EPA Docket Center homepage at *www.epa.gov/epahome/dockets.htm*.

Docket: All documents in the docket are listed in the *www.regulations.gov* index. Although listed in the index, some information is not publicly available, e.g., CBI or other information for which disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *www.regulations.gov* or in hard copy at the EPA Docket Center, EPA West, Room 3334, 1301 Constitution Ave. NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Docket Center is (202) 566–1742.

FOR FURTHER INFORMATION CONTACT: Reid J. Rosnick, EPA Office of Radiation and Indoor Air, (202) 343–9290, *rosnick.reid@epa.gov*.

SUPPLEMENTARY INFORMATION:

A. What should I consider as I prepare my comments for the EPA?

1. *Tips for Preparing Your Comments.* When submitting comments, remember to:

- Identify the rulemaking by docket number, subject heading, **Federal Register** date and page number.
- Explain why you agree or disagree; suggest alternatives and substitute language for your requested changes.
- Describe any assumptions and provide any technical information and/or data that you used.
- If you estimate potential costs or burdens, explain how you arrived at your estimate in sufficient detail to allow it to be reproduced.
- Illustrate your concerns with specific examples and suggest alternatives.
- Explain your views as clearly as possible, avoiding the use of profanity or personal threats.
- Make sure to submit your comments by the comment period deadline identified.

B. How can I get copies of this document, the proposed rule and other related information?

The EPA has established a docket for this action under Docket ID No. EPA–HQ–OAR–2008–0218. The EPA has also developed a Web site for the NPRM at: *www.epa.gov/radiation/neshaps/subpartw/rulemaking-activity.html*. Please refer to the original **Federal Register** notice on the NPRM for detailed information on accessing information related to the notice.

In response to requests for an extension, we are extending the public comment period for this NPRM through October 29, 2014. This extension will provide the public additional time to provide comment on updating this standard.

Dated: July 11, 2014.

Janet G. McCabe,

Acting Assistant Administrator, Office of Air and Radiation.

[FR Doc. 2014–17135 Filed 7–18–14; 8:45 am]

BILLING CODE 6560–50–P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 54

[WC Docket No. 10–90; DA 14–944]

Wireline Competition Bureau Announces Posting of Broadband Data From Urban Rate Survey and Seeks Comment on Calculation of Reasonable Comparability Benchmark for Broadband Services

AGENCY: Federal Communications Commission.

ACTION: Proposed rule.

SUMMARY: In this document, the Wireline Competition Bureau (Bureau) announces the posting of the fixed broadband services data collected in the 2013 urban rate survey, and explanatory notes regarding the data, on the Commission's Web site. The Bureau also proposes a specific methodology for calculating the reasonable comparability benchmark for fixed broadband services which would result in a broadband benchmark that ranges from $68.48 to $71.84 for services meeting the current broadband performance standard of 4 Mbps downstream/1 Mbps upstream, with the specific benchmark depending on the associated usage allowance.

DATES: Comments are due on or before August 20, 2014.

ADDRESSES: Interested parties may file comments on or before August 20, 2014. All pleadings are to reference WC Docket No. 10–90. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS) or by filing paper copies, by any of the following methods:

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: *http://fjallfoss.fcc.gov/ecfs2/*.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing.
- People with Disabilities: To request materials in accessible formats for people with disabilities (Braille, large print, electronic files, audio format), send an email to *fcc504@fcc.gov* or call the Consumer & Governmental Affairs Bureau at (202) 418–0530 (voice), (202) 418–0432 (tty).

For detailed instructions for submitting comments and additional information on the rulemaking process, see the **SUPPLEMENTARY INFORMATION** section of this document.

FOR FURTHER INFORMATION CONTACT: Suzanne Yelen, Wireline Competition Bureau at (202) 418–0626 or TTY (202) 418–0484.

SUPPLEMENTARY INFORMATION: This is a synopsis of the Wireline Competition Bureau's Public Notice (Notice) in WC Docket No. 10–90; DA 14–944, released June 30, 2014. The complete text of this document is available for inspection and copying during normal business hours in the FCC Reference Information Center, Portals II, 445 12th Street SW., Room CY–A257, Washington, DC 20554. The document may also be purchased from the Commission's duplicating contractor, Best Copy and Printing, Inc., 445 12th Street SW., Room CY–B402, Washington, DC 20554, telephone (800) 378–3160 or (202) 863–2893, facsimile (202) 863–2898, or via Internet at *http://www.bcpiweb.com.*

