriers varies widely even within the same minute.<sup>81</sup> This means that latency varies significantly depending upon the traffic on the network at any given time and does not vary in the same way for each carrier or even within each day for each carrier. Because of the countless number of distributions observed among carriers reflected by the MBA data, we conclude that a smaller number of observations would not yield reliable testing results. Thus, more testing provides the Commission with greater ability to detect bad performance in cases where a carrier's latency is consistently high. In other words, since the likelihood of failing or passing the Commission's latency standard depends, to some degree, on random noise, the more measurements taken by a carrier, the less likely that random factors would cause it to fail the standard.

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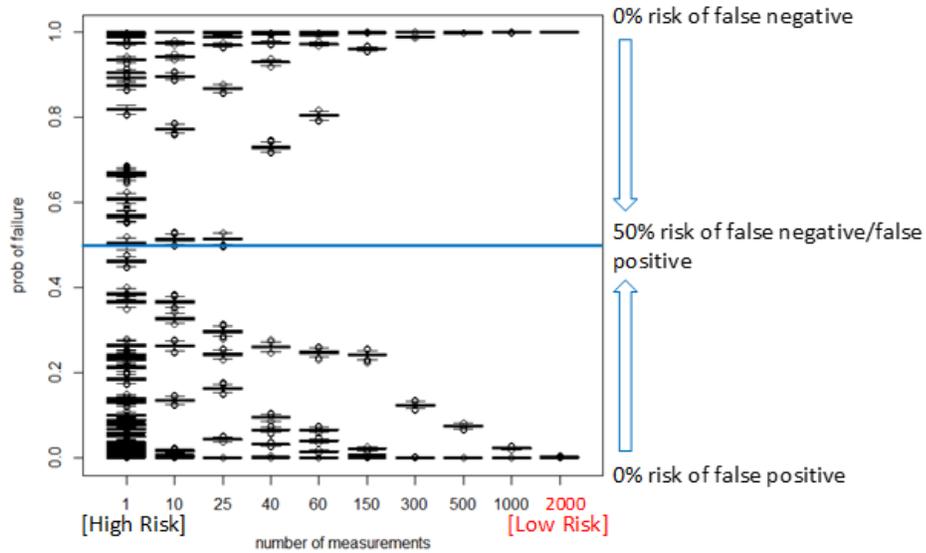
<sup>78</sup> NTCA/NRECA/UTC Opposition at 5.

<sup>79</sup> See AT&T April 12, 2019 *Ex Parte* at 2); AT&T May 21, 2019 *Ex Parte* at 2.

<sup>80</sup> See AT&T May 21, 2019 *Ex Parte* at 2.

<sup>81</sup> For example, the mean of latency from February to March 2016 ranged from 0 to 3000 ms, the standard deviation ranged from 0 to 1500 ms, and the coefficient of variation ranged from 0 to 8. Even among AT&T's own MBA measurements, the latency distributions have a mean ranging between 0 and 2000 ms with a coefficient of variation ranged from 0 to 5. Staff observed a similar or higher coefficient of variation using MBA per hour data from both October 2017 and October 2018.

37. The figure below demonstrates staff’s analysis of the estimated probability of failure and associated risk of false positive or false negative results with different numbers of measurements from a range of latency distributions observed in the MBA data.<sup>82</sup> Each box (bar) represents the estimated probability of failure for a given latency distribution. The difference in the probability of failure between N number of measurements and N=2000 is the estimated risk of a false positive (the test result indicates that a carrier fails when it should have passed) and a false negative (the test result indicates that a carrier passes when it should have failed). As demonstrated, there is a much higher risk of a false positive or false negative under AT&T’s proposed once per hour latency measurement as compared to a moderate risk from 60 measurements per hour.



Thus, staff’s analysis shows that, given the high variability of latency, one of two things would occur if we required only one measurement per hour: either a few extreme measurements would cause a carrier to fail the standard when, in fact, it should pass given its overall performance, or the Commission would be unable to capture consistent poor performance by a carrier that should fail based on the overall performance of its network. As a result, a moderate-risk approach of 60 measurements per hour strikes a balance between the burden of testing on carriers and the risk of failure by carriers caused by uncertainty.

38. Finally, we note that some parties may misunderstand what exactly constitutes a latency test for purposes of the performance measures. Specifically, USTelecom states that, “[t]esting every minute may also overload some testing methods and cause testing to be disrupted,” implying that a carrier must start and stop a latency test every minute within a test-hour.<sup>83</sup> While we do not believe this interpretation is consistent with the intent of the *Order*, we provide greater clarity here on what is considered a sufficient latency test to assuage concerns about the number of latency tests per hour. As the Bureaus described in the *Order*, a “test” constitutes a “single, discrete observation or measurement of speed or latency.”<sup>84</sup> While carriers may choose to continuously start and stop latency testing every minute and record the specific result, we clarify that there is no requirement to conduct latency testing in this manner. Instead, carriers may continuously run the latency testing software over the course of a test-hour and record an observation or measurement every minute of that test-hour. If a carrier transmits one packet at a time for a one-minute measurement, the carrier should report the result of that packet as one

<sup>82</sup> To conduct this analysis, FCC staff used MBA data from February to March 2016 (per minute data) and October 2017 and October 2018 (per hour data).

<sup>83</sup> See USTelecom July 31, 2018 *Ex Parte* at 2.

<sup>84</sup> *Performance Measures Order*, 33 FCC Rcd at 6519, n.83.

observation. However, some applications, such as ping, commonly send three packets and only report summarized results for the minimum, mean, and maximum packet round trip time and not individual packet round trip time. If this is the case, the carrier should report the mean as the result of this observation. If the carrier sends more than one packet and the testing application allows for individual round trip time results to be reported for each packet, then the carrier must report all individual measurements for each packet. Such an approach plainly fits within the definition of “test” adopted by the Bureaus in the *Order* and does not require constant starting and stopping of the latency testing software. In sum, carriers have the flexibility to choose how to conduct their latency testing, so long as one separate, discrete observation or measurement is recorded each minute of the specific test-hour.

#### **E. Number of Test Locations**

39. The Bureaus required that carriers test a maximum of 50 subscriber locations per required service tier offering per state, depending on the number of subscribers a carrier has in a state, randomly selected every two years.<sup>85</sup> The *Order* included scaled requirements permitting smaller carriers (i.e., carriers with fewer than 500 subscribers in a state and particular service tier) to test 10% of the total subscribers in the state and service tier, except for the smallest carriers (i.e., carriers with 50 or fewer subscribers), which must test 5 subscriber locations. The Bureaus also recognized that, in certain situations, a carrier serving 50 or fewer subscribers in a state and service tier may not be able to test even five active subscribers; the Bureaus permitted such carriers to test a random sample of existing, non-CAF-supported active subscriber locations within the same state and service tier to satisfy the testing requirement.<sup>86</sup> In situations where a subscriber at a test location stops subscribing to the service provider within 12 months after the location was selected, the Bureaus required that the carrier test another randomly selected active subscriber location.<sup>87</sup> Finally, the Bureaus explained that carriers may use inducements to encourage subscribers to participate in testing, which may be particularly useful in cases where support is tied to a particular performance level for the network, but the provider does not have enough subscribers to higher performance service tiers to test to comply with the testing sample sizes.<sup>88</sup>

40. Petitioners and applicants raise various concerns regarding the required number of subscriber test locations. Micronesian Telecommunications Corporation (MTC), for example, argues that it and similar carriers that may have fewer than 50 subscribers in a particular state and speed service tier will be unable to comply with the test locations requirement.<sup>89</sup> MTC claims that it will be difficult to find even five test customers to test, particularly in higher service tiers.<sup>90</sup> Asking that the Commission “provide a safety valve” for similar small carriers, MTC proposes that such a provider should “test no more than 10 percent of its customers in any given service tier, with a minimum of one test customer per service tier with customers.”<sup>91</sup> NTCA argues that testing 10% of subscribers may be excessive; instead, NTCA proposes that carriers should test the lesser of 50 locations per state or 5% of active subscribers.<sup>92</sup> Further, NTCA argues that carriers should not be required to upgrade the speed or customer premises

<sup>85</sup> *Id.* at 6522, 6524, paras. 36, 40.

<sup>86</sup> *Id.* at 6522-23, para. 36.

<sup>87</sup> *Id.* at 6524, para. 40.

<sup>88</sup> *Id.*

<sup>89</sup> MTC PFR at 1-2.

<sup>90</sup> *Id.*

<sup>91</sup> *Id.* at 1-3. *See also* Micronesian Telecommunications Corporation Reply to Comments on Petition for Partial Reconsideration, WC Docket No. 10-90, at 2 (Nov. 19, 2019).

<sup>92</sup> NTCA AFR at 13-18. *See also* ITTA PFR Comments at 2-4. NTCA expresses some concern that customers will be suspicious of testing and will not consent to testing even with carriers’ inducements. *See* Letter from Joshua Seidemann, VP of Policy – Industry Affairs and Business Development, NTCA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at (May 7, 2019) (NTCA May 7, 2019 *Ex Parte*).

equipment for individual locations even temporarily to conduct speed tests.<sup>93</sup> WTA suggests that, at least for rural carriers, the number of test locations should be much lower than adopted in the *Order*. Smaller carriers must test larger percentages of their customers compared to larger carriers;<sup>94</sup> accordingly, WTA argues, the Commission should permit testing of just 10-15 locations or 2-3% of subscribers in each CAF-required service tier.<sup>95</sup>

41. NTCA, as well as USTelecom, ITTA, and WISPA, also ask that the Commission clarify that carriers may use the same locations for testing both speed and latency.<sup>96</sup> USTelecom, ITTA, and WISPA explain that, if carriers must conduct speed and latency testing at different locations, the number of subscribers that must be tested would be unnecessarily doubled, which “would be particularly troublesome for smaller recipients, many of whom will be drawing test locations from a small group of subscribers.”<sup>97</sup> Similarly, the petitioners explain, the requirement regarding the number of test locations should be clarified to be exactly the same for both speed and latency.<sup>98</sup> These clarification proposals drew broad support from commenters.<sup>99</sup> For example, comments submitted jointly by NTCA, NRECA and UTC assert that the clarifications would help providers “avoid unnecessary costs and excessive administrative burden,”<sup>100</sup> while Midcontinent Communications notes that using “the same panelists for speed and latency testing for CAF purposes would align with [its] internal testing practices.”<sup>101</sup>

42. A few parties offer suggestions regarding the parameters for the random selection process. In particular, WTA asks that locations should be tested for five years, instead of two years, before a new random sample of test locations is chosen.<sup>102</sup> WTA also proposes that twice the required random number of testing locations be provided to carriers so that carriers can replace locations where

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<sup>93</sup> NTCA AFR at 13-18; NTCA May 7, 2019 *Ex Parte* at 3. See also WTA May 6, 2019 *Ex Parte* at 2; Letter from Michael J. Jacobs, VP, Regulatory Affairs, ITTA – The Voice of America’s Broadband Providers, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 1-2 (Aug. 6, 2019) (ITTA Aug. 6, 2019 *Ex Parte*) (arguing that carriers should be able to use their own randomization tools to develop test samples and should not be required to upgrade test locations if other locations offering such speeds exist); Letter from Louis Peraertz, Vice President of Policy, WISPA, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 1-3 (Aug. 13, 2019) (WISPA Aug. 13, 2019 *Ex Parte*) (stating that requiring carriers to upgrade customers speeds would be required to do a truck roll to provide the customer with higher speed service and could deter applicants in future auctions from bidding at higher speed tiers).

