



April 2015

# BROADBAND PERFORMANCE

## Additional Actions Could Help FCC Evaluate Its Efforts to Inform Consumers

# GAO Highlights

Highlights of [GAO-15-363](#), a report to congressional requesters

## Why GAO Did This Study

Broadband is increasingly seen as an essential communications service, with applications in education, medicine, public safety, and entertainment. However, consumers can experience broadband performance problems. FCC, which has primary responsibility for regulating broadband, has taken steps to measure broadband performance and to require that ISPs give consumers information about the performance of their services.

GAO was asked to review issues related to broadband performance information. This report examines (1) broadband performance information available to consumers and its limitations, if any, and (2) FCC's actions to evaluate its efforts to provide consumers with broadband performance information.

To address these objectives, GAO reviewed FCC proceedings; conducted a literature review; analyzed comments filed with FCC regarding broadband performance information; and interviewed FCC officials and various stakeholders from industry and public interest groups.

## What GAO Recommends

FCC should take additional steps to evaluate its efforts to provide consumers with broadband performance information. This should include: (1) conducting or commissioning research on the effectiveness of its efforts and making the results publicly available, and (2) establishing performance goals and measures that allow FCC to monitor and report on these efforts. FCC concurred with GAO's recommendations.

View [GAO-15-363](#). For more information, contact Mark Goldstein at (202) 512-2834 or [goldsteinm@gao.gov](mailto:goldsteinm@gao.gov).

April 2015

## BROADBAND PERFORMANCE

### Additional Actions Could Help FCC Evaluate Its Efforts to Inform Consumers

#### What GAO Found

Consumers can access broadband performance information from several sources, including Internet service providers (ISP), online speed tests, and the Federal Communications Commission (FCC); however, the information has some limitations. For example:

- **ISP information:** FCC's transparency rule requires ISPs to disclose broadband performance information, but ISPs' disclosures vary, and some stakeholders said that the lack of standardization of disclosures can make it difficult for consumers to compare broadband services. Some ISPs, however, question the need and benefit of standardized disclosures. FCC recently adopted enhancements to the transparency rule, such as specifying what information ISPs must disclose, and FCC is considering potential disclosure formats.
- **Speed tests:** Consumers can use information from these tests to verify their broadband speeds. However, speed tests can be affected by many factors and may not detect congestion affecting a specific website. Thus, it can be difficult for consumers to identify the cause of their broadband performance problems.
- **FCC reports:** Through the Measuring Broadband America (MBA) program, FCC tests ISPs' networks and compares their actual and advertised speeds in an [annual report](#). However, the report is not targeted toward consumers, and stakeholders stated that consumers may not be aware of the report.

FCC has taken steps to evaluate its efforts to provide consumers with broadband performance information, such as its transparency rule and MBA program; however, FCC's ability to evaluate its efforts is limited by a lack of useful performance information and relevant performance goals and measures. For instance, while FCC obtains information about the effectiveness of its efforts from stakeholders' comments and consumers' complaints, FCC has not sought performance information from more objective sources, such as consumer research—as has been done by other government entities. Further, although consumer complaints can provide FCC with valuable insights on topics of interest to the commission, FCC has acknowledged that complaints may not provide a complete picture of consumer's information needs and some industry stakeholders have questioned FCC's reliance on complaints as a basis for making decisions. In addition, although FCC's strategic plan includes strategic objectives related to informing consumers about broadband networks, FCC lacks performance goals and measures to monitor the impact and effectiveness of its efforts to provide consumers with broadband performance information. GAO has previously reported that critical elements of effective performance management include information that is complete and consistent, with performance measures linked to goals. Without such information and measures, FCC cannot be assured that its efforts to provide consumers with broadband performance information are effective and meeting consumers' needs.

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## Abbreviations

ACSI	American Customer Satisfaction Index
CFPB	Consumer Financial Protection Bureau
DSL	digital subscriber line
FCC	Federal Communications Commission
ISP	Internet service provider
MBA	Measuring Broadband America
Mbps	megabits per second
NPRM	Notice of Proposed Rulemaking
UK	United Kingdom

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April 17, 2015

The Honorable Frank Pallone, Jr.  
Ranking Member  
Committee on Energy and Commerce  
House of Representatives

The Honorable Anna G. Eshoo  
Ranking Member  
Subcommittee on Communications and Technology  
Committee on Energy and Commerce  
House of Representatives

The Honorable Edward J. Markey  
United States Senate

Broadband is increasingly seen as an essential communications service, with applications in education, medicine, public safety, and entertainment. Broadband allows people to share large amounts of information at increasingly faster speeds and provides access to information otherwise unavailable, such as online courses not offered in their local area. Press reports indicate that consumers spent over \$100 billion on Internet access in 2013, and the Federal Communications Commission (FCC) has noted that the number of fixed and mobile residential broadband connections in the United States grew from 48 million in December 2010 to nearly 180 million in December 2013.<sup>1</sup> Consumers' use of broadband has changed over the years as well, with more people using broadband to access video and data-intensive applications, and this trend is expected to continue. For example, Cisco (a provider of network infrastructure) projects that consumer Internet traffic in North America will grow at an average annual rate of 21.5 percent between 2013 and 2018.<sup>2</sup> However, FCC has previously expressed concerns regarding consumers' access to accurate and useful information about their broadband service

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<sup>1</sup>Includes connections of a download speed of at least 3 megabits per second and an upload speed of at least 768 kilobits per second. Federal Communications Commission, *Internet Access Services: Status as of December 31, 2013* (Washington, D.C.: October 2014).

<sup>2</sup>Cisco, *Cisco Visual Networking Index: Forecast and Methodology, 2013—2018* (June 10, 2014).

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performance. In addition, GAO has previously identified limitations in the broadband performance information available to consumers, and recently noted the need to ensure consumers understand issues that can affect their use of broadband, such as usage-based pricing.<sup>3</sup>

You asked us to review issues related to broadband performance information available to consumers. This report examines: (1) the information currently available to consumers regarding broadband performance and the limitations of this information, if any, and (2) FCC's actions to evaluate its efforts to provide consumers with broadband performance information. To identify the information currently available to consumers regarding broadband performance and any limitations of the information, we reviewed prior GAO reports on this issue, as well as relevant FCC proceedings, reports, and documents—including its Measuring Broadband America reports, 2010 *Open Internet* Order,<sup>4</sup> and 2014 *Open Internet* Notice of Proposed Rulemaking (NPRM) and subsequent 2015 *Open Internet* Order.<sup>5</sup> We also reviewed broadband provider websites, third-party sites that provide broadband performance information to consumers, and studies on broadband performance measurement. To identify limitations, we reviewed comments filed with FCC regarding the effectiveness of its transparency rule and Measuring Broadband America effort. To select relevant comments, we performed key-word searches that included terms related to transparency and disclosure for consumers. To ensure we reviewed a broad range of comments, we selected comments from stakeholders that represented a variety of interests, including public interest groups, Internet service providers (ISP), content providers, trade associations, and consumer representatives. We also interviewed representatives from FCC and selected stakeholder groups, including public interest and consumer advocacy groups, industry associations, content or equipment providers, ISPs, and other industry stakeholders. We identified stakeholders to

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<sup>3</sup>GAO, *Telecommunications: Current Broadband Measures Have Limitations, and New Measures Are Promising but Need Improvement*, [GAO-10-49](#) (Washington, D.C.: Oct. 9, 2009), and GAO, *Broadband Internet: FCC Should Track the Application of Fixed Internet Usage-Based Pricing and Help Improve Consumer Education*, [GAO-15-108](#) (Washington, D.C.: Nov. 24, 2014).

<sup>4</sup>*Preserving the Open Internet*, Report and Order, 25 FCC Rcd. 17905 (2010).

<sup>5</sup>*Protecting and Promoting the Open Internet*, Notice of Proposed Rulemaking, 29 FCC Rcd. 5561 (2014), *Protecting and Promoting the Open Internet*, Report and Order on Remand, Declaratory Ruling, and Order, FCC 14-24 (2015).

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interview based on our review of comments filed in FCC's 2014 *Open Internet* and related proceedings, as well as based on recommendations from other organizations we interviewed.

To determine how FCC evaluates its efforts to provide consumers with broadband performance information, we reviewed relevant FCC documents, such as FCC's strategic and performance plans. We also reviewed FCC's requests for comment on consumers' information needs and the effectiveness of FCC's efforts to provide consumers with broadband performance information, as well as selected comments filed in response to these proceedings (as described above). We also reviewed prior GAO reports on FCC and results-oriented management and compared FCC's use of performance information and measures to performance management best practices outlined in previous GAO work. To further inform our assessment, we interviewed representatives from the stakeholder groups identified above, as well as officials from the Federal Trade Commission and National Telecommunications and Information Administration regarding their efforts to inform consumers about broadband issues and to evaluate the effectiveness of those efforts. In addition, we reviewed reports and studies on consumer disclosures conducted by FCC's Transparency Working Group; foreign telecommunications regulatory bodies, including those in the United Kingdom and European Union; and other federal agencies, such as the Consumer Financial Protection Bureau. See appendix I for more information about our scope and methodology.

We conducted this performance audit from July 2014 to April 2015 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

The term "broadband" commonly refers to Internet access that is high speed and provides an "always-on" connection, so users do not have to reestablish a connection each time they access the Internet. Broadband speeds are described in download and upload capabilities, and are defined as the maximum rates at which data are delivered over the Internet. A higher speed indicates a faster information delivery rate. For example, a 10 megabits per second (Mbps) service should deliver ten times as much data as a 1 Mbps service in the same period of time.