1. The Wireline Competition Bureau (Bureau) announces the posting of the fixed broadband services data collected in the 2013 urban rate survey, and explanatory notes regarding the data, on the Commission's Web site at *http://www.fcc.gov/encyclopedia/urban-rate-survey-data.* The Bureau (Bureau) also proposes a specific methodology for calculating the reasonable comparability benchmark for fixed broadband services. In the *USF/ICC Transformation Order,* the Commission required that as a condition of receiving Connect America Fund support, recipients must offer voice and broadband services in supported areas at rates that are reasonably comparable to rates for similar services in urban areas. The methodology proposed here would result in a broadband benchmark that ranges from $68.48 to $71.84 for services meeting the current broadband performance standard of 4 Mbps downstream/1 Mbps upstream, with the specific benchmark depending on the associated usage allowance.

2. Consistent with longstanding Commission precedent for the voice comparability benchmark, we will

compute the broadband comparability benchmark based upon a national average. Indeed, the Commission made clear that it expected the Bureau to use a national urban average.

3. The Bureau Staff Report included herein discusses three potential methods for determining the average urban rate using the data collected in the Survey: Simple rate statistics for specified subsamples; an average rate for offerings meeting a minimum level of service; and regression analysis. The Staff Report also presents the average plus two standard deviations for each approach, thus showing a potential reasonable comparability benchmark for broadband service under each approach. For illustrative purposes, the Staff Report also presents the relevant calculations if the minimum performance obligations were modified as proposed recently by the Commission.

4. The first approach calculates the average using a subsample of observations based solely on download speed, without regard to usage or upstream speeds. The second approach calculates the average by identifying the subset of observations that meet or exceed a minimum service level, and then for each provider that is captured in that sub-sample, computing the average based on the lowest rate offered by that provider that meets or exceeds the specified service level. The third approach uses a simple weighted linear regression model that takes into account the impact of three dimensions of service on rates: upload speed, download speed, and usage allowance, if any. We summarize below the results under the three approaches.

Method	Speed	Usage allowance	Average	Average + 2 standard deviations
Service Offerings Meeting 3 to <5 Mbps Downstream.	3 to <5 Mbps/any upload speed	Any	$47.48	$73.22
Service Offerings Meeting or Exceeding a Minimum Service Level (Upstream, Downstream, Usage).	4 Mbps/1 Mbps	100 GB	54.54	82.00
Linear Regression	4 Mbps/1 Mbps	100 GB	44.74	68.48
	4 Mbps/1 Mbps	250 GB	46.76	70.50
Analysis	4 Mbps/1 Mbps	unlimited	48.10	71.84

5. We propose to use the weighted linear regression model to calculate the average urban rate. Although the regression analysis is more complex than the other methods identified in the Staff Report, regression analysis is well suited to take into account the differences in speed and usage allowance among the service offerings in the sample (and thus reducing the likelihood of having the rates for dramatically higher-speed services increase the benchmark for lower-speed services). Further, we propose to use a subsample of data points to develop the regression, specifically, those data points with download speeds less than or equal to 15 Mbps. We propose to adopt a separate benchmark for services with differing usage levels. Thus, the reasonable comparability benchmark for a high-cost recipient offering a 4 Mbps/1 Mbps/100 GB offering would be $68.48; if that high-cost recipient chose to meet the Commission's broadband performance obligations with a 4 Mbps/1 Mbps/unlimited usage offering, its reasonable comparability benchmark would be $71.84. We seek comment on these proposals.

6. To the extent parties believe one of the other approaches to determining an average of the data collected in the Survey is preferable, they should explain with specificity the benefits of adopting an alternative approach. Is there some other method of calculating the average urban rate that would better account for the differences in speed and usage allowance among the service offerings?

Procedural Matters

A. Paperwork Reduction Act

7. This document does not contain proposed information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104–13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, *see* 44 U.S.C. 3506(c)(4).

B. Filing Requirements

8. Pursuant to §§ 1.415 and 1.419 of the Commission's rules, 47 CFR 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments are to reference WC Docket No. 10–90 and DA 14–944, and may be filed by paper or by using the Commission's Electronic Comment Filing System (ECFS).

▪ Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: *http://fjallfoss.fcc.gov/ecfs2/*.

▪ Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

▪ All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St. SW., Room TW–A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.s

▪ Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.

▪ U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street SW., Washington, DC 20554.

9. In addition, we request that one copy of each pleading be sent to each of the following:

(1) Jay Schwarz, Industry Analysis and Technology Division, Wireline Competition Bureau, 445 12th Street SW., Room 6–A134, Washington, DC 20554; email: *Jay.Schwarz@fcc.gov;*

(2) Alexander Minard, Telecommunications Access Policy Division, Wireline Competition Bureau, 445 12th Street SW., Room 5–A334, Washington, DC 20554; email: *Alexander.Minard@fcc.gov.*

10. People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an email to *fcc504@fcc.gov*

or call the Consumer & Governmental Affairs Bureau at 202–418–0530 (voice), 202–418–0432 (tty).