<sup>94</sup> WTA AFR at 7.

<sup>95</sup> *Id.* at 6-9. See also ITTA PFR Comments at 2-4. WTA also asks that the Commission resolve uncertainties around the testing, including whether the “testing and reporting is covered or not covered by Commission rules or policies concerning Customer Proprietary Network Information.” See WTA May 6, 2019 *Ex Parte* at 3.

<sup>96</sup> See USTelecom/ITTA/WISPA PFR at 21-23; NTCA AFR at 22. See also AT&T PFR Comments at 8-9; Midcontinent PFR Comments at 7; Opposition of NTCA – The Rural Broadband Association, National Rural Electric Cooperative Association, and Utilities Technology Council to Petitions for Reconsideration, WC Docket No. 10-90, at 17-18 (Nov. 7, 2018) (NRECA/UTC PFR Comments); USTelecom/ITTA/WISPA PFR Reply at 4-5.

<sup>97</sup> USTelecom/ITTA/WISPA PFR at 21.

<sup>98</sup> *Id.* at 22-23.

<sup>99</sup> See AT&T PFR Comments at 8-9; USTelecom July 31, 2018 *Ex Parte* at 3; Midcontinent PFR Comments at 7; NTCA/NRECA/UTC Opposition at 17-18; USTelecom/ITTA/WISPA PFR Reply at 4-5.

<sup>100</sup> NTCA/NRECA/UTC Opposition at 18.

<sup>101</sup> Midcontinent PFR Comments at 7.

<sup>102</sup> WTA AFR at 6-9. See also ITTA PFR Comments at 4-5.

residents refuse to participate or have incompatible CPE.<sup>103</sup> Frontier, in an *ex parte* filing, proposes that carriers be allowed to test only new customer locations; it argues that installing the necessary testing equipment at older locations requires more time than is available with the adopted testing schedule.<sup>104</sup>

43. We decline to modify the adopted sample sizes for testing speed and latency. To minimize the burdens of testing, the Bureaus have used a “trip-wire” approach in determining the required sample sizes. In other words, the adopted sample sizes produce estimates with a high margin of error but can show where further inquiry may be helpful; our target estimation precision is a 90% confidence level with an 11.5% margin of error. For the largest carriers, i.e., those with over 500 subscribers in a given state and speed service tier, this requires a sample size of 50 subscriber locations. For the smallest carriers, the Bureaus adopted small sample sizes that result in less precision, with the margin of error reaching 34.9%, to reduce the testing burden on smaller providers. Reducing the sample sizes for smaller carriers even more would further reduce the resulting estimation precision—making the test data even less likely to be representative of the actual speed and latency consumers experience on CAF-supported networks. We therefore do not modify the required numbers of subscriber locations carriers must test.

44. Nonetheless, we recognize that a few carriers facing unique circumstances may find it extraordinarily difficult to find a sufficient number of subscriber locations to test.<sup>105</sup> Although we decline to modify the adopted sample sizes, the Commission appreciates that special circumstances occasionally demand exceptions to a general rule.<sup>106</sup> The Commission’s rules may be waived for good cause shown.<sup>107</sup>

45. For the smallest carriers that cannot find even five CAF-supported locations to test, we also reconsider the Bureaus’ decision to permit testing of non-CAF-supported active subscriber locations within the same state and service tier.<sup>108</sup> Testing and reporting speed and latency for non-CAF-supported locations adds unnecessary complexity to our requirements. Accordingly, we require that any non-compliant carrier testing fewer than five CAF-supported subscriber locations because more are not available would be subject to verification that more customers are not available, rather than requiring that all carriers testing fewer than five CAF-supported subscriber locations find non-CAF-supported locations to test.

46. Additionally, we recognize that, as several parties have noted, obtaining customer consent for testing which requires placement of testing equipment on customer premises may prove

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<sup>103</sup> WTA April 17, 2019 *Ex Parte* at 3. Letter from Derrick B. Owens, Senior Vice President, Government & Industry Affairs, and Gerard J. Duffy, Counsel, WTA – Advocates for Rural Broadband, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90 at 3 (Apr. 17, 2019) (WTA Apr. 17, 2019 *Ex Parte*).

<sup>104</sup> Letter from AJ Burton, Vice President, Federal Regulatory, Frontier Communications, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 1-2 (Dec. 18, 2018) (Frontier *Ex Parte*).

<sup>105</sup> See MTC PFR at 1-3.

<sup>106</sup> We note that some entities may have misunderstood the testing requirements. MTC explains that it, “is regulated by the Commission as a price cap ILEC, [and] offers several speed tiers for Internet subscribers in CNMI. Due to the challenging business environment, however, certain service tiers have very few customers even when counting non-CAF-supported areas.” MTC PFR at 2. As a price cap carrier, MTC is receiving CAF Phase II support, which requires build out of 10/1 Mbps. Thus, MTC is only required to test in one speed tier, 10/1 Mbps. The fact that MTC offers additional speed packages to its customers does not increase the number of test locations required. MTC will be required to test a random sample of up to 50 locations drawn from the number of CAF-supported locations at which there is a subscriber.

<sup>107</sup> 47 CFR § 1.3. Waiver of the Commission’s rules is appropriate only if both: (1) special circumstances warrant a deviation from the general rule, and (2) such deviation will serve the public interest. See *Northeast Cellular Tel. Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990) (citing *WAIT Radio v. FCC*, 418 F.2d 1153, 1157-59 (D.C. Cir. 1969), cert. denied, 93 S.Ct. 461 (1972)) (*Northeast Cellular*).

<sup>108</sup> See *Performance Measures Order*, 33 FCC Rcd at 6522-23, para. 36.

difficult.<sup>109</sup> We believe that our revised testing implementation schedule (discussed below) will help alleviate this concern, particularly for smaller carriers. Numerous vendors are also developing software solutions that will allow providers to test the service at customer locations without requiring any additional hardware at the customer's premises. Further, we direct WCB to publish information on the Commission's website explaining the nature and purpose of the required testing—to ensure that carriers are living up to the obligations associated with CAF support—and urging the public's participation. We expect that providing such information in an easy-to-understand format will help alleviate subscribers' potential concerns. Moreover, we emphasize that no customer proprietary network information is involved in the required testing or reporting, other than information for which the carrier likely would already have obtained customer consent;<sup>110</sup> carriers routinely perform network testing of speed and latency and the performance measures testing we are requiring is of a similar nature.

47. We agree with comments recommending that the same sample sizes adopted for speed should also apply to latency, and that the same subscriber locations should be used for both speed and latency tests. As some parties have noted, requiring testing of two separate sets of subscriber locations for speed and latency, rather than the same group of locations for both, is unnecessarily burdensome. By requiring speed and latency tests at the same subscriber locations, we reduce the amount of equipment, coordination, and effort that may otherwise be involved in setting up testing. Therefore, carriers will test all of the locations in the random sample for both speed and latency. We note that because the Commission is adopting different implementation dates for testing of different broadband deployment programs, a carrier will receive a separate random sample of testing locations for each program for which it must do performance testing. In the *Performance Measures Order*, the Bureaus stated that, “[a] carrier with 2,000 customers subscribed to 10/1 Mbps in one state through CAF Phase II funding and 500 RBE customers subscribed to 10/1 Mbps in the same state, and no other high-cost support with deployment obligations, must test a total of 50 locations in that state for the 10/1 Mbps service tier.”<sup>111</sup> But because CAF Phase II and RBE have different implementation dates for testing, the carrier in this example must test 50 locations for its CAF Phase II obligations and 50 locations for its RBE obligations.<sup>112</sup> Similarly, because we now require carriers to use the same sample for both speed and latency, we reconsider the requirement that carriers replace latency testing locations that are no longer actively subscribed after 12 months with another actively subscribed location.<sup>113</sup> The Bureaus did not make clear if this provision applied to both speed and latency test locations. To avoid confusion, we clarify that the same replacement requirements should apply to both speed and latency. Therefore, we now require that carriers replace non-actively subscribed locations with another actively subscribed location by the next calendar quarter testing.<sup>114</sup> Although we do not believe it is necessary for carriers to obtain a random list of twice the number of required testing locations at the outset,<sup>115</sup> carriers should be able to obtain additional randomly selected subscriber locations as necessary for these kinds of situations.

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<sup>109</sup> See, e.g., NTCA May 7, 2019 *Ex Parte*.

<sup>110</sup> See, e.g., Letter from Gerard J. Duffy, Regulatory Counsel WTA – Advocates for Rural Broadband, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 3 (May 9, 2019).

<sup>111</sup> *Performance Measures Order*, 33 FCC Rcd at 6524, para. 39 (citations omitted).

<sup>112</sup> Because programs will have different testing implementation and ending dates, and non-compliance will be calculated for each program individually, a carrier will be required to test a different sample for each program.

<sup>113</sup> See *Performance Measures Order*, 33 FCC Rcd at 6524, para. 40.

<sup>114</sup> We note that if a carrier chooses to test more than the required number of locations, it will be required to replace any locations to maintain the number the carrier originally chose to test, even if that number is greater than the number of testing locations required.

<sup>115</sup> See WTA Apr. 17, 2019 *Ex Parte* at 3.

48. We maintain the Bureaus' requirement that carriers meet and test to their CAF obligation speed(s) regardless of whether their subscribers purchase Internet service offerings with speeds matching the CAF-required speeds for those CAF-eligible locations.<sup>116</sup> In other words, some carriers may find it necessary to upgrade individual subscriber locations, at least temporarily, to conduct speed testing.<sup>117</sup> In addition, because we are allowing carriers to use the same sample for both speed and latency testing, we require carriers to test all locations in the random sample even if the carrier has other customers that subscribe to the required service level. The alternative could preclude the testing of many subscriber locations for which carriers receive CAF support and create a non-random sample for latency testing.<sup>118</sup> For instance, if a carrier was obligated to deploy gigabit service in all its locations, yet most customers in those locations purchased Internet service with speeds no faster than 50 Mbps, the carrier would have few subscriber locations to test. Unless the carrier tests those locations to the CAF-required speeds, the Commission would not be able to verify that the carrier actually deployed broadband service with the speeds it committed to provide. Moreover, parties' concerns regarding the potential time involved to upgrade locations are misplaced.<sup>119</sup> Carriers will have advance notice of which subscriber locations they must test and, in any case, receive CAF support to provide the CAF-required speeds at those locations.<sup>120</sup> In addition, although upgrading the speed at a particular location may require a truck roll and/or new equipment,<sup>121</sup> that location will be subject to testing for two years, so the upgrades and new equipment will be in use for eight testing quarters before needing to be changed. We do not believe that requiring temporary upgrades of service of testing locations will discourage bidding in future auctions.<sup>122</sup> Carriers participating in auctions should be prepared to provide the required speeds at all of the locations in the relevant service area and should anticipate that over time more and more customers in the service area will be purchasing the higher-speed offerings.