Internet service providers (ISP) have marketed and competed with one another on the speed of their various broadband plans. Advances in technology, such as the use of fiber (described below) and new wireless technologies, have allowed ISPs to offer increasingly faster speeds that support new services and applications, such as streaming video. FCC takes those advances into account as part of its required inquiry into whether “advanced telecommunications capability” is being deployed to all Americans in a reasonable and timely fashion.<sup>6</sup> Pursuant to this inquiry, FCC recently updated the minimum speed benchmark it uses to measure the availability of advanced telecommunications capability.<sup>7</sup> In addition to speed, a number of factors can be used to evaluate broadband performance. See table 1.

**Table 1: Measures of Broadband Performance**

Term	Description	How measure relates to the end-user’s experience
Upload Speed	Upload speed refers to the rate at which data are transferred from the consumer to the Internet. Measured by the number of bits of data transferred per second.	Slow upload speeds can create delays when consumers are trying to upload content to the Internet, such as uploading photos to a website or using video chat.
Download Speed	Download speed refers to the rate at which data are transferred to the consumer. Measured by the number of bits of data transferred per second.	Slow download speeds can create delays when consumers are accessing Internet content, which can manifest as long waits for the loading of webpages and problems in viewing video content.
Latency	A measure of the time that it takes for data to travel from a computer to a server and back again.	Accessing Internet content requires multiple messages to pass between the end-user and the web server, so latency can have a significant impact on broadband performance. A high-latency network connection experiences long delay times. High latency can affect the performance of online gaming, videoconferencing, phone, and streaming media services.

<sup>6</sup>47 U.S.C. § 1302(b). Advanced telecommunications capability is defined as “high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.” 47 U.S.C. § 1302(d).

<sup>7</sup>In January 2015, FCC adopted a speed benchmark at download speeds of at least 25 Mbps and upload speeds of at least 3 Mbps. *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 14-126, 2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment, FCC 15-10 (rel. Feb. 4, 2015) (2015 Broadband Progress Report) at paras. 3 and 45.

<b>Term</b>	<b>Description</b>	<b>How measure relates to the end-user's experience</b>
Jitter	Jitter measures the variance in latency. Zero jitter means the results were exactly the same every time, and anything above zero is the amount by which they varied. A lower jitter value is better.	High jitter can affect consumers' ability to use real-time applications such as video or audio applications.
Packet Loss	A measure of the amount of data lost in transmission from one device to another.	Packet loss can result in slower download and upload speeds, poor quality Internet phone services, and pauses with streaming media.
Availability	Refers to the amount of time that the network is functioning, stable and able to provide connectivity between a computer and a desired application.	If a network experiences an outage, a consumer will be unable to use their broadband service.

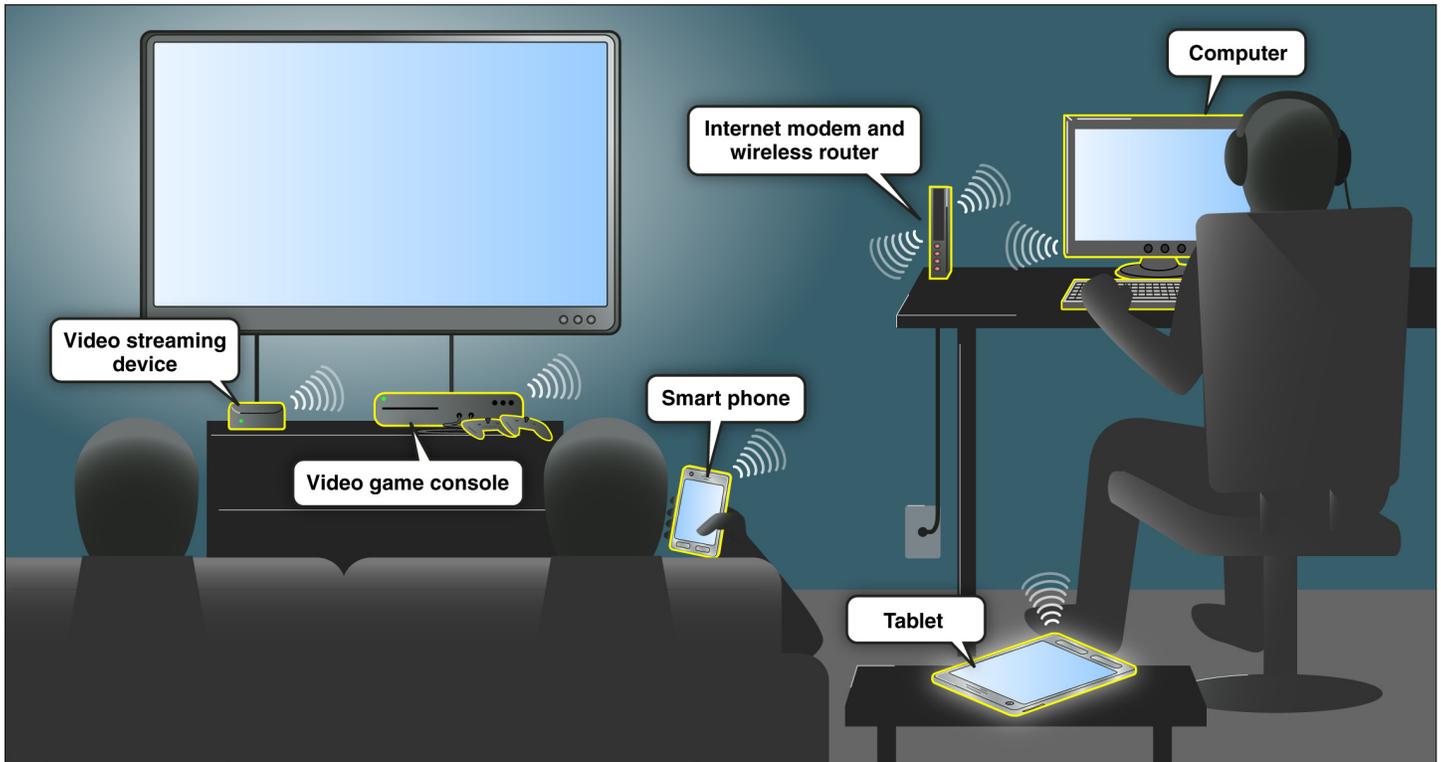
Source: GAO analysis of FCC, academic, private sector, and other federal sources. | GAO-15-363

Note: This list is not comprehensive, as there are many technical measures that may be used to evaluate specific aspects of broadband performance.

Consumers generally subscribe to broadband in two ways:

- **Fixed:** In-home fixed Internet plans are often sold as a monthly subscription by cable television or telephone companies. Service from cable television companies is generally provided through the same coaxial cables that deliver television programming. Service from telephone companies is generally provided through traditional copper telephone lines—commonly referred to as digital subscriber line (DSL) service—or fiber-optic lines, which convert electrical signals carrying data into light and send the light through glass fibers. These network technologies generally have higher speeds than mobile networks. Consumers can connect a variety of devices to in-home fixed networks through a wired connection or wireless Wi-Fi connection (see fig. 1). Consumers are increasingly using the Internet to supplement or replace their use of traditional services, such as traditional telephone and cable TV service.

Figure 1: Examples of Devices Connected to In-Home Fixed Broadband Service

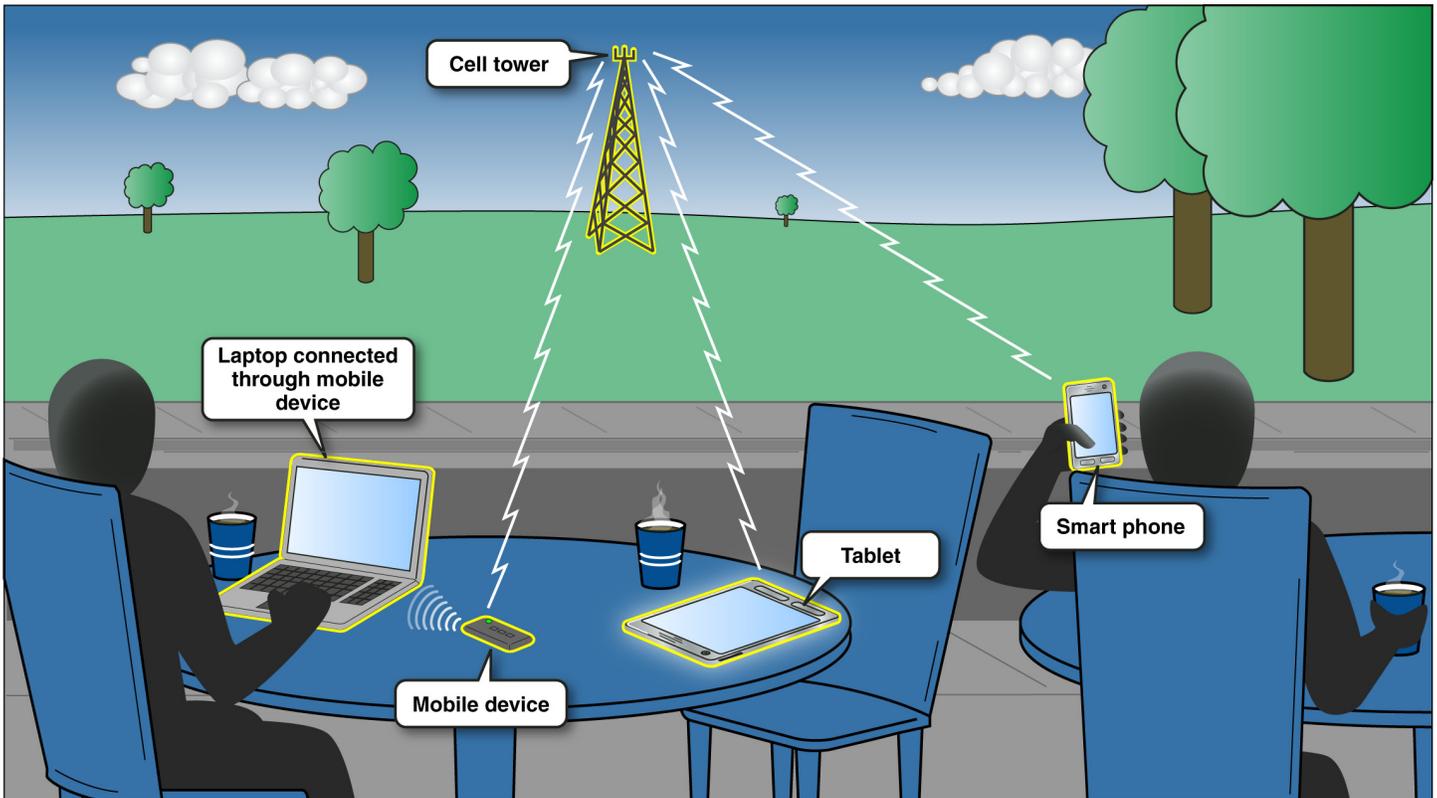


Source: GAO. | GAO-15-363

- Mobile: Traditionally, mobile providers sold access to the Internet as an add-on to mobile telephone service plans that may or may not include a multiyear contract. Mobile service is provided through cell tower coverage with data sharing through radio spectrum.<sup>8</sup> A number of devices may connect to mobile broadband networks, such as smart phones, tablets, and mobile devices that enable laptops to connect to mobile networks (see fig. 2).