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

Federal Communications Commission.

Rodger Woock,

Chief, Industry Analysis and Technology Division Wireline Competition Bureau.

Wireline Competition Bureau Staff Report

Possible Methodologies for Establishing Reasonably Comparable Broadband Rates for Fixed Services

June 30, 2014

Introduction. In the *USF/ICC Transformation Order,* the Commission required that as a condition of receiving Connect America Fund support, recipients must offer voice and broadband services in supported areas at rates that are reasonably comparable to rates for similar services in urban areas. The Commission concluded that rural rates for broadband service would be deemed ''reasonably comparable'' to urban rates if those rates ''fall within a reasonable range of the national average urban rate for broadband service.'' It delegated authority to the Wireline Competition and Wireless Telecommunications Bureaus to conduct an annual survey of urban broadband rates in order to derive a national range of rates for broadband service. In the *USF/ICC Transformation FNPRM,* the Commission sought comment on whether using two standard deviations would be the appropriate methodology for determining reasonable comparability, or should another methodology be used.

The Wireline Competition Bureau (Bureau) is working to develop an approach for determining an upper range of rates that could be reasonably comparable to urban broadband prices for a broadband service with characteristics similar to a specified minimum download speed, upload speed and usage allowance. Our objective is to develop an approach that is flexible enough to take account any changes the Commission may make in the future regarding broadband performance obligations for recipients of Connect America funding.

Developing a methodology for setting a reasonably comparable broadband benchmark involves (1) defining terms and scope based on the *USF/ICC Transformation Order,* (2) creating a sampling plan, (3) processing the collected data, and (4) analyzing the data. We explain below each step in this process, specifying the decisions that the Bureaus have already made regarding the execution of the urban rate survey and identifying the options for analyzing the data that has been collected.

Implementation of the Survey—Definitions. In 2013, the Bureaus adopted the form and content of the urban rate survey. We decided to compute the ''national average urban rate for broadband service'' based on the mean of residential, non-promotional, advertised rates offered to potential new customers by firms in urban areas, i.e. list prices. Given this, we designed a survey and methodology to estimate this parameter. The specific statistical interpretation used for development of the survey and estimation from the data collected is given in the Appendix.

The Bureaus made the decision not to create a national average urban rate that blends rates derived from fixed and mobile data. Satellite broadband also was excluded from the sampling frame. The Bureaus made the decision not to include existing contracts, but instead to collect rates only for new offered service. The Bureaus made the decision to collect rates on all standalone service plans offered to residential customers. As a result, in our sample, for each plan offered, the provider reported the advertised download bandwidth, the advertised upload bandwidth, the usage allowance (if any), and the monthly rate.

The Bureaus made a decision to define urban rates based on whether the rate was offered in an urban census tract. A census tract was defined as urban if it contained any census-defined Urban Areas or Urban Clusters. Census tracts served as the geographic unit for which providers were asked to report residential broadband rates.

Survey Sample Selection. A sample of 500 survey units was randomly selected with replacement. These survey units were chosen by the Bureau's Industry Analysis and Technology Division (IATD) in a two-step process. First, 500 census tracts were randomly selected from all urban census tracts (as defined above). Second, for each of these selected census tracts a provider was chosen, using FCC Form 477 data. This census tract-provider pair constitutes a sampling unit for which a survey was sent. Each of these sampling steps is explained below.

The frame for the selection of urban census tracts was provided by the Excel file *''urbantracts_list_all.xls''* which listed 58,331 urban census tracts encompassing the 50 states, the District of Columbia, and Puerto Rico. The first phase in the sample selection process was to randomly select, using household weights, 500 census tracts with replacement from this list of urban census tracts. The selection was weighted proportionately by the number of households in the census tracts which was also provided in the file. The

selection was performed using the ''RandomChoice'' function in Mathematica. The selection process produced an Excel file ''urban tracts sample broadband.xls'' of 498 unique census tracts; two census tracts were each selected twice.

An Excel file (''broadband_v2'') listing Fixed Broadband service providers reporting subscribers in the 498 unique census tracts in the sample was prepared based on Form 477 December 2012 filings. The file also gave the number of residential connections each provider had in each census tract in the sample.