49. Finally, we reject proposals to require testing only of newly deployed subscriber locations<sup>123</sup> and to maintain the same sample for more than two years.<sup>124</sup> If we were to permit testing of only new locations, carriers' speed and latency test data would not reflect their previous CAF-supported deployments, for which carriers also have ongoing speed and latency obligations. Moreover, although the Bureaus adopted the *Order* in 2018, carriers have been certifying that their CAF-supported deployments

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<sup>116</sup> See *Performance Measures Order*, 33 FCC Rcd at 6528, para. 51.

<sup>117</sup> See *id.* Carriers may not charge customers for any upgrades, new modems, or other testing equipment required by the carrier to comply with its testing obligations. Performance testing is a requirement of receiving CAF support and is the responsibility of the carrier, not the customer. See *USF/ICC Transformation Order*, 26 FCC Rcd at 17705-06, para. 109.

<sup>118</sup> For similar reasons, we do not allow carriers to select their own randomization procedures and make only those customers that have subscribed to the required speed level eligible to be part of the sample. This would in no way produce a random sample, particularly for latency testing. See ITTA Aug. 6, 2019 *Ex Parte* at 1-2.

<sup>119</sup> See NTCA May 7, 2019 *Ex Parte*.

<sup>120</sup> For similar reasons, a carrier should not be able to avoid testing a subscriber location because it believes an upgrade to customer premises equipment is necessary. See WTA Apr. 17, 2019 *Ex Parte*. With the implementation scheduled adopted herein, carriers will have sufficient time to prepare for testing at particular locations, and also still retain multiple options for conducting the testing.

<sup>121</sup> See WISPA Aug. 13, 2019 *Ex Parte* at 2.

<sup>122</sup> See *id.*

<sup>123</sup> See *Frontier Ex Parte* at 1-2.

<sup>124</sup> See WTA AFR at 6-9. WTA also argues that, because many customers will refuse to consent to carriers' testing at customer locations, twice the number of required test locations should be selected and provided to carriers, and carriers should be able to self-certify the reasons for not being able to test specific customer locations. See WTA Apr. 17, 2019 *Ex Parte*. The Commission is working with USAC to implement the random selection process and will ensure that carriers will be able to obtain additional randomly selected subscribers as needed.

meet the relevant speed and latency obligations for several years. Requiring testing of older locations should not prove a problem for carriers that have been certifying that their deployments properly satisfy their CAF obligations. In any case, further shrinking the required sample to include only more recent deployments would compromise the effectiveness of the “trip-wire” sample; the Commission would not be able to identify potential problems with many older CAF-supported deployments. Maintaining the same sample beyond two years would present the opposite problem. By excluding newer deployments, the Commission’s understanding of carriers’ networks would be outdated; the Bureaus’ decision to require testing a different set of subscriber locations every two years struck the correct balance between overburdening carriers and maintaining a current, relevant sample for testing.

#### **F. Quarterly Testing**

50. The Bureaus required quarterly testing for speed and latency. In particular, to capture any seasonal effects and differing conditions throughout the year that can affect a carrier’s broadband performance, the Bureaus required carriers subject to the performance measures to conduct one week of speed and latency testing in each quarter of the calendar year.<sup>125</sup>

51. WTA argues that spreading testing across the year imposes a substantial burden, particularly on rural carriers, without producing more accurate information than a single week of testing.<sup>126</sup> WTA also contends that obtaining consent from customers to allow testing for four weeks a year “is going to be extremely difficult and likely to become a customer relations nightmare.”<sup>127</sup> Instead, WTA argues that testing for a single week in late spring or early fall would be more representative of typical Internet usage.<sup>128</sup> WTA cites these claimed difficulties as a reason for reducing the number of weeks of annual testing, reducing the numbers of locations to be tested, allowing more flexible selection of customer locations, and using the test locations for longer periods.<sup>129</sup>

52. We decline to adjust the quarterly testing requirement as proposed by WTA. As the Bureaus acknowledged when they adopted the quarterly requirement, different conditions exist throughout the year that can affect service quality, including changes in foliage, weather, and customer usage patterns, school schedules, holiday shopping, increased or decreased customer use because of travel and sporting events, and business cycles.<sup>130</sup> The goal of the testing requirements is to ensure that consumers across the country experience consistent, quality broadband service throughout the year, not at only one defined point during the year. Additionally, we believe WTA’s concerns regarding customer consent are unfounded. We expect that once the requisite technology and software to conduct the required testing has been installed, testing the performance of the network for one week per quarter will not impose any additional significant burden on carriers or customers. Moreover, the tests themselves use so little bandwidth that we do not believe customers will even notice that testing is occurring.<sup>131</sup> Indeed, as the Bureaus explained, quarterly testing “strikes a better balance of accounting for seasonal changes in broadband usage and minimizing the burden on consumers who may participate in testing.”<sup>132</sup>

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<sup>125</sup> *Performance Measures Order*, 33 FCC Rcd at 6520, para. 29.

<sup>126</sup> WTA AFR at 4.

<sup>127</sup> *Id.* at 10.

<sup>128</sup> *Id.* at 5.

<sup>129</sup> *Id.* at 15.

<sup>130</sup> *Performance Measures Order*, 33 FCC Rcd at 6520, para. 29 (“we expect test results to reflect a carrier’s performance throughout the year, including during times of the year in which there is a seasonal increase or decrease in network usage”).

<sup>131</sup> *See id.* at 6520-21, para. 32.

<sup>132</sup> *Id.*

### G. Flexibility in Choosing Testing Methods

53. We confirm that carriers may use any of the three methodologies outlined in the *Performance Measures Order* to demonstrate their compliance with network performance requirements. The Commission has previously determined that it should provide carriers subject to performance testing with flexibility in determining the best means of conducting tests. In 2013, the Wireline Competition Bureau had determined that price cap carriers generally may use “existing network management systems, ping tests, or other commonly available network measurement tools,” as well as results from the MBA program, to demonstrate compliance with latency obligations associated with CAF Phase II model-based support.<sup>133</sup> Thus, the Bureaus concluded that ETCs subject to fixed broadband performance obligations would be permitted to conduct testing by employing either: (1) MBA testing infrastructure (MBA testing), (2) existing network management systems and tools (off-the-shelf testing), or (3) provider-developed self-testing configurations (provider-developed self-testing or self-testing).<sup>134</sup> The Bureaus reasoned that the flexibility afforded by three different options offered “a cost-effective method for conducting testing for providers of different sizes and technological sophistication.”<sup>135</sup>

54. NTCA requests clarification about language in the *Order* stating that “MBA testing must occur in areas and for the locations supported by CAF, *e.g.*, in CAF Phase II eligible areas for price cap carriers and for specific built-out locations for RBE, Alternative Connect America Cost Model (A-CAM), and legacy rate-of-return support recipients.”<sup>136</sup> NTCA contends that this language refers to previously-promulgated MBA testing requirements and that the Commission should clarify that ETCs subject to fixed broadband performance obligations should be permitted to use any of three testing options outlined by the Bureaus.<sup>137</sup>

55. The language highlighted by NTCA applies only to carriers choosing the MBA testing option; the Bureaus set out additional, separate requirements for carriers choosing to use off-the-shelf or provider-developed testing options.<sup>138</sup> As the *Order* explained, in the event that a carrier opts to use the MBA testing methodology to collect performance data, it must ensure boxes are placed at the appropriate randomly selected locations in the CAF-funded areas, as required for the CAF testing program.<sup>139</sup> If, on the other hand, a carrier opts for either off-the-shelf testing tools or its own self-testing, it must use the testing procedures specific to the providers’ respective chosen methodology.<sup>140</sup>

### H. Standards for Full Compliance

56. To achieve full compliance with the latency and speed standards, the *Order* required that 95% of latency measurements during testing windows fall below 100 milliseconds round-trip time, and that 80% of speed measurements be at 80% of the required network speed. Based on the standard adopted by the Commission in 2011, WCB used ITU calculations and reported core latencies in the contiguous United States in 2013 to determine that a latency of 100 ms or below was appropriate for real-time applications like VoIP.<sup>141</sup> WCB thus required price cap carriers receiving CAF Phase II model-

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<sup>133</sup> *CAF Phase II Price Cap Service Obligation Order*, 28 FCC Rcd at 15071, para. 23.

<sup>134</sup> *Performance Measures Order*, 33 FCC Rcd at 6513, para. 9.

<sup>135</sup> *Id.* at 6513, para. 10.

<sup>136</sup> NTCA AFR at 22-23 (quoting *Performance Measures Order*, 33 FCC Rcd at 6513, para. 9).

<sup>137</sup> *Id.* at 23. We note that legacy rate-of-return support recipients are those carriers that receive Connect America Fund Broadband Loop Support (CAF BLS).

<sup>138</sup> *Performance Measures Order*, 33 FCC Rcd at 6513, para. 9.

<sup>139</sup> *Id.*

<sup>140</sup> *Id.*

<sup>141</sup> See *CAF Phase II Price Cap Service Obligation Order*, 28 FCC Rcd at 15068-70, paras. 19-22.

based support to test and certify that 95% of testing hours latency measurements are at or below 100 ms (the latency standard).<sup>142</sup> Later, WCB sought comment on extending the same testing methodologies to other high-cost support recipients serving fixed locations,<sup>143</sup> and in multiple orders, the Commission extended the same latency standard to RBE participants, rate-of-return carriers electing the voluntary path to model support, CAF Phase II competitive bidders not submitting high-latency bids, and Alaska Plan carriers.<sup>144</sup>

57. The Bureaus ultimately reaffirmed and further extended the latency standard to all high-cost support recipients serving fixed locations, except those carriers submitting high-latency bids in the CAF Phase II auction.<sup>145</sup> In doing so, the Bureaus noted that the data on round-trip latency in the United States had not markedly changed since the *2013 CAF Phase II Price Cap Service Obligation Order*, and that no parties challenged the Commission's reasoning for the existing 100 ms standard.<sup>146</sup> More recently, the Bureaus refreshed the record, seeking comment on USTelecom's proposal that certifying "full" compliance means that 95 to 100% of all of an ETC's measurements during the test period meet the required speed.<sup>147</sup> The Bureaus then adopted a standard requiring that 80% of a carrier's download and upload measurements be at or above 80% of the CAF-required speed (i.e., an 80/80 standard).<sup>148</sup> The Bureaus explained that this speed standard best meets the Commission's statutory requirement to ensure that high-cost-supported broadband deployments provide reasonably comparable service as those available in urban areas.<sup>149</sup> The Bureaus also noted that they would exclude from certification calculations certain speed measurements above a certain threshold to ensure that outlying observations do not unreasonably affect results.<sup>150</sup>

58. In their Petition, USTelecom, ITTA, and WISPA complain that "[t]here is . . . a significant disparity in compliance thresholds for speed and latency," and ask that the Bureaus require ETCs' latency measurements to meet 175 ms at least 95% of the time.<sup>151</sup> The petitioners argue that, before accepting CAF Phase II model-based support, carriers could not have fully understood whether the latency standard adopted in 2013 was appropriate, apparently because it was adopted "almost two full years before price cap carriers accepted CAF Phase II support," and other "reasonable" requirements were adopted later.<sup>152</sup> Further, the petitioners argue, the same ITU analysis that WCB relied on in 2013 to adopt the latency standard "found that consumers continue to be 'satisfied' with speech quality at a one-

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<sup>142</sup> See *id.* at 15068-74, paras. 19-32.