<sup>8</sup>The radio frequency spectrum is the resource that makes possible wireless communications and supports a vast array of commercial and government services.

Figure 2: Examples of Devices Connected to Mobile Broadband Network



Source: GAO. | GAO-15-363

The 2014 American Customer Satisfaction Index (ACSI)<sup>9</sup> reported that with respect to fixed broadband service, consumer satisfaction regarding data speeds and video streaming increased from 2013 to 2014. However, ACSI also found that during this time period, customer satisfaction related to service interruptions and outages, speed and service reliability, and peak evening-hour performance declined. With respect to mobile broadband providers, ACSI reported that customer satisfaction related to speed for downloading data and streaming content increased from 2013

<sup>9</sup>The ACSI measures the satisfaction that U.S. consumers have with the quality of a number of different types of services, including Internet services. American Customer Satisfaction Index, *ACSI Telecommunications and Information Report 2014*, (Ann Arbor, MI: May 2014).

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to 2014; however, ACSI also reported that the customer satisfaction scores indicated that improvements were still needed in speed and reliability.

Broadband performance problems can manifest in a number of ways, such as slow loading of content, lost connections, and pauses in streaming video and audio. FCC, ISPs, content providers, and researchers have noted that a variety of factors can affect broadband performance, such as accessing the Internet during peak usage times,<sup>10</sup> outdated equipment in the home, or multiple users in the same household accessing the Internet simultaneously. In addition, mobile broadband performance will vary based on the location of the phone or device.<sup>11</sup> Running multiple applications at once or having multiple users in a household may require greater speeds. Different types of Internet applications use varying amounts of data and require different minimum speeds to operate properly (see table 2). For example, email and web-browsing use small amounts of data, while watching movies uses larger amounts of data. Use of data-intensive broadband applications is projected to grow.<sup>12</sup> FCC has noted that consumers are increasingly using broadband applications that require large amounts of data, such as streaming video content, which can require more consistency of service and be more visibly affected by technical problems.

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<sup>10</sup>In the context of its Measuring Broadband America program (discussed later in this report), FCC defines the peak usage period for residential broadband as weeknights between 7:00 pm to 11:00 pm local time. This is the time when delivery of Internet service is under highest demand.

<sup>11</sup>Mobile service is provided through cell tower coverage with data sharing through radio spectrum; thus, mobile connection quality will vary based on the location of the phone or device in reference to the tower. For example, if the device is blocked by terrain, the mobile broadband service will be degraded or not available. In addition, the performance of the broadband connection degrades over distance to the tower, so that performance at the edge of a tower's coverage is not equal to performance close to the tower.

<sup>12</sup>Cisco estimates that Internet video traffic will grow in North America by 27 percent, from 2013–2018.

**Table 2: Minimum Download Speeds for Different Broadband Activities (Assumes One Activity Is Occurring at a Time), as of February 2015**

<b>Activity</b>	<b>Minimum download speed in megabits per second (Mbps)</b>
Email	0.5
<b>Web browsing</b>	
Job searching, navigating government websites	0.5
Interactive pages and short educational videos	1
Streaming radio	Less than 0.5
Phone calls/Voice over Internet Protocol <sup>a</sup>	Less than 0.5
<b>Watching video</b>	
Standard-definition streaming videos	0.7
Streaming feature movies	1.5
High-definition quality streaming movie or university lecture	5–8
<b>Video conferencing</b>	
Basic video conferencing	1
High-definition video conference and tele-learning	1- 2
<b>Gaming</b>	
Game console connecting to the Internet	1
Two-way online gaming in high-definition	4

Source: FCC | GAO-15-363

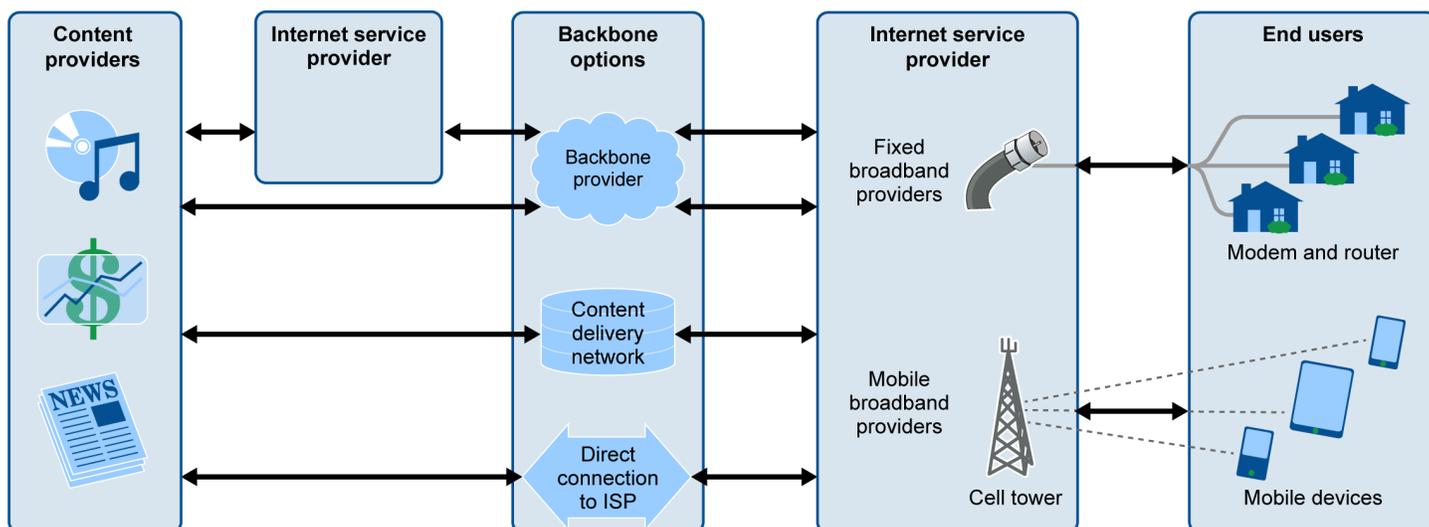
Note: The entire citation for the source is: Federal Communications Commission's Broadband Speed Guide (<http://www.fcc.gov/guides/broadband-speed-guide>), last accessed February 10, 2015, and 2015 Broadband Progress Report.

<sup>a</sup>Voice over Internet Protocol is a technology that allows users to make voice calls using a broadband Internet connection instead of a regular phone line.

In addition, congestion at various points on the network can affect a user's broadband performance. In order to connect their customers to the Internet, ISPs link with other networks, including "backbone providers" that move Internet traffic long distances and interconnect with other networks. Companies may use a number of options to deliver their content across the Internet, such as connecting with a backbone provider (directly, or through an ISP), connecting directly to the consumer's ISP, or

paying a content delivery network to deliver their content to ISPs.<sup>13</sup> See figure 3 for a simplified illustration of how content moves from websites and applications to consumers. Congestion occurring within the content provider's network, at points of interconnection between the networks, or within the ISP's network can all affect a consumer's broadband performance. ISPs' traffic management policies can also affect a consumer's broadband performance. This issue is discussed later in the report.

**Figure 3: Simplified Example of Internet Content Delivery**



Source: GAO analysis of FCC, industry, and academic sources. | GAO-15-363

FCC has primary responsibility for regulating broadband. In response to a requirement in the American Recovery and Reinvestment Act of 2009, FCC staff developed The National Broadband Plan, which includes a

<sup>13</sup>A content delivery network deploys many servers in many distributed locations to offer the best quality of experience to the end user. Content delivery networks may build large content distribution centers and connect these centers with high speed links to the ISPs, or they may deploy their cache servers inside the ISPs. Cheng Huang, Angela Wang, Jin Li, and Keith W. Ross, "Understanding Hybrid CDN-P2P: Why Limelight Needs Its Own Red Swoosh," *NOSSDAV '08: Proceedings of the 18th International Workshop on Network and Operating Systems Support for Digital Audio and Video* (2008): 75-80, cited by Manuel Palacin et.al, "The Impact of Content Delivery Networks on the Internet Ecosystem," *Journal of Information Policy*, vol. 3 (2013).