<sup>143</sup> See *2014 Broadband Measurement and Reporting Public Notice*, 29 FCC Rcd at 12625-26, paras. 5-14.

<sup>144</sup> See *Rural Broadband Experiments Order*, 29 FCC Rcd at 8795, para. 78; *Connect America Fund*, WC Docket No. 10-90, Report and Order, Order and Order on Reconsideration, and Further Notice of Proposed Rulemaking, 31 FCC Rcd 3087, 3099, para. 28 (2016) (*2016 Rate-of-Return Reform Order*); *CAF Phase II Auction Order*, 31 FCC Rcd at 5960, para. 31 FCC Rcd at 29; *Connect America Fund*, WC Docket No. 10-90, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd at 10139, 10146-47, paras. 19-20 (2016) (*Alaska Plan Order*).

<sup>145</sup> *Performance Measures Order*, 33 FCC Rcd at 6527-28, para. 50.

<sup>146</sup> *Id.* (citing *2016 Rate-of-Return Reform Order*, 31 FCC Rcd at 3099, para. 28 (noting that no parties objected to extending the latency standard already adopted for price cap carriers to rate-of-return carriers)).

<sup>147</sup> See *2017 Performance Measures Public Notice*, 32 FCC Rcd at 9324-26, paras. 8-9 (citing Letter from Kevin Rupy, Vice President, Law & Policy, USTelecom, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 4-6 (May 23, 2017) (USTelecom May 23, 2017 *Ex Parte*)).

<sup>148</sup> *Id.* at 6528, para. 51.

<sup>149</sup> *Id.* at 6528-29, paras. 51-52.

<sup>150</sup> See *id.* at 6528 n.145.

<sup>151</sup> USTelecom/ITTA/WISPA PFR at 10-12.

<sup>152</sup> *Id.* at 10.

way mouth-to-ear latency of 275 ms or a provider round-trip latency of 175 ms,” so “treating a latency result that is even one millisecond above 100 ms as a violation . . . penaliz[es] recipients for providing users with voice quality with which they are fully satisfied.”<sup>153</sup> Changing the standard to require latency measurements of 175 ms or better 95% of the time, petitioners assert, would better align the latency standard with the speed standard, which is designed to ensure that high-cost-supported broadband deployments are reasonably comparable to those in urban areas.<sup>154</sup>

59. NTCA, NRECA, and UTC oppose the petitioners’ request to “align” the latency standard with the speed standard. Defending the 95% threshold adopted by the Bureaus, these parties explain that low latency is necessary to support achieving a “reasonably comparable” level of service, and the 95% compliance benchmark for latency is a “reasonable” standard for that.<sup>155</sup> Moreover, speeds may vary up to 20% because of “networking protocols, interference and other variances that affect all providers and whose accommodation is technology neutral,” but such factors do not affect latency.<sup>156</sup> Thus, they say, the record supports the adopted latency standard.

60. Multiple parties seek clarifications regarding implementation of the 80/80 speed standard adopted in the *Order*. In particular, carriers expressed concern that compliance will be measured against advertised speeds, rather than the speeds carriers are obligated to provide in exchange for CAF support.<sup>157</sup> In addition, USTelecom, ITTA, and WISPA, among others,<sup>158</sup> challenge the Bureaus’ finding that speed test results greater than 150% of advertised speeds are likely invalid and ask that the Bureaus reconsider automatically excluding those measurements from compliance calculations.<sup>159</sup> Instead, Vantage Point suggests, the Commission should consider excluding data points beyond a defined number of standard deviations, rather than setting a 150% cutoff for measurements.<sup>160</sup>

61. We decline to modify the longstanding latency standard requiring that 95% of round-trip measurements be at or below 100 ms. As petitioners acknowledge, the standard was initially adopted in 2013, before carriers accepted CAF Phase II model-based support.<sup>161</sup> Petitioners claim that, as a result, “no future recipient could have been expected to assess the appropriateness of this prematurely adopted requirement,”<sup>162</sup> but, in fact, carriers accepted CAF Phase II support conditioned on the requirement that they certify to the adopted latency standard. In other words, carriers assessed the appropriateness of the standard and decided that they would be able to certify meeting the standard—or, at the very least, accepted that they would risk losing CAF Phase II support if they were unable to meet the standard. Moreover, no parties sought reconsideration when the standard was originally adopted, and the

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<sup>153</sup> *Id.* at 11.

<sup>154</sup> *Id.* at 11-12. *See also* USTelecom July 31, 2018 *Ex Parte* at 2-3; AT&T PFR Comments at 9-11; Midcontinent PFR Comments at 3.

<sup>155</sup> NTCA/NRECA/UTC Opposition at 12. NTCA, NRECA, and UTC also point out that voice telephony is a required component of CAF deployment obligations, and that reducing latency standards can compromise the quality of voice service and other vital broadband applications reliant on low latency. *See id.* at 3-4.

<sup>156</sup> *Id.* at 13.

<sup>157</sup> *See* NTCA AFR at 18-20; NTCA/NRECA/UTC Opposition at 16-17; Comments of Alaska Communications Systems, WC Docket No. 10-90, at 2-5 (Nov. 7, 2018) (ACS Comments); USTelecom/ITTA/WISPA PFR Reply at 2-3.

<sup>158</sup> *See, e.g.*, ACS Comments at 2-5; AT&T PFR Comments at 13-14; Midcontinent PFR Comments at 4-7.

<sup>159</sup> USTelecom/ITTA/WISPA PFR at 15-19.

<sup>160</sup> Vantage Point Aug. 28, 2018 *Ex Parte* at 4.

<sup>161</sup> *See* USTelecom/ITTA/WISPA PFR at 10.

<sup>162</sup> *Id.*

Commission later extended the same standard to other high-cost support recipients in the years following.<sup>163</sup>

62. We also note that latency is fundamentally different from speed and therefore requires a different standard to ensure that CAF-supported broadband Internet service is reasonably comparable to service in urban areas.<sup>164</sup> The 100 ms standard, which is more lenient than the 60 ms standard originally proposed,<sup>165</sup> ensures that subscribers of CAF-supported Internet service can use real-time applications like VoIP.<sup>166</sup> If we were to require 95% of latency measurements to be only 175 ms or lower, we would be relaxing the standard considerably—permitting CAF-supported Internet service to have 75% higher latency than permitted by the existing standard adopted by the Commission. Further, lowering the existing standard would not decrease burdens on carriers and provide “a more efficient compliance and enforcement process,” as the petitioners suggest. The carriers need only to conduct tests, which can be automated, and provide the data; USAC will complete the necessary calculations to determine compliance. To the extent that parties argue that the 100 ms standard is overly strict and that consumers may be satisfied with higher latencies, that standard was adopted in prior Commission orders and thus is not properly addressed in this proceeding, which is to determine the appropriate methodology for measuring whether high-cost support recipients’ networks meet established performance levels.

63. We clarify, however, that carriers are not required to provide speeds beyond what they are already obligated to deploy as a condition of their receipt of high-cost support. Thus, for a location where a carrier is obligated to provide 10/1 Mbps service, we only require testing to ensure that the location provides 10/1 Mbps service, even if the customer there has ordered and is receiving 25/3 Mbps service.

64. Regarding the trimming of data in calculating compliance with the speed standard, we reconsider the Bureaus’ decision to exclude from compliance calculations any speed test results with values over 150% of the advertised speed for the location. Instead of trimming the data at the outset, we direct the Bureaus to study data collected from carriers’ pre-testing and testing and determine how best to implement a more sophisticated procedure using multiple statistical analyses to exclude outlying data points from the test results. We expect that such a procedure will be used for each carrier’s test results in each speed tier in each state or study area and may involve determining whether multiple methods (e.g., the interquartile range, median absolute deviation, Cook’s distance, Isolation Forest, or extreme value analysis) flag a particular data point as an anomaly.

## **I. Remedies for Non-Compliance**

65. The *Performance Measures Order* also established a framework of support reductions that carriers would face in the event that their performance testing did not demonstrate compliance with speed and latency standards to which each carrier is subject. The Bureaus considered numerous approaches to address non-compliance with the required speed and latency standards.<sup>167</sup> They adopted a

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<sup>163</sup> See *Rural Broadband Experiments Order*, 29 FCC Rcd at 8795, para. 78; *2016 Rate-of-Return Reform Order*, 31 FCC Rcd at 3099, para. 28; *CAF Phase II Auction Order*, 31 FCC Rcd at 5960, para. 29; *Alaska Plan Order*, 31 FCC Rcd at 10146-47, paras. 19-20.

<sup>164</sup> See NTCA/NRECA/UTC Opposition at 12.

<sup>165</sup> See *Wireline Competition Bureau Seeks Further Comment on Issues Regarding Service Obligations for Connect America Phase II and Determining Who Is an Unsubsidized Competitor*, WC Docket No. 10-90, Public Notice, 28 FCC Rcd 1517, 1524, para. 25-26 (WCB 2013). In proposing the 60 ms standard, WCB pointed to recent testing results that “show[ed] that the average peak period round trip UDP latency for all wireline terrestrial technologies is less than 60 ms.” *Id.*

<sup>166</sup> *CAF Phase II Price Cap Service Obligation Order*, 28 FCC Rcd at 15073, para. 28.

<sup>167</sup> See, e.g., USTelecom May 23, 2017 *Ex Parte* at 4-6, Exhibit A; Comments of NTCA – The Rural Broadband Association, WC Docket No. 10-90, at 15-17 (Dec. 6, 2019) (NTCA Comments); WISPA Comments at 7-10; WTA Comments at 11.

“four-level framework that sets forth particular obligations and automatic triggers based on an ETC’s degree of compliance with our latency, speed, and, if applicable, MOS testing standards in each state and high-cost support program.”<sup>168</sup> Under this scheme, compliance for each standard is separately determined, with the percentage of a carrier’s measurements meeting the relevant standard divided by the required percentage of measurements to be in full compliance.<sup>169</sup> The Bureaus noted that the framework “appropriately encourages carriers to come into full compliance and offer, in areas requiring high-cost support, broadband service meeting standards consistent with what consumers typically experience.”<sup>170</sup>

66. Several parties now urge the Commission to adjust the adopted framework for non-compliance. USTelecom, ITTA, and WISPA jointly argue that non-compliance with the speed and latency requirements are punished under the established framework “more severely than non-compliance with build-out milestones.”<sup>171</sup> For example, they observe that a carrier with a compliance gap of less than six percent would lose five percent of its high-cost support, while only being subject to quarterly reporting obligations for missing its required build out by up to 14.9%.<sup>172</sup> USTelecom, ITTA, and WISPA instead propose mirroring the precedent established for the deployment milestone framework, with non-compliance with the speed and latency requirements of 5% or less resulting only in a quarterly reporting obligation and non-compliance of 5% to 15% resulting in 5% of funding being withheld.<sup>173</sup> Additionally, they request clarification that a carrier not complying with both its performance measurement requirements and deployment requirements will be subject only to a reduction in support equal to the greater of the two amounts, rather than the combined percentage of the two amounts.<sup>174</sup> AT&T concurs with petitioners that support reductions for failing to comply with performance standards should not be more serious than failure to deploy.<sup>175</sup> NTCA, NRECA, and UTC jointly contend that “non-compliance (especially if relatively minor in degree) should impose upon the provider the burden of proof to demonstrate a justifiable reason for non-compliance and an avenue toward remediation; it should not eliminate automatically support upon which the provider relies for deployment and operation.”<sup>176</sup> WTA proposes that rural carriers not in full compliance be given a six-month grace period “to locate and correct the problem without reduction or withholding of the monthly high-cost support needed to finance the repair, upgrade and operation of [their] networks.”<sup>177</sup> WTA also reiterates that rural LECs should not lose high-cost support due to the shortcomings of facilities or circumstances over which they have no control and are not able to repair or upgrade.<sup>178</sup> Finally, Peñasco Valley Telephone Cooperative (PVT) argues a 100% success requirement for full compliance does not take into account factors outside the carrier’s control and instead proposes a high percentage benchmark, but less than 100%, to account for these variables.<sup>179</sup>

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<sup>168</sup> *Performance Measures Order*, 33 FCC Rcd at 6531-32, para. 60.

<sup>169</sup> *Id.*

<sup>170</sup> *Id.* at 6533, para. 65.

<sup>171</sup> USTelecom/ITTA/WISPA PFR at 12;

<sup>172</sup> *Id.* at 12-13.

<sup>173</sup> *Id.* at 14. *See also* USTelecom July 31, 2018 *Ex Parte* at 4.

<sup>174</sup> *Id.* at 14.

<sup>175</sup> AT&T PFR Comments at 11-13.

<sup>176</sup> NTCA/NRECA/UTC Opposition at 15-16.

<sup>177</sup> WTA AFR 5-6. *See also* WTA Apr. 17, 2019 *Ex Parte*.

<sup>178</sup> WTA AFR at 6.

<sup>179</sup> Letter from Salvatore Taillefer, Jr., Counsel to Peñasco Valley Telephone Cooperative, Inc., to Marlene H. Dortch, Secretary, FCC, WC Docket Nol. 10-90, at 2 (Oct. 9, 2018).

67. We generally decline to revise the compliance and certification frameworks adopted by the Bureaus. We disagree that the consequences for failure to meet our performance measures are greater than that for failure to meet deployment obligations. As opposed to the deployment obligations that many parties use for comparison, the speed and latency standards adopted by the Bureaus include a margin for error and do not require carriers to meet the established standards in every instance. For example, carriers are required to meet the 100 ms standard for latency only 95% of the time, rather than 100% as suggested by some parties. Similarly, we allow carriers to be in compliance with our speed standards if they provide 80% of the required speed 80% of the time. Moreover, we established pre-testing periods in which no support reductions for failing to meet standards will occur to allow carriers to adjust to the new regime. This opportunity for pre-testing will ensure that carriers are familiar with the required testing and how to properly measure the speed and latency of their networks. Because carriers will be aware of which locations are being tested, they will be able to monitor their networks prior to beginning the required testing to make sure the network is performing properly. Further, once a location is certified in USAC's High Cost Universal Broadband (HUBB) portal, the carrier has certified that it meets the required standards, so the performance of the network should not be a surprise to the carrier.

68. Some parties have expressed concern about the performance requirements and the non-compliance support reductions. For example, USTelecom, ITTA, and WISPA argue that certain aspects of the compliance framework “penalize noncompliance with broadband speed and latency requirements more severely than non-compliance with build-out milestones.”<sup>180</sup> They also assert that the compliance framework is “is too stringent and could impede—rather than advance—broadband deployment in rural CAF-supported areas.”<sup>181</sup> We disagree. As a condition of receiving high-cost support, carriers must commit not only to building out broadband-capable networks to a certain number of locations, but also to providing those locations with a specific, defined level of service. Building infrastructure is insufficient to meet a carrier’s obligation if the customers do not receive the required level of service. If a carrier fails to meet its deployment requirements, it will face certain support reductions, and if it likewise fails to meet its performance requirements for locations to which it claims it has deployed, it has failed to fully fulfill its obligations. The compliance framework established by the Bureaus is essential to ensuring that consumers are receiving the appropriate level of service that the carrier has committed to provide.

69. We also clarify that, at the conclusion of a carrier’s buildout term, any failure to meet the speed and latency requirements will be considered a failure to deploy. In other words, a failure to comply with all performance measure requirements will result in the Commission determining that the carrier has not fully satisfied its broadband deployment obligations at the end of its buildout term and subjecting the carrier to the appropriate broadband deployment non-compliance support reductions. We do not consider a carrier to have completed deployment of a universal service funded broadband-capable network simply by entering the required number of locations to which it has built into the HUBB; customers at those locations also must be able to receive service at the specific speed and latency to which the carrier has committed. Simply put, consumers must receive the required level of service before a network can be considered to have been fully deployed. We use the testing data to determine the level of compliance for the carrier’s network. Thus, if a carrier has deployed to 100% of its required locations, but only 90% of those locations meet the required speed and latency measurements, USAC will recover the percentage of the carrier’s support equal to 1.89 times the average amount of support per location received in the state for that carrier over the term of support for the relevant number of locations that do not meet the speed and latency requirements, plus 10 percent of the carrier’s total relevant high-cost support over the support term for that state.<sup>182</sup> Similarly, if a carrier deploys to only 90% of the locations to which it is

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<sup>180</sup> USTelecom/ITTA/WISPA PFR at 12.

<sup>181</sup> *Id.*

<sup>182</sup> *See* 47 CFR 54.320(d)(2). For instance, Carrier X deployed to 100 locations, but only 90 of those locations met the requisite speed and latency requirements, leaving a shortfall of 10 locations. If the average support per line in the state was \$100, Carrier X would be required to refund \$11,340 (\$100 x 10 locations x 6 years x 1.89) in support.

required to build, and of those locations, only 90% meet the required speed and latency measurements, the carrier will be required to forfeit support equal to 1.89 times the average amount of support per location received in the state for that carrier over the term of support for the combined number of locations lacking deployment and not in 100% compliance with the performance measures, plus 10 percent of the carrier's total relevant high-cost support over the support term for that state.<sup>183</sup> However, carriers are permitted up to one year to address any shortcomings in their deployment obligations, including ensuring that their measurements are 100% in compliance, before these support reductions will take effect.<sup>184</sup>

70. In response to commenters' concerns regarding the fairness of potentially reducing carriers' support amounts for both lack of deployment and non-compliance with speed and latency standards,<sup>185</sup> we clarify that at the end of the support term when USAC has performed the calculation to determine the total lack of deployment based on the numbers of locations to which the carrier has built out facilities and the number of locations that are in compliance with the performance measures, USAC will ensure that the total amount of support withheld from the carrier because of failure to meet deployment milestones and performance requirements does not exceed the requirements of section 54.320(d)(2). To facilitate this calculation, we reconsider the decision allowing carriers to recover only the support withheld for non-compliance for 12 months or less.<sup>186</sup> When a non-compliant carrier comes into a higher level of compliance, USAC will now return the withheld support up to an amount reflecting the difference between the levels' required withholding. By returning all the support USAC may have withheld from a carrier for non-compliance, the non-compliance framework will continue to provide an incentive to carriers to return to full compliance with the speed and latency standards.

71. Finally, we provide additional flexibility at the conclusion of a carrier's buildout term for any carrier that has failed to meet its performance requirements and believes that its failure to do so is the result of a small sample size. As noted above, to minimize the burdens of testing, the Bureaus have used a "trip-wire" approach in determining the required sample sizes; while these sample sizes are useful for demonstrating where further inquiry may be helpful, they are subject to a high margin of error. Thus, if at the end of its term, a carrier is shown not to have met its deployment obligations due to a failure in meeting the speed and latency requirements, the carrier can submit a request to the Bureaus for an increased size of random samples that will produce an estimate with a margin of error of 5% or less and conduct further testing to show that the carrier is compliance with the Commission's performance requirements. If, after this further testing, the carrier is able to demonstrate that it fully complies with the required speed and latency benchmarks, then the carrier will be considered to have met the deployment obligations.

#### **J. Schedule to Commence Testing**

72. We are persuaded by the record here to modify the specific schedule to commence speed and latency tests established in the *Performance Measures Order*. The *Performance Measures Order* established a deadline of July 1, 2020 for carriers subject to the *Order* to report the results of testing, with an accompanying certification, for the third and fourth quarters of 2019.<sup>187</sup> We now adopt a modified approach to enable better individualization to the specific circumstance of a given provider.

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<sup>183</sup> For instance, Carrier X was required to deploy to 100 locations, but only deployed to 90 total locations, a shortfall of 10 locations. Of those 90 locations, only 90% (81) met the requisite speed and latency requirements, a shortfall of 19 (from the 100 required). If the average support per line in the state was \$100, Carrier X would be required to refund \$32,886 ( $\$100 \times (10 + 19) \text{ locations} \times 6 \text{ years} \times 1.89$ ) in support.

<sup>184</sup> See 47 CFR 54.320(d)(2).

<sup>185</sup> See USTelecom/ITTA/WISPA PFR at 14; AT&T PFR Comments at 11-13.

<sup>186</sup> *Performance Measures Order*, 33 FCC Rcd at 6532, para. 63.

<sup>187</sup> *Id.*, para. 67.

73. We conclude that it is appropriate under the circumstances to modify the scheduled start of performance testing to link speed and latency testing to the deployment obligations for carriers receiving support from each of the various high-cost support mechanisms. We believe this solution best balances the Commission's responsibility to ensure that consumers are receiving the promised levels of service in a timely manner with the ability of all carriers to undertake the required performance testing. This approach also allows larger price cap carriers that are further along in their deployments and are more able, at this point, to begin testing to do so without additional delay. Moreover, the rolling testing schedule we adopt will be less administratively burdensome for Commission staff by allowing for more individualized review and evaluation of testing results over time. Pushing back testing will have the added benefit of allowing additional time for the marketplace to further develop solutions for carriers to undertake the required testing.<sup>188</sup>

74. We also implement a pre-testing period that will occur prior to the commencement of each carrier's testing start date. As with the testing period, this pre-testing period will be aligned with a carrier's deployment obligations for the specific high-cost mechanism under which it receives support and will require the filing of data regarding pre-testing results. Pre-testing will require carriers to conduct testing according to the Commission's requirements using a USAC-determined random sample of subscribers, and results must be submitted to USAC within one week of the end of each quarter (i.e., by April 7 for the first quarter, July 7 for the second quarter, etc.).<sup>189</sup>

75. However, no support reductions will be assessed during the pre-testing period, as long as carriers actually undertake the pre-testing and report their results. Carriers that fail to conduct pre-testing and submit results in a timely fashion will be considered to be at Level 1 noncompliance.<sup>190</sup> The random sample for pre-testing can be used by the carrier for a total of two years, meaning that carriers will need to obtain a new random sample after two years of pre-testing/testing. Thus, for example, if a carrier does one year of pre-testing and then one year of testing, it will need to obtain a new random sample prior to beginning the second year of testing. While there will be no support reductions during the pre-testing period (as long as the carrier undertakes the testing and reports results), the filing will allow Commission staff to evaluate the pre-testing data and determine if any adjustments to the testing regime are needed to ensure that the testing period is successful. In addition, pre-testing will give carriers an opportunity to see how their networks and testing software and hardware perform and make any changes necessary. We direct the Bureaus to amend the performance measures as appropriate based on the information learned and experience gained from the pre-testing period.