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series of recommendations aimed at ensuring all Americans have access to broadband.<sup>14</sup> In addition, section 706 of the Telecommunications Act of 1996, as amended, directs FCC “to encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans” through a variety of measures, including measures that promote competition in the local telecommunications market.<sup>15</sup> FCC has repeatedly noted the connection between informed consumers and increased competition, noting that the latter is an important part of promoting broadband deployment.<sup>16</sup>

FCC adopted an *Open Internet* Report and Order in 2010<sup>17</sup> outlining certain limits on how ISPs could treat network traffic. The 2010 *Open Internet* Order imposed three requirements on broadband providers: transparency, anti-discrimination, and anti-blocking. After facing a court challenge that affirmed the transparency rule but vacated and remanded the antidiscrimination and anti-blocking rules, FCC initiated a new rulemaking to address these issues,<sup>18</sup> which resulted in the adoption of the 2015 *Open Internet* Order.<sup>19</sup> This order, adopted in February 2015, addressed issues related to ISPs’ disclosure of broadband performance information to consumers and other parties, as well as other practices that may affect consumers’ broadband performance. The 2015 *Open Internet* Order also responded to concerns that ISPs may have the

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<sup>14</sup>Pub. L. No. 111-5, title VI, § 6001, 123 Stat.115 (2009); FCC, *Connecting America: The National Broadband Plan* (2010)

<sup>15</sup>47 U.S.C. § 1302(a). As previously noted, advanced telecommunications capability is defined as “high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.” 47 U.S.C. § 1302(d).

<sup>16</sup>*In the Matter of Consumer Information and Disclosure*, Notice of Inquiry, 24 FCC Rcd. 11380, ¶15 (2009); *Preserving the Open Internet*, Report and Order, 25 FCC Rcd. 17905, ¶153 (2010); *Connecting America: The National Broadband Plan*, p.44 (2010); *In the Matter of Broadband Industry Practices*, Notice of Inquiry, 22 FCC Rcd. 7894, ¶12 (2007).

<sup>17</sup>*Preserving the Open Internet*, Report and Order, 25 FCC Rcd. 17905 (2010), *aff’d in part, vacated and remanded in part sub nom, Verizon v. FCC*, 740 F.3d. 623 (D.C. Cir. 2014).

<sup>18</sup>*Protecting and Promoting the Open Internet*, Notice of Proposed Rulemaking, 29 FCC Rcd. 5561 (2014).

<sup>19</sup>*Protecting and Promoting the Open Internet*, Report and Order on Remand, Declaratory Ruling, and Order, FCC 14-24 (2015).

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incentive and ability to act in ways that limit Internet openness (e.g., by blocking or discriminating against unaffiliated applications and services).

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### Although Consumers Can Access a Number of Sources of Information on Broadband Performance, the Information Is Limited

Consumers can access information on broadband performance from a number of sources, including their ISPs, third-party websites, and FCC reports. FCC adopted a transparency rule requiring ISPs to provide consumers with information on their services' performance characteristics. However, the information available to consumers is not standardized, and some stakeholders stated that this lack of standardization makes it difficult for consumers to compare broadband services. In addition, the information available through speed tests may not accurately reflect the end-user's actual experience. FCC has taken steps to measure and report on the extent to which ISPs are providing the speeds they advertise. However, the reports are not targeted toward consumers, and stakeholders stated that consumers might not be aware of the information.

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### Performance Information from ISPs and Third Parties Is Not Standardized and May Not Accurately Reflect the End-User's Actual Experience

Consumers interested in purchasing broadband service can go to providers' websites to get information on performance, including speed and latency, as well as information on availability and price. ISPs may also provide tools for selecting the correct package based on use and information on factors that affect broadband performance.<sup>20</sup> ISPs told us that consumers may also call and speak to a representative to determine the best package for their needs, and existing customers may call for help troubleshooting problems with their broadband service.

FCC's 2010 *Open Internet* Order included a transparency rule intended to provide consumers with more information on broadband performance. The rule requires that fixed and mobile providers "publicly disclose accurate information regarding the network management practices, performance, and commercial terms of its broadband Internet access services sufficient for consumers to make informed choices regarding use of such services..."<sup>21</sup> In response to concerns from ISPs regarding the

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<sup>20</sup>For example, AT&T's performance disclosure website includes a video explaining the factors that can affect speed, and Cox Communications provides a tool that asks consumers questions about the number of users in their household and what services they use with each device.

<sup>21</sup>47 C.F.R. § 8.3

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burden associated with specific requirements, FCC did not require ISPs to disclose specific information in a standardized format. Instead, the 2010 *Open Internet* Order stated that FCC expected disclosures to include some or all of certain types of information, such as actual speed, to be timely and prominently disclosed in plain language accessible to consumers and to, at a minimum, be provided through a publicly available, easily accessible website. As part of its 2014 *Open Internet* NPRM, FCC proposed enhancing the transparency rule and requested comment on a variety of options, some of which are discussed later in this report. In the resulting February 2015 *Open Internet* Order, FCC adopted enhancements to the transparency rule, and stated that ISPs are required to disclose certain information under the transparency rule. Specifically, FCC now states that disclosures of network performance should include actual speed, latency, and packet loss, and disclosures should also include network management practices applied to specific users or user groups (for example, users in a particular service plan or geographic location). FCC also requires ISPs to develop a mechanism for directly notifying consumers if their individual use of a network will trigger a network practice that is likely to have a significant impact on the consumer's use of the service.<sup>22</sup>

Currently, ISPs' disclosures vary with respect to length, content, and where they are placed on ISPs' websites. In addition, according to public interest groups we spoke with, the complexity of this information and its lack of standardization across ISPs can make it difficult for consumers to find and use the information to compare broadband products and services. Some groups also raised concerns that consumers have difficulty understanding the information. However, some of the ISP and trade associations we spoke with questioned the rationale for more specific disclosure requirements, stating that consumers have access to the information they need or that flexibility is important, given the difficulties in explaining technical performance information to consumers. In addition, some ISPs and a trade association argued in written comments filed with the FCC that a standardized disclosure requiring specific information from ISPs could overlook features that may be of greater importance to consumers (such as nationwide wireless access) or confuse consumers by providing highly technical information. However,

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<sup>22</sup>FCC granted a temporary exemption from these enhancements to smaller broadband providers.

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other ISPs were open to adopting a standardized label (as discussed below), with one ISP stating in written comments that it might help consumers make informed choices.

FCC's Open Internet Advisory Committee's Transparency Working Group studied how ISPs' present performance and pricing information and issued a report in which it recommended that FCC promote a voluntary labeling program to help consumers more easily compare and select broadband service offerings. The working group suggested the program be voluntary and result in a label that would include information on an ISP's upload and download speed, price, and usage restrictions. However, the report also noted a number of complexities associated with implementing a standardized label program, such as accounting for variability in broadband speeds, as well as for factors beyond the ISP's control, and the potential for consumers to purchase more expensive packages due to a lack of consumer education on what speeds they need. FCC officials told us that they have considered standardized labels, but developing a label that is easy to use, useful for consumers with differing broadband needs, and relevant in a changing environment is complicated. Researchers have noted that standardized performance information could help third parties develop tools and information that allow consumers to compare multiple broadband services. FCC requested comment on the working group's label proposal as part of its 2014 *Open Internet* NPRM. In its 2015 *Open Internet* Order, FCC established a voluntary safe harbor for the format and nature of the required disclosure to consumers. To take advantage of the safe harbor, a broadband provider must provide a consumer-focused, stand-alone disclosure. FCC, however, did not mandate the exact format of such disclosure at this time. Instead, it directed its Consumer Advisory Committee to develop and submit to the commission a voluntary

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disclosure format that ISPs could use to ensure compliance with the transparency rule no later than October 31, 2015.<sup>23</sup>

Online third-party speed tests allow consumers to test the performance of their broadband service by sending and receiving data between the consumer's device (such as a laptop or smart phone) and a test server. For example, [www.speedtest.net](http://www.speedtest.net) measures users' broadband speed, and [www.pingtest.net](http://www.pingtest.net) tests other parameters and provides an overall grade that includes information on which applications may be affected by the user's broadband performance characteristics. FCC also released an application that allows users to test the speed, latency, and packet loss of their mobile broadband.<sup>24</sup> In addition, ISPs may provide speed test tools to help consumers understand their broadband performance. In some cases, third parties have created sites that rank broadband providers based on the results of speed-test data. For example, OOKLA's [www.netindex.com](http://www.netindex.com) uses data from its speed test and consumer surveys to create country, state, and city-level rankings of fixed and mobile broadband providers in terms of upload and download speed, as well as other performance measures. This allows consumers to compare providers based on their performance in the consumer's local area. RootMetrics.com provides similar data on mobile broadband, including assessments of the mobile ISPs' speed and reliability.

However, the information from speed tests may not provide consumers with the information they need to understand what factors are affecting their broadband performance. Studies we reviewed and stakeholders we spoke with noted that speed tests can be affected by a variety of factors, which makes it difficult for consumers to identify what specific problem is affecting their broadband performance. For example, researchers have

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<sup>23</sup>FCC's Consumer Advisory Committee previously reviewed pre-sale disclosures for consumers interested in purchasing broadband services. The committee noted that while a label would help consumers compare broadband options prior to purchasing service, a label would be limited in empowering consumers with respect to educating them about which broadband services and speeds would meet their needs. The committee noted that this would be better addressed through a comprehensive educational program and expanded industry disclosure that included FCC, industry, and consumer groups. FCC Consumer Advisory Committee, *Recommendations Regarding Pre-sale Consumer Disclosures*, GC Docket No 09-158, CC Docket No. 98-170, WC Docket No. 04-36 (Aug. 4, 2010).

<sup>24</sup>FCC, *FCC Speed Test App Tip Sheet*, accessed February 6, 2015, <http://www.fcc.gov/guides/mobile-speed-test-tip-sheet>.