76. Several industry associations support the approach we adopt to tie speed and latency testing to a carrier's deployment obligations for the specific high-cost program under which it receives

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<sup>188</sup> We are aware of numerous vendors offering solutions and believe they will be ready in time for the revised testing deadlines. See, e.g., <https://www.vantagepnt.com/2018/10/02/introducing-betti-box-network-performance-testing-solution/> ("Vantage Point Solutions Introduces BETTI Box for Network Performance Testing"); <https://www.axiros.com/news-and-announcements/speed-and-latency-test-program-for-caf-recipients> ("Axiros Announces FCC Compliant Speed And Latency Test Program For Connect America Fund (CAF) Phase II Recipients"); <https://finepoint.com/products/> ("We have also developed a complete project plan for addressing the FCC's testing requirement that broadly includes 8 steps."); <https://www.calix.com/press-release/2019/02--february--calix-launches-connect-america-fund-performance-testing-solution.html> ("Calix Launches Connect America Fund Performance Testing Solution for the Calix Smart Home Platform Leveraging Speedtest® by Ookla®"); <https://samknows.com/blog/connect-america-fund> ("SamKnows has an ISP solution for both [testing] of the options the FCC put forward.").

<sup>189</sup> We note that USAC's interface for accepting performance testing results may not be complete when CAF Phase II carriers need to submit their pre-testing data. USAC will provide notice of alternative submission methods and/or the date when such interface will be available prior to the end of the first quarter of 2020.

<sup>190</sup> See *Performance Measures Order*, 33 FCC Rcd at 6532-33, paras. 64-67. USAC will withhold 5% of a carrier's monthly support payments while Level 1 noncompliant.

support.<sup>191</sup> Specifically, ITTA, USTelecom, and WISPA advocate aligning a carrier’s performance obligations with its deployment obligations, as well as designating the first two quarters of testing as “transitional and not subject to non-compliance measures for any performance deficiencies” to allow carriers to become familiar with the testing process.<sup>192</sup> In addition, both NTCA and WTA support linking testing obligations to deployment obligations and allowing carriers to have a period of advanced testing before the mandated testing period.<sup>193</sup> We agree with those commenters suggesting that a period to “test the testing” will help ensure that all carriers become familiar with testing methodologies and equipment, as well as prevent or reduce future administrative issues with the testing process.

77. Accordingly, we adopt the schedule below for pre-testing and testing obligations specific to the carriers receiving high-cost universal service support:

**Schedule for Pre-Testing and Testing**

Program	Pre-testing start date	Testing start date
CAF Phase II (Price-cap carrier funding)	January 1, 2020	July 1, 2020
Rural Broadband Experiments	January 1, 2021	January 1, 2022
Alaska Plan	January 1, 2021	January 1, 2022
A-CAM I	January 1, 2021	January 1, 2022
A-CAM I Revised	January 1, 2021	January 1, 2022
ACAM II	January 1, 2022	January 1, 2023
Legacy Rate of Return	January 1, 2022	January 1, 2023
CAF II Auction	January 1, 2022	January 1, 2023
New NY Broadband Program	January 1, 2022	January 1, 2023

78. Because we establish pre-testing and testing periods to coincide with a carrier’s specific deployment obligations under its respective high-cost mechanism, recipients of CAF Phase II model-based support will be the first to undertake the pre-testing period on January 1, 2020. These carriers are required to build out to 80% of their supported locations by December 31, 2019.<sup>194</sup> Recipients of CAF Phase II model-based support are primarily larger carriers that are better positioned to begin testing sooner due to the availability of testing equipment and solutions already in the marketplace for these carriers. During the six-month pre-testing period, these carriers will be required to test the speed and latency of their networks for a weeklong period once per quarter (first and second quarters of 2020) and submit the results to the Commission within one month of the conclusion of testing.<sup>195</sup> The testing period for CAF Phase II model-based support recipients will commence on July 1, 2020, with speed and latency

<sup>191</sup> We believe the changes adopted to the testing initiation dates for small carriers also will allow sufficient time for any issues regarding the HUBB to be addressed. *See* NTCA May 7, 2019 *Ex Parte* at 1-2.

<sup>192</sup> ITTA/USTelecom/WISPA Apr. 10, 2019 *Ex Parte*.

<sup>193</sup> Letter from Joshua Seidemann, VP of Policy, NTCA, to Marlene S. Dortch, Secretary, FCC, WC Docket No. 10-90, at 2-3 (Mar. 21, 2019) (“the rules should not be effective until vendors have sufficient time to create generally available solutions following decisions on final protocols and standards, and only after ISPs then have sufficient time to “bench test” the solutions”); stating that there should be a “test the testing” period”); WTA 4, 2019 *Ex Parte* at 1-2, 4 (rural LECs should be given “a period of six months or more to engage in informal practice testing to discover and resolve potential equipment and procedural problems before being required to initiate formal performance testing and reporting”); WTA Apr. 17, 2019 *Ex Parte* at 4; WTA May 6, 2019 *Ex Parte* at 1-2, 4 (“some WTA members want to do some informal or limited pre-testing in advance of their quarterly testing week”).

<sup>194</sup> *December 2014 CAF Phase II Order*, 29 FCC Rcd at 15657-58, para. 36, Table 1.

<sup>195</sup> USAC is in the process of developing a mechanism for carriers to submit testing data electronically.

tests occurring for weeklong periods in both the third and fourth quarters of 2020 and results of that testing submitted by July 2021.

79. Rural Broadband Experiments (RBE) support recipients,<sup>196</sup> as well as rate-of-return carriers receiving model-based support under both the A-CAM I and the revised A-CAM I, will follow a similar, but slightly extended schedule. The pre-testing period for these carriers will commence on January 1, 2021 and will last one full year to ensure that the predominantly smaller carriers receiving support under these mechanisms have adequate time to implement and test their technology and software solutions to meet the Commission's performance testing requirements. We believe that a longer pre-testing period than the one we adopt for CAF Phase II model-based support recipients is warranted to ensure that any concerns or issues with the testing process are addressed prior to these carriers being subject to support reductions. During this one-year pre-testing period, this group of carriers will be required to test the speed and latency of their networks quarterly for a weeklong period and submit the results to the Commission within one month of the conclusion of testing. The testing period for these carriers will begin on January 1, 2022, and results will be submitted to the Commission by July 2023.

80. We also adopt a one-year pre-testing period for recipients of support from the CAF Phase II auction and A-CAM II, as well as legacy rate-of-return support recipients. However, we delay commencement of the pre-testing period for these carriers to account for certain timing considerations. For example, we are in the process of authorizing CAF Phase II auction winners to receive support,<sup>197</sup> and recently authorized rate-of-return carriers electing the A-CAM II offer to receive support.<sup>198</sup> Additionally, to increase administrative efficiency, we put legacy rate-of-return carriers on the same schedule as A-CAM II support recipients in light of the fact that their deployment requirements started at approximately the same time. Thus, to allow time for carriers receiving support under these mechanisms not only to be authorized, but also to deploy in a timely manner, we institute a one-year pre-testing period beginning January 1, 2022. The required testing period for these carriers will commence on January 1, 2023. We anticipate that these support recipients will have deployed to at least 40% of their required locations by the end of 2022.<sup>199</sup> These carriers will be subject to the same testing and reporting requirements, for both pre-testing and testing, as the other categories of carriers described above, except that these carriers will have a one-year pre-test period rather than a six-month pre-test period.

81. We disagree with those petitioners urging the Commission to adopt a blanket delay of implementation of the testing requirements. NTCA contends that the equipment necessary for the most cost-effective method of testing is not yet fully developed or widely available, particularly in rural markets. NTCA instead proposes that any obligations be suspended or waived until a later time—at least 12 months—following the widespread availability of modems with built-in testing capability to the rural market.<sup>200</sup> WTA agrees that the necessary testing equipment is unavailable at this time and thus proposes

<sup>196</sup> See *Rural Broadband Experiments Order*, 29 FCC Rcd at 8794, paras. 74-75. RBE recipients receive a ten-year term of support but must deploy to at least 85% of locations by the end of the third year of support and 100% by the end of year five. Because RBE support was awarded on a rolling basis, recipients have staggered deadlines for meeting the required deployment milestones. However, all RBE support recipients should be fully deployed by the end of 2021, prior to the commencement of testing.

<sup>197</sup> See e.g., *Connect America Fund Auction Support Authorized for 459 Winning Bids*, AU Docket No. 17-182, WC Docket No. 10-90, Public Notice, DA 19-414 (WCB rel. May 14, 2019).

<sup>198</sup> See *Wireline Competition Bureau Authorizes 171 Rate-Of-Return Companies To Receive \$491 Million Annually in Alternative Connect America Cost Model II Support To Expand Rural Broadband*, WC Docket No. 10-90, Public Notice, DA 19-808 (WCB rel. Aug. 22, 2019).

<sup>199</sup> *Connect America Fund, et al.*, WC Docket No. 10-90, Report and Order, Further Notice of Proposed Rulemaking, and Order on Reconsideration, 33 FCC Rcd 11893, 11914, para. 67 (2018) (*December 2018 Rate-of-Return Order*).

<sup>200</sup> NTCA AFR at 9-12; see also Comments of NTCA-The Rural Broadband Association on Applications for Review and Requests for Clarification, WC Docket No. 10-90, at 2 (Oct. 15, 2018).

that the Commission postpone testing for rural Local Exchange Carriers (LECs) for at least two years.<sup>201</sup> WTA also proposes to delay support reductions for noncompliance to coincide with build-out milestones.<sup>202</sup> WISPA, ITTA, and NTTA support proposals to postpone testing for a time in order to permit equipment to become more available and affordable.<sup>203</sup>

82. We are not convinced that a blanket delay for all carriers subject to the Commission's performance measure requirements is necessary. As petitioners and commenters observe, large carriers and carriers serving more urban markets are differently situated than smaller carriers serving more rural communities, and these carriers may already be positioned to begin testing. Though a minor delay for all carriers is warranted to allow USAC time to develop and implement specific IT solutions, additional time beyond that for the marketplace to develop technical solutions is necessary only for a certain subset of carriers. As WTA observes, "Whiteboxes for MBA testing are being used by large carriers, but thus far [its members] have generally been unable to obtain Whitebox pricing estimates for their likely levels of demand."<sup>204</sup> Similarly, NTCA explains that larger carriers are able to purchase modems and routers at scale or can develop their own proprietary devices, but smaller carriers oftentimes must purchase "off the rack" technology solutions and may have already deployed equipment that cannot be easily retrofitted to accommodate performance testing.<sup>205</sup>

83. We agree that a one-size-fits-all approach does not reflect the realities of the marketplace. However, the tiered implementation schedule we adopt strikes a better balance between the interests of carriers in cost-effectively testing their networks' performance and the Commission's need to ensure that those networks are performing at the level promised. We further note that WCB has already announced a delay in the requirement to begin testing and reporting of speed and latency results until the first quarter of 2020.<sup>206</sup>

84. Given the changes to the testing framework we adopt, we likewise decline WTA's suggestion to delay support reductions for noncompliant carriers until they are given an opportunity to address any deficiencies in their networks.<sup>207</sup> The pre-testing period we adopt will provide carriers with ample opportunity to identify any issues within their network infrastructure that may impact testing results and to rectify those problems prior to undertaking the required testing. As a result, carriers should have minimal, if any, technological or software challenges that prevent them from meeting the Commission's performance requirements and would require an opportunity to cure. Moreover, because carriers will be testing only those locations that the carrier has certified are deployed with the requisite speed, we do not see a compelling reason to delay support reductions for noncompliance.

85. We likewise decline to further delay testing and reporting obligations for Alaska Communications Systems (ACS). Because carriers serving certain non-contiguous areas of the United States face different operating conditions and challenges from those faced by carriers in the contiguous 48 states,<sup>208</sup> the Commission concluded that it was appropriate to adopt tailored service obligations for each

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<sup>201</sup> WTA AFR at 10-12.

<sup>202</sup> WTA Apr. 17, 2019 *Ex Parte* at 3-4.

<sup>203</sup> See Comments of the Wireless Internet Service Providers Association on Applications for Review, WC Docket No. 10-90, at 1-3 (Oct. 4, 2018) (WISPA AFR Comments); ITTA PFR Comments at 5-7; Letter from Godfrey Enjady, President, National Tribal Telecommunications Association, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 10-90, at 1 (Apr. 14, 2019).

<sup>204</sup> WTA AFR at 11.

<sup>205</sup> NTCA AFR at 9.

<sup>206</sup> See *Delay in Initiation of Performance Measures Testing Requirements Until First Quarter of 2020*, Public Notice, DA 19-490 (WCB rel. May 30, 2019).

<sup>207</sup> WTA AFR at 5.

<sup>208</sup> *USF/ICC Transformation Order*, 26 FCC Rcd at 17737-38, para. 193.

non-contiguous carrier that elected to continue to receive frozen support amounts for Phase II in lieu of the offer of model-based support.<sup>209</sup> For ACS, the Commission adopted a 10-year term of support to provide a minimum of 10/1 Mbps broadband service with a roundtrip provider network latency requirement of 100 ms or less to a minimum of 31,571 locations.<sup>210</sup>

86. ITTA, USTelecom, and WISPA propose that testing and reporting obligations for ACS be delayed for one year from the date on which they begin for other CAF Phase II model-based support recipients.<sup>211</sup> These parties contend that ACS should be given more time because it is still in the process of planning its CAF II deployment and has not identified or reported the specific customer locations that it intends to serve.<sup>212</sup> ITTA, USTelecom, and WISPA also argue that additional time also is necessary for ACS to identify one or more suitable points at which traffic can be aggregated for transport to the continental U.S.<sup>213</sup>

87. Because we are instituting a pre-testing period and delaying the start of the required testing period for CAF Phase II model-based support recipients until July 1, 2020, we anticipate that ACS will have had ample time to finalize deployment plans and identify a suitable aggregation point or points. Thus, we are unconvinced by the argument advanced by ITTA, USTelecom, and WISPA that these issues warrant further delay for ACS. Moreover, we note that ACS already has passed its first deployment milestone and certified to locations in the HUBB. Thus, ACS should be fully prepared to commence testing on the same schedule as other CAF Phase II support recipients.

#### **K. Requirements for Certain Alaska Plan Carriers**

88. NTCA requests clarification that the *Order* applies only to high-cost recipients with mandatory build-out obligations.<sup>214</sup> Though some Alaskan rate-of-return carriers are subject to defined build-out obligations, NTCA observes that if a carrier has “no mandated buildout obligation, there is neither a clear speed threshold to which a carrier can be required to test nor a specified number of locations at which the test can be conducted.”<sup>215</sup> NTCA argues that additional proper notice-and-comment rulemaking procedures would be needed to subject carriers without mandatory build-out obligations to any required performance measures.<sup>216</sup>

89. Absent any specific deployment requirements, the Commission lacks a standard for determining whether a carrier’s deployment meets the required performance measures. As a result, consistent with NTCA’s request, we clarify that only carriers subject to defined build-out requirements are required to test the speed and latency of their networks in accord with Commission rules.<sup>217</sup> Alaskan

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<sup>209</sup> *December 2014 CAF Phase II Order*, 29 FCC Rcd at 15662, para. 46.

<sup>210</sup> *Connect America Fund*, Order, 31 FCC Rcd 12086, 12089, 12092-93, paras. 9, 12, 22, 27 (2016).

<sup>211</sup> See ITTA/USTelecom/WISPA Apr. 10, 2019 *Ex Parte* at 7.

<sup>212</sup> See *id.*

<sup>213</sup> See *id.*

<sup>214</sup> NTCA AFR at 20-22.

<sup>215</sup> *Id.* at 21.

<sup>216</sup> *Id.* at 21-22.

<sup>217</sup> Previously, carriers receiving Connect America Fund-Broadband Loop Support (CAF-BLS) with 80% or greater deployment of 10/1 Mbps broadband service in their entire study areas did not have specific build-out obligations as a condition of receiving CAF-BLS support. *Connect America Fund; ETC Annual Reports and Certifications; Developing a Unified Intercarrier Compensation Regime*, WC Docket No. 10-90 et al., Report and Order, Order on Reconsideration, and Further Notice of Proposed Rulemaking, 31 FCC Rcd 3087, 3152, para. 173 (2016). To the extent it was unclear whether these recipients of CAF-BLS were required to conduct required performance measures testing, this question is now moot because those carriers now also have mandatory deployment obligations. See *December 2018 Rate-of-Return Order*, 33 FCC Rcd at 11927, paras. 111-112.

rate-of-return carriers that have committed to maintaining existing service levels therefore are not subject to the performance measures adopted by the Bureaus and modified herein.

90. Alaskan rate-of-return carriers that have committed to defined build-out obligations, however, must conduct speed and latency testing of their networks. That said, we recognize that many of these carriers lack the ability to obtain terrestrial backhaul such as fiber, microwave,<sup>218</sup> or other technologies and instead must rely exclusively on satellite backhaul. Consistent with the standards we adopted for high-latency service providers in the CAF Phase II auction, we require Alaska Plan carriers using satellite or satellite backhaul to certify that 95% or more of all testing hour measurements of network round trip latency are at or below 750 ms for any locations using satellite technology.<sup>219</sup> We also reaffirm that these carriers must certify annually that no terrestrial backhaul options exist, and that they are unable to satisfy the standard performance measures due to the limited functionality of the available satellite backhaul facilities.<sup>220</sup> To the extent that new terrestrial backhaul facilities are constructed, or existing facilities improve sufficiently to meet the public interest obligations, we have required funding recipients to meet the standard performance measures within twelve months of the new backhaul facilities becoming commercially available.<sup>221</sup>

#### IV. PROCEDURAL MATTERS

91. *Paperwork Reduction Act Analysis.* This document contains new information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the new or modified information collection requirements contained in this proceeding. In addition, we note that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees.

92. *Congressional Review Act.* [The Commission will submit this draft Order on Reconsideration to the Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, for concurrence as to whether this rule is “major” or “non-major” under the Congressional Review Act, 5 U.S.C. § 804(2).] The Commission will send a copy of this Order on Reconsideration to Congress and the Government Accountability Office pursuant to 5 U.S.C. § 801(a)(1)(A).<sup>222</sup>

93. *Supplemental Final Regulatory Flexibility Analysis.* The Supplemental Final Regulatory Flexibility Analysis, pursuant to the Regulatory Flexibility Act,<sup>223</sup> is contained in Appendix B.

#### V. ORDERING CLAUSES

94. Accordingly, IT IS ORDERED that, pursuant to the authority contained in sections 1-4, 5, 201-206, 214, 218-220, 251, 252, 254, 256, 303(r), 332, 403, and 405 of the Communications Act of 1934, as amended, and section 706 of the Telecommunications Act of 1996, 47 U.S.C. §§ 151-155, 201-

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<sup>218</sup> We expect locations with microwave backhaul to be able to satisfy the speed and latency requirements and thus subject them to the same testing standards as other locations.

<sup>219</sup> *See CAF Phase II Auction Order*, 31 FCC Rcd at 5960-61, para. 30. Alaska Plan carriers are not required to meet the second part of the “two-part standard” for high-latency providers, i.e., demonstrating a required mean opinion score, which applies only to CAF Phase II auction winners and New York CAF winners. *See id.*

<sup>220</sup> *USF/ICC Transformation Order*, 26 FCC Rcd at 17699-17700, para. 101. *See also* 47 CFR § 54.313(g).

<sup>221</sup> *USF/ICC Transformation Order*, 26 FCC Rcd at 17699-17700, para. 101.

<sup>222</sup> *See* 5 U.S.C. § 801(a)(1)(A).

<sup>223</sup> *See* 5 U.S.C. § 604.

206, 214, 218-220, 251, 256, 254, 256, 303(r), 403 and 405, this Order on Reconsideration IS ADOPTED, effective thirty (30) days after publication of the text or summary thereof in the Federal Register, except for those rules and requirements involving Paperwork Reduction Act burdens, which shall become effective immediately upon announcement in the Federal Register of OMB approval. It is our intention in adopting these rules that if any of the rules that we retain, modify, or adopt herein, or the application thereof to any person or circumstance, are held to be unlawful, the remaining portions of the rules not deemed unlawful, and the application of such rules to other persons or circumstances, shall remain in effect to the fullest extent permitted by law.

95. IT IS FURTHER ORDERED that, pursuant to the authority contained in section 405 of the Communications Act of 1934, as amended, 47 U.S.C. § 405, and sections 0.331 and 1.429 of the Commission's rules, 47 CFR § 0.331 and 47 CFR § 1.429, the Petition for Reconsideration and Clarification filed by USTELECOM – THE BROADBAND ASSOCIATION, ITTA – THE VOICE OF AMERICA'S BROADBAND PROVIDERS, and the WIRELESS INTERNET SERVICE PROVIDERS ASSOCIATION on September 19, 2019 IS GRANTED IN PART and DENIED IN PART to the extent described herein.

96. IT IS FURTHER ORDERED that, pursuant to the authority contained in section 5(c)(5) of the Communications Act of 1934, as amended, 47 U.S.C. § 155(c)(5), and section 1.115(g) of the Commission's rules, 47 CFR § 1.115(g), the Application for Review and Request for Clarification filed by NTCA – THE RURAL BROADBAND ASSOCIATION and the Application for Review filed by WTA – ADVOCATES FOR BROADBAND, ARE GRANTED IN PART and DENIED IN PART to the extent described herein.<sup>224</sup>

97. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Order on Reconsideration, including a Supplemental Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

98. IT IS FURTHER ORDERED that the Commission SHALL SEND a copy of this Order on Reconsideration to Congress and the Government Accountability Office pursuant to the Congressional Review Act, *see* 5 U.S.C. § 801(a)(1)(A).

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch  
Secretary

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<sup>224</sup> 47 U.S.C. § 155(c)(5); 47 CFR § 1.115(g).