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noted that online speed tests can be affected by the home equipment and the number of users accessing the Internet in the home; however, these tests may not enable consumers to discern that these factors are affecting their speeds.<sup>25</sup> In addition, speed tests can be limited in reflecting the end-user's actual experience because speed tests vary methodologically, and different tests can provide differing results, depending on the location of the speed test server. If a speed test server is located outside the consumer's ISP network, then the results could be affected by congestion occurring on networks outside of the ISP's control. For example, when using third-party speed tests, a consumer's traffic may travel over networks that are not controlled by their ISP, and congestion on those networks may have an effect on the speed test. On the other hand, speed tests hosted by an ISP may only test the performance of the ISP's network, and thus do not capture congestion that may be affecting a consumer's ability to access content outside of their ISP's network.

Stakeholders we interviewed noted that consumers may experience performance problems due to disputes between ISPs and content providers regarding interconnection (interconnection disputes) that lead to network congestion when consumers are accessing specific sites, and these problems may not be reflected in speed tests. Congestion at interconnection points has been identified as a problem contributing to poor broadband performance, particularly with respect to streaming video content. Such congestion may not be adequately captured by third-party or ISP speed tests, since it may be limited to a specific interconnection point not used by the speed test server. Some content providers, such as Google, have provided alerts to consumers when Internet congestion is affecting their broadband performance. However, information regarding interconnection agreements can be subject to non-disclosure agreements, and there have been several disputes regarding who is responsible for addressing interconnection congestion. In June 2014, FCC released a statement asserting that these interconnection disputes can affect consumers' broadband performance and that in the interest of providing consumers with more transparency, FCC was obtaining copies of interconnection agreements to further its understanding of

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<sup>25</sup>FCC's 2014 Measuring Broadband America report noted that as available broadband speeds continue to increase, older modems incapable of supporting such speeds could be a growing problem for consumers' fixed broadband performance. See, FCC, *2014 Measuring Broadband America Fixed Broadband Report* (Washington, D.C.).

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interconnection disputes. Separately, in the 2015 *Open Internet Order*, FCC stated that it would hear interconnection disputes on a case-by-case basis.

ISPs' traffic management policies can also affect the results of speed tests, making comparisons across providers difficult. In August 2014, a public interest group announced it was filing a complaint against T-Mobile. According to the group, T-Mobile was slowing down the broadband speeds provided to mobile broadband subscribers that had reached their usage limits;<sup>26</sup> however, T-Mobile did not slow down traffic coming from speed test applications. Thus, if a T-Mobile customer whose broadband was being slowed down accessed a speed test to try and determine their broadband speed, their speed test would show a higher speed than the customer was actually receiving. The public interest group stated that this was a violation of the transparency rule, because consumers were not receiving accurate information regarding network performance. In November, FCC issued a press release stating that T-Mobile agreed to take several actions to ensure consumers were able to obtain accurate measures of their speed, including providing a link to a speed test that would reflect the speed reduction. There have also been press reports that backbone networks' traffic management policies have affected speed test results, and researchers have noted that ISPs can design their networks to provide better speed test results.

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### FCC Reports on Broadband Performance, but the Reports Are Not Targeted toward Consumers

Since 2011, FCC has published annual reports with broadband performance results from its Measuring Broadband America (MBA) effort.<sup>27</sup> The MBA program compares fixed ISPs' average delivered download and upload speeds against their advertised speeds (for a 24-hour period, as well as for the peak usage time of 7 PM to 11 PM on weeknights), and provides additional information on measurements of latency and website loading time. FCC is working to expand its MBA

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<sup>26</sup>Some ISPs offer plans that limit how much data a consumer can use per month before receiving slower speeds or paying an additional fee. For example, once customers reach their high-speed data allowance, they may continue to access unlimited data, but at slower connection speeds of 128 kilobits per second or less, slower than speeds FCC recommends for browsing the web or downloading e-mail. See [GAO-15-108](#) for additional information.

<sup>27</sup>FCC, *Measuring Broadband America*, accessed February 6, 2015, <http://www.fcc.gov/measuring-broadband-america>.

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effort to include mobile broadband providers and, as part of that process, has released an app for consumers to download and test their mobile broadband speeds.<sup>28</sup>

MBA developed out of a recommendation in the 2010 National Broadband Plan to improve the availability of information for consumers about their broadband service. At the time, there were concerns that ISPs were not delivering their advertised speeds, and data were not available to determine whether this was the case. FCC officials stated that MBA allowed them to verify the accuracy of ISPs' advertising claims. FCC collaborated with industry and public interest stakeholders when designing the MBA program. The sample population is drawn from subscribers of 14 of the largest ISPs (which serve over 80 percent of the residential marketplace) and consists of about 6,000 volunteers. Unlike online speed tests that consumers may access from a variety of websites, MBA only tests elements under the direct or indirect control of a consumer's ISP, from the consumer's gateway—the modem or router used by the consumer to access the Internet—to a nearby major Internet gateway point. Thus, the results are not affected by congestion occurring outside of an ISP's network.

In 2014, FCC found that the ISPs included in the report were, on average, delivering 101 percent of advertised download speeds during the peak usage hours.<sup>29</sup> FCC, ISPs, and public interest group representatives stated that the transparency provided through MBA spurred competition among providers and led to improved speeds, which benefit consumers.<sup>30</sup> In addition, ISPs that participate in the MBA effort can provide consumers with their MBA results in order to comply with the transparency rule's disclosure requirements. Researchers have used raw data from MBA to conduct in-depth analyses of broadband performance. FCC officials also told us that it uses the information from the MBA report to inform its

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<sup>28</sup>FCC, *Measuring Broadband America Mobile Broadband Services*, accessed February 6, 2015, <http://www.fcc.gov/measuring-broadband-america/mobile>.

<sup>29</sup>FCC, *2014 Measuring Broadband America Fixed Broadband Report* (Washington, DC).

<sup>30</sup>Some ISPs raised concerns regarding comparisons of actual versus advertised speed for broadband delivered via DSL, noting that the actual speed a specific customer receives depends on the distance between the ISP's central office and the customer's home. One ISP we interviewed noted that is why they advertise a speed range, rather than a specific speed.

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rulemakings on broadband, such as raising the broadband speed for providers to be eligible for the Connect America Fund, which supports telephone and broadband service for rural residents.<sup>31</sup>

FCC is also in the process of considering next steps for the program. As noted above, in order to provide comparable results across ISPs, the MBA initially only measured the ISP's network. Thus, delays incurred in the consumer's home or in segments of the Internet outside an ISP's network were excluded from the results. For example, in the 2014 MBA report, FCC noted that it excluded data from the report after discovering some testing servers (and thus, any measurements taken using these servers) were affected by congestion at interconnection points where ISPs exchange traffic with Internet backbone providers.<sup>32</sup> In the report, FCC acknowledged that consumers accessing services and content over the affected paths would likely see a significant degradation in their service, but FCC stated that it did not include the results from these servers in its report because it aims to provide an analysis of average network performance. Two public interest groups we interviewed raised concerns that the MBA results were not reflecting the experience of consumers whose broadband performance was negatively affected by interconnection disputes. In the 2014 MBA report, FCC noted that while MBA was initially focused on measuring broadband performance from the consumer to the end of the service provider's network, Internet services and applications rely on a complex and variable arrangement of interconnected networks to reach consumers. FCC stated that it is exploring options to leverage its MBA effort to gain more insights into the evolving performance of the Internet and provide better information to consumers. For example, FCC officials told us that it is testing an expansion of the MBA program to include measuring broadband performance when a consumer is using streaming video services.

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<sup>31</sup>For example, in 2014, FCC increased, to 10Mbps download/1 Mbps upload speed, the required minimum speed that fixed broadband providers receiving high-cost support must offer. The Universal Service Fund's High Cost program subsidizes telecommunications carriers that provide basic telephone, broadband and wireless telephone service in generally rural high-cost areas.

<sup>32</sup>According to FCC, this congestion was caused by business disputes between ISPs and a backbone provider. FCC did collect results from the affected servers and released the data for use by academics and others examining such congestion issues.

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Although the program initially was developed to provide consumers access to broadband performance information, many of the various stakeholders we interviewed, as well as FCC, generally agreed that most consumers are unaware of the MBA report and do not rely on it to obtain broadband performance information. MBA reports are highly technical and include detailed appendices and raw data. FCC and some of the ISPs and public interest groups we interviewed noted that information collected through the MBA program may reach consumers through secondary sources, such as ISPs' advertising and transparency rule disclosures, news reports, and tech blogs. In addition, as noted above, FCC and many of the ISPs and public interest groups stated that the program has spurred competition among providers and led to improved speeds. However, ISPs' offerings and performance can vary geographically, and in the *Open Internet* comments we reviewed, two stakeholders raised concerns that the MBA reports do not provide consumers with information about broadband performance at the local level. The National Broadband Plan recommended that FCC's broadband performance reporting effort should include "detailed information about the actual performance of the country's top broadband service providers in different geographic markets (e.g., by county, city or [Metropolitan Statistical Area])." In the 2014 MBA report, FCC stated that the data are not collected in a way that permits meaningful conclusions about broadband performance at the local level and that this limitation was a result of cost issues and the finite number of measurement devices that could be deployed over the course of the project. A report on the MBA effort that was commissioned by FCC and conducted by the North Carolina State University's Institute for Advanced Analytics primarily reviewed MBA's methodology, but also made some suggestions for making the data more consumer-friendly, including the use of a tool developed by the group to help consumers compare ISPs' performance in their states (when enough data were available to allow for statistically valid comparisons).

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## FCC Has Taken Steps to Evaluate Its Efforts to Inform Consumers, but Could Enhance Its Performance Information and Measures

FCC has taken steps to determine whether its efforts to provide consumers with broadband performance information—such as the transparency rule and MBA program—are effective and meeting consumers’ needs. Specifically, FCC has reviewed consumer complaints and requested stakeholder comments on this issue in several recent rulemaking proceedings. However, FCC’s ability to evaluate its efforts is limited by a lack of useful performance information. In addition, FCC established strategic objectives related to informing consumers in its strategic plan, but lacks performance goals and measures to monitor the effectiveness of its efforts to provide consumers with broadband performance information. Additional actions—such as conducting or commissioning objective consumer research and establishing performance goals and measures—could help FCC evaluate whether its efforts to provide consumers with broadband performance information are effective and meeting consumers’ needs.