## Appendix A

AS Rank	AS Number	Organization	Flag	Transit ASN Degree	Peer w/ United States Top 100	Peer w/ Top United States 300	Class
1	3356	Level 3 Parent, LLC	USA	5,177	many	many	Transit/Access
3	174	Cogent Communications	USA	5,761	many	many	Transit/Access
4	2914	NTT America, Inc.	USA	1,769	many	many	Transit/Access
7	6939	Hurricane Electric LLC	USA	7,566	many	many	Transit/Access
8	6453	TATA COMMUNICATIONS (AMERICA) INC	USA	740	many	many	Transit/Access
9	3491	PCCW Global, Inc.	USA	640	many	many	Transit/Access
10	6461	Zayo Bandwidth	USA	1,896	many	many	Transit/Access
12	3549	Level 3 Parent, LLC	USA	2,390	many	many	Transit/Access
16	209	CenturyLink Communications, LLC	USA	1,862	many	many	Transit/Access
21	701	MCI Communications Services, Inc. d/b/a Verizon Business	USA	1,310	many	many	Transit/Access
22	7018	AT&T Services, Inc.	USA	2,289	many	many	Transit/Access
23	7922	Comcast Cable Communications, LLC	USA	234	many	many	Transit/Access
27	2828	MCI Communications Services, Inc. d/b/a Verizon Business	USA	902	many	many	Transit/Access
36	1239	Sprint	USA	349	many	many	Transit/Access
62	11164	Internet2	USA	132	7	14	Transit/Access
68	7029	Windstream Communications LLC	USA	466	2	4	Transit/Access
71	22773	Cox Communications Inc.	USA	536	4	6	Transit/Access
81	577	Bell Canada	CANADA	319	many	101	Transit/Access
87	6128	Cablevision Systems Corp.	USA	322	4	6	Transit/Access
90	20115	Charter Communications	USA	413	5	7	Transit/Access
122	11404	vanoppen.biz LLC	USA	322	3	5	Transit/Access
123	6327	Shaw Communications Inc.	CANADA	233	6	11	Transit/Access
140	702	MCI Communications Services, Inc. d/b/a Verizon Business	USA	274	7	7	Transit/Access
169	7385	Integra Telecom, Inc.	USA	216	2	3	Transit/Access
175	852	TELUS Communications Inc.	CANADA	234	12	23	Transit/Access
179	5650	Frontier Communications of America, Inc.	USA	210	9	15	Transit/Access
205	812	Rogers Communications Canada Inc.	CANADA	175	6	8	Transit/Access

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224	13768	Cogeco Peer 1	CANADA	241	1	5	Transit/Access
276	2381	WiscNet	USA	216	4	8	Transit/Access
290	29791	Internap Corporation	USA	180	4	7	Transit/Access
308	26554	US Signal Company, L.L.C.	USA	115	1	2	Transit/Access
311	703	MCI Communications Services, Inc. d/b/a Verizon Business	USA	107	4	5	Transit/Access
319	2686	AT&T Global Network Services, LLC	USA	181	7	7	Transit/Access
400	13760	Southern Light, LLC	USA	244	2	11	Transit/Access
404	6079	RCN	USA	179	6	15	Transit/Access
438	19151	WV FIBER	USA	347	8	20	Transit/Access
474	7342	VeriSign Infrastructure & Operations	USA	219	4	8	Transit/Access
520	4181	TDS TELECOM	USA	100	7	18	Transit/Access
613	29838	Atlantic Metro Communications, LLC	USA	154	1	2	Transit/Access
643	11096	FloridaNet	USA	102	2	4	Transit/Access
930	293	ESnet	USA	112	9	18	Transit/Access
1566	14537	Continent 8 LLC	USA	132	1	5	Transit/Access
1725	23473	PAVLOV MEDIA INC	USA	172	1	6	Transit/Access
2228	40805	JMF Solutions, Inc	USA	636	1	2	Transit/Access

## APPENDIX B

## Supplemental Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980 (RFA),<sup>1</sup> as amended, an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *USF/ICC Transformation FNPRM*.<sup>2</sup> The Commission sought written public comment on the proposals in the *USF/ICC Transformation FNPRM*, including comment on the IRFA. The Wireline Competition Bureau, Wireless Telecommunications Bureau, and Office of Engineering and Technology (the Bureaus) included a Final Regulatory Flexibility Analysis (FRFA) in connection with the *Performance Measures Order*.<sup>3</sup> This Supplemental Final Regulatory Flexibility Analysis (Supplemental FRFA) supplements the FRFA in the *Performance Measures Order* to reflect the actions taken in the Order on Reconsideration and conforms to the RFA.<sup>4</sup>

**A. Need for, and Objective of, the Order**

2. The Order on Reconsideration addresses issues raised by parties in petitions for reconsideration and applications for review of the *Performance Measures Order*.<sup>5</sup> In the *Performance Measures Order*, the Bureaus established how recipients of Connect America Fund (CAF) support must test their broadband networks for compliance with speed and latency metrics and certify and report those results.<sup>6</sup> In doing so, the Bureaus adopted a flexible framework to minimize the burden on small entities—for example, by permitting carriers to choose from one of three methodologies to conduct the required testing.

3. The Order on Reconsideration affirms certain key components of the *Performance Measures Order* while making several modifications to the requirements. Specifically, in the Order, we maintain the choice between three testing methodologies for carriers to conduct required testing; tie the implementation of speed and latency testing to a carrier's deployment obligations for the specific high-cost program under which it receives support; adopt a pre-testing regime to give both carriers and the Commission the opportunity to ensure that carriers are familiar with the testing regime and minimize any administrative issues; maintain the previously-adopted testing sample sizes but clarify that carriers must use the same locations for testing both latency and speed; adopt a revised definition of FCC-designated Internet Exchange Point (IXP); confirm that end-points for testing are from the customer's side of any network being used to an FCC-designated IXP; maintain the existing daily testing time period and quarterly testing requirement; allow further flexibility for the timing of speed tests but maintain the same frequency of latency testing; and reaffirm the compliance standards and associated support reductions for non-compliance.

**B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA**

4. There were no comments raised that specifically addressed how broadband service should be measured, as presented in the *USF/ICC Transformation FNPRM* IRFA.<sup>7</sup> Nonetheless, the

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<sup>1</sup> 5 U.S.C. § 603. The RFA, 5 U.S.C. §§ 601-612 has been amended by the Contract With America Advancement Act of 1996, Public Law No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

<sup>2</sup> See *USF/ICC Transformation Order*, 26 FCC Rcd at 18364-95.

<sup>3</sup> *Performance Measures Order*, 33 FCC Rcd at 3538-46, Appx. B, Final Regulatory Flexibility Analysis.

<sup>4</sup> See 5 U.S.C. § 604.

<sup>5</sup> See *Performance Measures Order*.

<sup>6</sup> See generally *id.*

<sup>7</sup> See *USF/ICC Transformation FNPRM*, 26 FCC Rcd at 18364, para. 3.

Commission has considered the potential impact of the rules proposed in the IRFA on small entities and reduced the compliance burden for all small entities in order to reduce the economic impact of the rules enacted herein on such entities.

**C. Response to Comments by the Chief Counsel for Advocacy of the Small Business Administration**

5. Pursuant to the Small Business Jobs Act of 2010,<sup>8</sup> which amended the RFA, the Commission is required to respond to any comments filed by the Chief Counsel of the Small Business Administration (SBA), and to provide a detailed statement of any change made to the proposed rule(s) as a result of those comments.

6. The Chief Counsel did not file any comments in response to the proposed rule(s) in this proceeding.

**D. Description and Estimate of the Number of Small Entities to Which the Rules Would Apply**

7. The RFA directs agencies to provide a description of, and where feasible, an estimate of the number of small entities that may be affected by the proposed rules, if adopted.<sup>9</sup> The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.”<sup>10</sup> In addition, the term “small business” has the same meaning as the term “small-business concern” under the Small Business Act.<sup>11</sup> A small-business concern” is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).<sup>12</sup>

8. As noted above, the *Performance Measures Order* included a FRFA. In that analysis, the Bureaus described in detail the small entities that might be significantly affected. Accordingly, in this Supplemental FRFA, we hereby incorporate by reference the descriptions and estimates of the number of small entities from the previous FRFA in the *Performance Measures Order*.<sup>13</sup>

**E. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities**

9. We expect the amended requirements in the Order on Reconsideration will not impose any new or additional reporting or recordkeeping or other compliance obligations on small entities and, as described below, will reduce their costs.

**F. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered**

10. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include (among others) the following four alternatives:

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<sup>8</sup> 5 U.S.C. § 604(a)(3).

<sup>9</sup> See 5 U.S.C. § 603(b)(3).

<sup>10</sup> See 5 U.S.C. § 601(6).

<sup>11</sup> See 5 U.S.C. § 601(3) (incorporating by reference the definition of “small-business concern” in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies “unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register.”

<sup>12</sup> See 15 U.S.C. § 632.

<sup>13</sup> See *Performance Measures Order*, 33 FCC Rcd at 6539-44, Appx. B, paras. 8-24.

(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.<sup>14</sup>

11. The Commission has taken further steps which will minimize the economic impact on small entities. In the Order on Reconsideration, we adopt a delayed schedule providing for a period of “pre-testing” for all carriers and later start dates for carriers that do not receive CAF Phase II model-based support. Thus, CAF Phase II model-based support recipients, which include only large carriers, must begin pre-testing and testing in 2020, whereas legacy rate-of-return carriers, many of which are smaller entities, must begin pre-testing in 2022 and testing in 2023, and small carriers receiving A-CAM I model support do not begin pre-testing until 2021 and testing in 2022. Pre-testing will give carriers time to correct any issues with their networks or with their testing infrastructure without being subject to support reductions, and the delayed schedule for non-CAF Phase II carriers will permit smaller entities even more time to prepare to meet our testing requirements.

12. We also now permit greater flexibility for carriers to conduct speed tests within an hour. In the Order on Reconsideration, we clarify that carriers may not necessarily start testing speed at the very beginning of each test hour. Instead, a carrier must simply report a successful speed test for each hour, except a carrier that begins attempting a speed test within the first 15 minutes of an hour and checks for crosstalk in one-minute intervals (using the crosstalk thresholds of 64 Kbps for download and 32 Kbps for upload) may record that no test was successful during that test hour.

13. Finally, we clarify that carriers may use the same subscriber locations for testing both speed and latency, halving the potential burdens for carriers that may have otherwise believed it necessary to test separate subscriber locations for speed and latency. This clarification is most significant for the smallest carriers, which may use less automated means of testing than larger carriers.

**Report to Congress:**

The Commission will send a copy of the Order, including this FRFA, in a report to be sent to Congress and the Government Accountability Office pursuant to the Small Business Regulatory Enforcement Fairness Act of 1996.<sup>15</sup> In addition, the Commission will send a copy of the Order, including the FRFA, to the Chief Counsel for Advocacy of the Small Business Administration. A copy of the Order and FRFA (or summaries thereof) will also be published in the Federal Register.<sup>16</sup>

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<sup>14</sup> 5 U.S.C. § 603(c).

<sup>15</sup> 5 U.S.C. § 801(a)(1)(A).

<sup>16</sup> *See id.* § 604(b).