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## FCC Has Requested Stakeholder Comments in Several Recent Rulemakings and Reviewed Consumer Complaints

FCC has requested stakeholder comments in rulemaking proceedings and reviewed consumer complaints filed with the commission to determine whether its efforts to provide consumers with broadband performance information—such as its transparency rule and MBA program—are effective and meeting consumers’ needs. According to FCC officials, FCC relies heavily on stakeholder comments to inform and explain decisions underlying the commission’s orders; however, FCC may also request stakeholders’ comments to develop a body of knowledge on issues of interest to the commission. In several recent rulemaking proceedings, FCC has requested comments from stakeholders on (1) consumers’ broadband performance information needs, (2) best practices for presenting and displaying performance information to consumers, and (3) potential improvements to FCC’s efforts to provide consumers with broadband performance information, among other things. For instance, FCC officials told us that stakeholder comments were used as part of FCC’s determination to enhance its transparency rule. Table 3 summarizes some of the consumer-related issues and questions FCC has raised and requested stakeholder comments on in recent years.

**Table 3: GAO Analysis of Selected Consumer-Related Issues and Questions Raised in Recent Federal Communications Commission’s Rulemaking Proceedings**

Date	Federal Communications Commission’s (FCC) Rulemaking Action	Summary of selected consumer-related issues and questions raised
August 2009	<i>Notice of Inquiry</i> <sup>a</sup>	<ul style="list-style-type: none"> <li>• What information do consumers need when selecting a service provider and plan, managing their service plan, and deciding whether and when to switch providers or plans?</li> <li>• What information do consumers need to assess service quality?</li> <li>• What are best practices related to formatting and displaying information to consumers and measuring the effectiveness of consumer disclosures?</li> <li>• What additional steps could FCC take to improve its consumer education efforts?</li> </ul>
June 2010	<i>Public Notice</i> <sup>b</sup>	<ul style="list-style-type: none"> <li>• How should FCC measure performance of mobile broadband?</li> <li>• How should FCC convey mobile-broadband performance information to consumers—are there best practices FCC should follow?</li> <li>• What are the existing sources of mobile-broadband performance information available to consumers and how they could be improved?</li> </ul>
April 2011	<i>Public Notice</i> <sup>c</sup> ,	<ul style="list-style-type: none"> <li>• What types of broadband performance information are most useful to consumers assessing service options?</li> <li>• What is the most effective way to present the information and ensure Internet service providers (ISP) are providing this information to consumers?</li> </ul>
May 2014	<i>Notice of Proposed Rulemaking</i> <sup>d</sup>	<ul style="list-style-type: none"> <li>• Should FCC revise the transparency rule to require ISPs to disclose specific network practices, performance characteristics (e.g., effective download speeds, upload speeds, latency, and packet loss), and/or terms and conditions of service to end users (e.g., data caps)?</li> <li>• Are there best practices for displaying and formatting ISP disclosures for end users, such as the use of a standardized label, as suggested by the Transparency Working Group?</li> <li>• Are there areas of the Measuring Broadband America (MBA) program that could be improved to provide more useful information to consumers?</li> </ul>

Source: GAO Analysis of Selected Federal Communications Commission Rulemaking Proceedings. | GAO-15-363

<sup>a</sup>*In the Matter of Consumer Information and Disclosure*, Notice of Inquiry, 24 FCC Rcd. 11380 (2009).

<sup>b</sup>*Comment Sought on Measurement of Mobile Broadband Performance and Coverage*, Public Notice, 25 FCC Rcd. 7069 (2010).

<sup>c</sup>*Consumer and Government Affairs Bureau Seeks Comment on “Need for Speed” Information for Consumers of Broadband Services*, Public Notice, 26 FCC Rcd. 5847(2011). FCC noted that although the transparency rule adopted in its 2010 *Open Internet* Order requires broadband providers to disclose information regarding network management practices, performance, and commercial terms of broadband services, the Notice represented a step further in the commission’s ongoing effort to ensure that consumers have access to the information they need to make informed decisions.

<sup>d</sup>*Protecting and Promoting the Open Internet*, Notice of Proposed Rulemaking, 29 FCC Rcd. 5561 (2014).

According to FCC officials, FCC also relies on consumer complaints filed with the commission to determine whether its efforts to provide consumers with broadband performance information are effective and

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meeting consumers' needs. For example, in the 2014 *Open Internet NPRM*, FCC stated that it had received and analyzed hundreds of consumer complaints related to ISPs' disclosures under the transparency rule and that these complaints were part of the agency's rationale for tentatively concluding the rule should be strengthened. In addition, officials told us that consumer complaints have indicated that service reliability is now as important to consumers as speed due to the popularity of video-streaming services, such as Netflix, and that as a result, they are exploring ways to further incorporate service reliability information into the MBA program. They also told us that based on consumer complaints, they knew that consumers could not easily access—and in some cases were not provided—certain performance information (e.g., ISPs' network management practices, data limits, etc.), and FCC tried to address this issue through the transparency rule.

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## FCC's Ability to Evaluate Its Efforts Is Limited by a Lack of Useful Performance Information and Relevant Performance Goals and Measures

### FCC Obtains Inconsistent and Incomplete Performance Information from Stakeholder Comments and Consumer Complaints

We have previously found that leading organizations that have progressed toward results-oriented management use performance information as a basis for decision-making<sup>33</sup> and that the usefulness of performance information can be affected by its completeness, accuracy, consistency, validity, and credibility, among other things.<sup>34</sup> For example, performance information can focus on various dimensions of performance, such as outcomes, outputs, quality, or customer satisfaction, and can help agencies monitor their progress in meeting programmatic and operational goals. Although stakeholder comments and consumer complaints can provide FCC with valuable insights on topics of interest to the commission, the information FCC obtains from

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<sup>33</sup>GAO, *Managing for Results: Enhancing Agency Use of Performance Information for Management Decision Making*, [GAO-05-927](#) (Washington, D.C.: Sept. 9, 2005).

<sup>34</sup>GAO, *Results-Oriented Management: Strengthening Key Practices at FEMA and Interior Could Promote Greater Use of Performance Information*, [GAO-09-676](#) (Washington, D.C.: Aug. 17, 2009).

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these sources lacks some of the characteristics of useful performance information, such as consistency and completeness.

Our review of selected stakeholders' *Open Internet* comments found that they generally provided inconsistent views regarding the effectiveness of FCC's efforts to provide consumers with broadband performance information. For instance, some public interest groups and content providers argued that FCC's transparency rule was not providing consumers the information they need to make informed decisions regarding broadband services. In their view, FCC should have required ISPs to provide additional technical information—such as detailed information on network congestion—under the transparency rule. However, ISPs countered that this level of technical detail would be confusing to consumers and that the transparency rule had been effective in providing consumers with the information they need. For example, Cox Communications, an ISP, stated that, “most of the expanded disclosure proposals included in the NPRM would impose burdensome obligations that are highly unlikely to prove useful to consumers and would only degrade the overall effectiveness of the transparency rule.” FCC has acknowledged that it has not received consistent information in response to its requests for comments. For instance, in its 2010 *Open Internet* Order, FCC states that despite broad agreement that broadband providers should disclose information sufficient to enable end users and content providers to understand the capabilities of broadband services, commenters disagree about the appropriate level of detail required to achieve this goal. As a result, FCC decided to continue to allow ISPs flexibility in the implementation of the transparency rule while providing guidance regarding acceptable disclosure methods. Similarly, in its 2015 *Open Internet* Order, FCC noted that despite its efforts to seek comment on this issue, the record was lacking with respect to specific details on how such a disclosure should be formatted. Thus, as previously mentioned, FCC asked its Consumer Advisory Committee to propose a disclosure format.

As noted above, in the 2014 *Open Internet* NPRM, FCC cited consumer complaints as a basis for tentatively concluding that the transparency rule should be strengthened. However, in the NPRM FCC also acknowledged that its analysis of consumer complaints provided limited insight into the issues that consumers were experiencing. Specifically, FCC stated that since the transparency rule took effect, it had received a “significant number” of consumer complaints about provider speeds, charges, and other practices that the rule was designed to disclose. However, FCC also stated that in some cases, it is difficult to discern from the complaints

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“whether the consumer’s frustration is with slow speeds or high prices generally, or instead with how the service as actually provided differs from what the provider has advertised.” Moreover, because consumer complaints reflect the perspective of a non-representative sample of consumers—i.e., those who have experienced broadband issues and have chosen to report those issues to the FCC—they do not fully capture the effectiveness of FCC’s efforts for a broader range of consumers. Consequently, several *Open Internet* comments we reviewed filed by ISPs and industry associations questioned FCC’s reliance on complaints as a basis for decision-making.

In addition, we have previously noted concerns with FCC’s complaint process.<sup>35</sup> In 2009, we found that many wireless phone service consumers were not aware that they could file complaints with FCC when they encountered problems. We also found that FCC did not complete in-depth analyses of consumer complaints and lacked goals and measures that clearly identified the intended outcomes of its complaint-processing efforts. As a result, we noted that FCC may not be aware (1) of emerging trends in consumer problems, (2) if specific rules are being violated, or (3) if additional rules are needed to protect consumers. We made a number of recommendations to help address these issues, and FCC has indicated that it is in the process of reforming the agency’s complaint process. For example, in January 2015, FCC launched a new online consumer-help center. According to FCC, the online center will make it easier for consumers to file complaints with FCC, improve communications between consumers and FCC representatives, and help streamline FCC’s process for synthesizing and analyzing trends in consumer complaints. While these steps may enhance FCC’s ability to assess the effectiveness of its efforts among the subset of consumers who file complaints, they will not provide FCC information regarding the effectiveness of its efforts for a broader range of consumers.

Without consistent and complete information regarding the effectiveness of its efforts to provide consumers with broadband performance information, FCC’s ability to evaluate its efforts and make performance-based decisions about these efforts is limited. In addition, FCC may find it difficult to convince stakeholders that enhancements to its transparency

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<sup>35</sup>GAO, *Telecommunications: FCC Needs to Improve Oversight of Wireless Phone Service*, [GAO-10-34](#) (Washington, D.C.: Nov. 10, 2009).

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rule and MBA program are warranted. As we reviewed industry groups' *Open Internet* comments, we found many stating that FCC did not provide adequate evidence that ISPs' disclosures under the transparency rule were ineffective and that enhancements or changes to the rule were needed. For example, Cisco, an equipment provider, stated that FCC's concerns regarding the accuracy of information some consumers received under the transparency rule do not imply that additional disclosures are called for, but rather that the commission may need to enforce the requirements instead.

In contrast to the approaches FCC typically relies on to evaluate the effectiveness of its efforts to provide consumers with broadband performance information, other government entities have undertaken extensive, qualitative, and quantitative consumer research to evaluate the effectiveness of their efforts to inform consumers and ensure that consumers' information needs are being met. For example:

- Ofcom—the United Kingdom's (UK) communications regulatory agency—has conducted qualitative and quantitative research to determine consumers' use and understanding of ISPs' traffic management information and the effectiveness of a standardized form that all major UK ISPs voluntarily use to publish their traffic management information. For instance, in 2013, Ofcom commissioned a study that involved qualitative workshops with 135 participants and a representative survey of UK broadband consumers. The study found that consumers had problems understanding some aspects of the standardized form and suggested several potential improvements that could make the information more understandable to consumers, such as adding a summary to the form explaining the relevance of traffic management policies to broadband products.
- The U.S. Consumer Financial Protection Bureau (CFPB) conducted qualitative and quantitative consumer research when revamping mortgage disclosure forms. The CFPB tested the prototype of the revised disclosure form through 10 rounds of qualitative testing in nine cities. After issuing the revised forms the CFPB also conducted a large-scale quantitative validation test—that included 858 consumers in 20 locations—to compare the revised forms with the disclosures that were currently in use.

Some stakeholders we spoke with and whose comments we reviewed also suggested that FCC should undertake consumer research to inform and evaluate its efforts to provide consumers with broadband performance information. In 2009, the Federal Trade Commission filed comments with FCC stating that research has shown that well-designed

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standardized disclosures can improve consumer understanding and facilitate competition; however, to be most effective, these disclosures should be developed and revised based on controlled, quantitative, objective tests of consumer understanding. In addition, representatives from one industry association we spoke with stated that FCC’s analytical framework, which largely consists of requesting and reviewing stakeholder comments, is not consumer-centric and may not be the most productive process for obtaining an accurate representation of consumers’ information needs. These representatives noted that given the time, effort, and money ISPs expend to collect broadband performance data for FCC’s MBA program, it is important to make sure that the data are presented in a way that is meaningful to consumers. In their view, FCC should also be conducting consumer research, such as focus groups, to make sure that its MBA effort produces a report that consumers can understand. According to FCC officials, FCC’s goal is to improve the accessibility, accuracy, and relevance of the broadband performance information available to consumers. Because consumers’ decision-making processes are complex and can vary, FCC has not attempted to formally evaluate whether its efforts to provide consumers with broadband performance information are meeting consumers’ needs. Officials also told us that they do not believe this type of research has been conducted outside of FCC.

### FCC Lacks Performance Goals and Measures to Monitor Its Efforts to Inform Consumers

FCC’s current strategic plan includes strategic objectives related to informing consumers about broadband networks—reflecting its position that informed consumers help facilitate competition in the broadband market. Specifically, FCC includes “ensure effective policies are in place to promote and protect competition” and “take action where competition is not sufficient to protect the public interest, including ensuring that consumers remain informed” as two of its 17 strategic objectives and states that it will continue to engage consumers through its outreach and education initiatives to facilitate informed choice in the competitive communications marketplace. However, FCC does not include any performance goals under these strategic objectives that define desired outcomes for its efforts to provide consumers with broadband performance information, such as its transparency rule and MBA program. Consequently, FCC also lacks relevant performance measures under these strategic objectives that would allow it to monitor the impact and effectiveness of its efforts. We have previously reported that effective performance goals and measures possess certain characteristics. These include the following: 1) performance goals should clearly define the organization’s desired outcomes, and 2) each performance goal should have a few performance measures that clearly tie back to the goal, cover

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key performance dimensions, and take different priorities into account.<sup>36</sup> Without performance goals and measures that allow FCC to monitor its progress on its goals related to providing consumers with broadband performance information, FCC has limited assurance that its efforts to provide consumers with broadband performance information are effective and meeting consumers' needs. In addition, FCC cannot demonstrate that it is achieving its objectives to ensure consumers are informed as envisioned in its strategic plan.

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## Conclusions

In recent years, the broadband market has undergone significant changes. More Americans are accessing broadband and relying on their broadband service for an increasingly diverse range of uses, including education, medicine, public safety, and entertainment. As broadband traffic grows, consumers' broadband performance issues—such as slower than expected speeds and disruptions to video-streaming services—may simultaneously become more prevalent and more critical to resolve. However, broadband performance can be affected by a number of complicated, technical factors that are not readily apparent to most consumers.

FCC has maintained that informed consumers play an important role in facilitating competition in the broadband market and has undertaken efforts to provide consumers with broadband performance information, such as the transparency rule and the MBA program. However, FCC lacks useful performance information and relevant performance goals and measures to evaluate the effectiveness of these efforts and monitor their impact. As a result, FCC cannot be assured that its efforts to provide consumers with broadband performance information are effective and meeting consumers' needs, and its ability to make performance-based decisions will remain limited. Moreover, FCC may find it difficult to convince stakeholders that its enhancements to the transparency rule are warranted and address their concerns that FCC has not provided adequate evidence to support these enhancements.

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<sup>36</sup>GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act*, [GAO/GGD-96-118](#) (Washington, D.C.: June 1, 1996).

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## Recommendations for Executive Action

To help FCC determine whether its efforts to provide consumers with broadband performance information are effective and meeting consumers' needs, and whether additional efforts—such as a standardized label suggested by FCC's transparency working group—could benefit consumers, FCC should take the following two actions:

1. conduct or commission research on the effectiveness of FCC's efforts to provide consumers with broadband performance information and make the results of this research publicly available, and
2. establish performance goals and measures under the agency's relevant strategic objectives that allow it to monitor and report on the impact and effectiveness of its efforts.

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## Agency Comments

We provided a draft of this report to FCC for review and comment. In its written comments, reproduced in appendix II, FCC generally concurred with our recommendations. FCC described its various consumer outreach and education efforts and agreed that extensive research would be helpful in evaluating the effectiveness of its efforts to inform consumers. FCC stated that it will evaluate consumer research on broadband performance and move expeditiously to take action. FCC also stated that it would use consumer research, consumer comments, and in-person feedback at consumer-related events to establish performance measures that will allow it to monitor and report on its progress. FCC also provided an appendix with details about its outreach efforts as well as technical comments that were incorporated as appropriate.

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As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the Chairman of the Federal Communications Commission and the appropriate congressional committees. In addition, this report will be available at no charge on GAO's website at <http://www.gao.gov>.

If you or your staff has any questions about this report, please contact me at (202) 512-2834 or [goldsteinm@gao.gov](mailto:goldsteinm@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last

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page of this report. GAO staff who made key contributions to this report are listed in appendix III.

A handwritten signature in black ink, appearing to read 'Mark Goldstein', with a long, sweeping horizontal line extending to the right.

Mark Goldstein  
Director, Physical Infrastructure

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# Appendix I: Objectives, Scope, and Methodology

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The objectives of this report were to examine (1) what information is currently available to consumers regarding broadband performance and the limitations of this information, if any, and (2) how does the Federal Communications Commission (FCC) evaluate its efforts to provide consumers with broadband performance information?

To assess what information is currently available to consumers regarding broadband performance and any limitations of this information, we reviewed prior GAO reports on this issue, relevant FCC rulemaking proceedings, including its 2014 *Open Internet* proceeding, FCC's transparency rule and Measuring Broadband America reports, Internet service providers' (ISP) websites, information provided by companies, including Netflix and Google, and third-party sites that provide broadband performance information to consumers. We also conducted a literature review to identify articles and studies relevant to broadband performance measurement and disclosure of broadband performance information to consumers. We used key-word searches to identify peer-reviewed articles and other work in relevant databases and reviewed the websites of researchers identified by FCC as conducting work relevant to our review. We also interviewed representatives from FCC, public-interest and consumer-advocacy groups, industry associations, content or equipment providers, and broadband providers. We identified stakeholders to interview based on our review of comments filed in FCC's 2014 *Open Internet* and related proceedings, as well as based on recommendations from other organizations we interviewed. Finally, we reviewed a judgmental sample of comments filed in FCC's 2014 *Open Internet* proceeding. In this proceeding, FCC requested comment on the effectiveness of its efforts to provide broadband performance information to consumers, including its transparency rule and its Measuring Broadband America program, and its proposed enhancements to these efforts. We ran key-word searches that included terms related to transparency and disclosure for consumers to identify relevant comments, and selected comments from a variety of stakeholders, including public interest groups, ISPs, content providers, trade associations, and consumer representatives. We reviewed these comments to identify statements regarding the effectiveness of FCC's efforts to provide broadband performance information to consumers, including comments supporting and opposing FCC's proposed enhancements to these efforts.

To determine how FCC evaluates its efforts to provide consumers with broadband performance information, we interviewed FCC officials regarding their efforts to provide consumers with broadband performance information and evaluate and monitor the effectiveness of these efforts

and reviewed relevant FCC documents, including its strategic and performance plans, consumer surveys, and resources available to consumers on FCC's website. We also reviewed FCC's requests for comment on consumers' information needs and the effectiveness of FCC's efforts to provide consumers with broadband performance information, as well as selected comments filed in response to these proceedings (as described above). To determine what additional actions, if any, FCC could take to evaluate its efforts to provide consumers with broadband performance information, we interviewed representatives from the stakeholder groups identified above, as well as officials from the Federal Trade Commission and National Telecommunications and Information Administration regarding their efforts to inform consumers about broadband issues and to evaluate the effectiveness of those efforts. In addition, we reviewed reports and studies on consumer disclosures conducted by FCC's Transparency Working Group; foreign telecommunications-regulatory bodies, including those in the United Kingdom and European Union; and other federal agencies, such as the Consumer Financial Protection Bureau. We also reviewed prior GAO reports on FCC and results-oriented management and compared FCC's use of performance information and measures to performance management best practices outlined in previous GAO work.

We conducted this performance audit from July 2014 to April 2015 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

# Appendix II: Comments from the Federal Communications Commission



Federal Communications Commission  
Washington, D.C. 20554

April 2, 2015

Mark L. Goldstein  
Director, Physical Infrastructure Issues  
Government Accountability Office  
441 G Street NW  
Washington, DC 20548

Dear Mr. Goldstein:

Thank you for the opportunity to review the Government Accountability Office (GAO) draft report regarding the Commission's efforts to inform consumers about broadband performance.<sup>1</sup> As detailed below, the Commission, through the outreach activities of the Consumer and Governmental Affairs Bureau (CGB) is in touch with thousands of consumers each year on broadband issues through the Bureau's participation in consumer-related tradeshows, attendance at conferences, creation of educational materials, and interaction with consumers through the Internet. More recently, in the *Open Internet* proceeding, the Commission responded to consumer concerns by (among other things) adopting rules prohibiting broadband providers from blocking or throttling content, and adopted enhancements to the transparency rule targeted at increasing transparency on broadband performance. The Commission is dedicated to expanding the information it provides to consumers on broadband performance and welcomes suggestions on making improvements to that outreach, including measuring the effectiveness of the information consumers receive.

GAO's draft report provides an overview of how consumers access broadband performance information from several sources, including data from both Internet service providers (ISPs) and the Commission. GAO examined "(1) broadband performance information available to consumers and its limitations, if any; and (2) FCC's actions to evaluate its efforts to provide consumers with broadband performance information."<sup>2</sup> The draft report recommends that the Commission conduct or commission research on the effectiveness of its efforts, make that research publicly available, and establish performance measures for monitoring and reporting on these efforts.<sup>3</sup> We understand this concern and address below our efforts to conduct meaningful outreach to consumers as well as prospectively putting performance measures into place that would capture the effectiveness of these efforts.

<sup>1</sup> GAO Draft Report, "Broadband Performance: Additional Actions Could Help FCC Evaluate its Efforts to Inform Consumers," April 2015 (GAO Report).

<sup>2</sup> *Id.* at 3.

<sup>3</sup> *Id.*

By way of background, the Commission, through CGB, develops and implements consumer outreach and education policies, goals and objectives, and ensures that the commission has the benefit of a wide spectrum of information and viewpoints in its decision-making processes. CGB plans, develops, and conducts consumer outreach and education initiatives to inform the public about important Commission regulatory programs. Our efforts in the area of broadband performance began with the development of the *Connect America: The National Broadband Plan*, released March 2010, which provided a strategic framework for the Commission's broadband program. A key element in development of the *National Broadband Plan* was a comprehensive survey on consumer adoption and usage of broadband services as well as factors either favoring or inhibiting adoption.<sup>4</sup> Since then, the Commission has launched and maintained four major suites of Web pages focused on broadband outreach and consumer engagement. These include [broadband.gov](http://broadband.gov), our series of *Measuring Broadband America (MBA)* wireline reports, a smart-device app for consumers to measure their own mobile broadband speed, as well as an assortment of consumer guides. The total number of pageviews for our primary broadband-related Web pages for the five-year period is in excess of 6.6 million. In addition, in the past six years, we have posted more than 200 broadband-related videos to our FCC YouTube channel. The number of views per video varies, with most in the range of 100-1,000 views. The most popular videos include the unveiling of the National Broadband Plan in March 2010 (29,448 views) and a November 2009 field hearing at Gallaudet University featuring actress Marlee Matlin (34,446 views).

During that same period, the Commission conducted over 250 instances of outreach to consumers through exhibits, speaking engagements, and workshops.<sup>5</sup> While we interacted with many consumers personally at these events, each event provides the opportunity to reach thousands of consumers indirectly. For example, at an industry show such as the Consumer Electronics Show, Commission staff speaks with several thousand consumers over several days. Many of the consumers and show attendees pass on the consumer information when they return their companies, families, and friends, which has the potential to significantly multiple the number of consumers reached through each event. The information the Commission distributes may also be reprinted or referenced in trade association or consumer group newsletters and email distribution lists.

As the GAO Report demonstrates, while it has been making broadband performance information available to consumers during the past several years, the Commission has repeatedly sought to evaluate whether consumers found helpful the broadband performance information that was available.<sup>6</sup> In the recent *Open Internet* proceeding, the Commission received almost four million comments, many of which were from consumers who raised an array of issues, including those pertaining to broadband performance. Individual consumers overwhelmingly spoke out in favor of adopting rules to protect an

<sup>4</sup> *Broadband Adoption and Use in America*, OBI Working Paper Series No. 1 (February 2010), see <http://transition.fcc.gov/national-broadband-plan/broadband-adoption-in-america-paper.pdf>, last accessed on 3/26/2015

<sup>5</sup> See Appendix for a detailed listing of outreach events in which Commission staff participated.

<sup>6</sup> *Id.* at 17-20.

open Internet and for reclassifying broadband Internet access service under Title II. The Commission listened, and took those very actions in the *2015 Open Internet Order*.

To understand what consumers found helpful on broadband performance, the Commission has relied primarily on soliciting comments from consumers and consumer advocacy groups in rulemaking proceedings because of the abundance of broadband-related proceedings in the past several years, as noted by GAO.<sup>7</sup> GAO states that “[i]n contrast to the approaches FCC typically relies on to evaluate the effectiveness of its efforts to provide consumers with broadband performance information, other government entities have undertaken extensive, qualitative and quantitative consumer research to evaluate the effectiveness of their efforts to inform consumers and ensure that consumers’ information needs are being met.”<sup>8</sup> We agree that extensive research would be helpful in this regard. The Commission has commissioned research on consumers and broadband in the past. In 2009, the Commission conducted a survey of 5,005 Americans in an effort to “understand the state of broadband adoption and use, as well as barriers facing those who do not have broadband at home.”<sup>9</sup> Per GAO’s recommendation, the Commission will evaluate consumer research on broadband performance in the near term and move expeditiously to take action.<sup>10</sup>

The Commission also looks forward to developing performance measures regarding the effectiveness of our efforts to provide consumers with broadband performance information. While not precisely on point, the Commission currently has two related performance measures in effect, as developed at the end of FY 2014 and published in February 2015 within the 2015-2018 FCC Strategic Plan. Under Strategic Objective 1.2, which ensures effective policies are in place to promote and protect competition and remove barriers to investment, there is a performance target to “develop and publish reports, by deadlines established in legislation or Commission policy, that provide information concerning competition in the telecommunications, broadcast, cable, commercial wireless, and satellite industries, and develop measures to address concerns where appropriate.” The competition reports contemplated by this target could encompass performance information. In addition, under Strategic Objective 3, which seeks to maximize availability of broadband to all, including low income Americans, those in rural areas and tribal lands, and individuals with disabilities there is an outreach component within the first performance target (pertaining to universal service). With the benefit of research in the future, consumer comments in recent broadband-related proceedings, and in-person feedback at consumer-related events, the Commission will look to establish performance measures that are more specific to GAO’s recommendation that the measures provide a means through which our progress can be monitored and reported.

<sup>7</sup> *Id.*

<sup>8</sup> *Id.* at 22-23.

<sup>9</sup> *Broadband Adoption and Use in America*, OBI Working Paper Series No. 1 (February 2010).

<sup>10</sup> The Commission, like other federal agencies, must comply with the Paperwork Reduction Act (PRA), which requires every Federal agency to obtain approval from the Office of Management and Budget (OMB) for any planned information collections, including surveys, forms, questionnaires and interviews of 10 or more persons. 5 C.F.R. §1320.5 (2012). The approval process takes at least 120 days, which includes a period for public comments. Even if the Commission were to commission a survey through an independent third-party, which would be dependent on the availability of funding, PRA approval would still be necessary. 5 C.F.R. §1320.3 (2012).

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Communications Commission**

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Once again, we appreciate GAO's recommendations. We agree that the Commission should continue to provide information to consumers about broadband performance. We will take all appropriate steps to conduct research, make those results publicly available, and establish performance measures prospectively. We look forward to working with you on this matter in the future.

Sincerely,



Kris Anne Monteith  
Acting Chief  
Consumer & Governmental Affairs Bureau

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# Appendix III: GAO Contact and Staff Acknowledgments

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## GAO Contact

Mark L. Goldstein, (202) 512-2834 or [goldsteinm@gao.gov](mailto:goldsteinm@gao.gov).

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## Staff Acknowledgments

In addition to the contact named above, Teresa Anderson, Assistant Director; Steve Brown; Crystal Huggins; Bert Japikse; Sara Ann Moessbauer; Jaclyn Nidoh; Josh Ormond; Cheryl Peterson; Amy Rosewarne; and Hai Tran made key contributions to this report.

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