For each of the 500 census tracts in the sample, a service provider was randomly selected from the providers of Fixed Broadband service for that census tract as listed in ''broadband_v2'' using the ''RandomChoice'' function in Mathematica. Because different providers in the same census tract may offer service to substantially different numbers of households, the selection was weighted based on the number of residential subscribers for each provider in the census tract as now described.

A service provider was given weight = 1 if the provider had more than 7% of the total residential subscribers in the census tract. Otherwise, the provider was given the weight = 1/(N+1) where N is the number of providers with 7% or less of the total residential subscribers in the census tract. So, if the census tract had only one service provider with 7% or less of the total residential subscribers in the census tract, that service provider had weight 1/2 while all others had weight 1. If the census tract had two service providers each with 7% or less of the total residential subscribers in the census tract, those two service providers each had weight 1/3 while all others had weight 1.

Survey Data Collection. The Bureau contacted each provider that had been selected in the sampling stage. Each provider was asked to report rates for all standalone broadband plans in one or more census tracts. These providers were asked to report these rates via a specially-designed online system for which each provider was given login access. If a provider did not currently offer residential service in the census tract, the provider would indicate this and otherwise report nothing. Providers reported rates beginning December 17, 2013, continuing for several weeks thereafter.

Analysis of the Collected Data—Data Preparation. The Bureau received responses for 498 census tracts from 81 service providers. A total of 2211 rows of data were recorded. A total of 63 rows did not provide monthly rate data, for the following reasons:

- The row gave no indication that the census tract was served by the provider (54).
- The row was an erroneous entry (4).
- The row indicated service at a specified level was provided but no rates were given (3).
- The row indicated that service would be provided at a higher level in the future (1).
- The row was a duplicate entry (1).

In two separate cases identical rates were provided for the same service for the same provider in the same census tract; in each of these two cases, the two duplicate rows were merged into a single row. In addition, some service providers offered the same service in a census tract using digital subscriber line (DSL) and fiber to the home (FTTH) technologies reporting rates for each technology on separate rows. There were 41 such cases where the two rows were merged by averaging the rates for DSL and FTTH technologies. As a result, a total of 2105 monthly rates for broadband service were provided by 71 providers for 444 census tracts.

Values for reported download speeds ranged from 0.5 to 20480 and values for reported upload speeds ranged from 0.125 to 1024. All values were expected to be entered in Mbps, but some respondents evidently entered the relevant data as Kbps. For consistency, speed values entered in the survey were converted as shown in the table below:

Speed entered	Speed
0.256 or 256	0.25
0.384 or 384	0.375
0.512 or 512	0.5
0.768 or 768	0.75
1.024 or 1024	1
20.48 or 20480	20

The rates presented below represent the sum of the Monthly Charge, Surcharge, and Other Mandatory Charge (if any) reported by the respondents. In cases where a maximum and minimum charge was provided by the respondent, the average of the maximum and minimum was used.

Two service offering rates from Nitelog Inc were excluded from the analysis as apparent outliers. The rates were $1,250 and $1,999 for 25/25/Unlimited and 50/50/Unlimited using Fixed Wireless technology. The next highest reported monthly rate was $399.95 for 505/100/250 service.

One service offering from Digis LLC for 5/5/Unlimited service using Fixed Wireless technology at a monthly rate of $271.45 was also excluded from the analysis as an apparent outlier. The next highest reported monthly rate for 5/×/Unlimited service was $87.45 for 0.75 Mbps upload speed. The third highest reported monthly rate for 5/×/Unlimited service was $61.45 for 2 Mbps upload speed which was also offered by Digis LLC.

Potential Options. The goal is to develop an approach for determining an upper range of rates that could be reasonably comparable to the national average urban rate for similar broadband services. For purposes of the following discussion, the Bureau defined ''similar services'' as those with a download speed, upload speed, and usage allowance close to the minimum performance specifications of a download speed of 4 Mbps, an upload speed 1 Mbps, and a usage allowance of 100 GB per month. We note, however, that the options presented could be adapted for use with services offering differing speeds and/or usage allowances and thus would be flexible enough to take account any changes the Commission may make in the future regarding broadband performance obligations.

The following analysis explicitly does not select a specific methodology or benchmark. Rather, we present several potential methodologies for determining an upper range that could be adopted by the Bureau at a future date as a benchmark and discuss the benefits and challenges of each. The selection of a method and a value to select with that method are decisions that will be made after further public comment.

The first method is to calculate relatively simple rate statistics for specified subsamples; for example, all rates for observations with the specified download speed, or all rates for observations from providers that offer a service that meets or exceeds a minimum service level. Both of these approaches have the disadvantage of including and/or excluding observations that are close, but not identical to the specified broadband service requirement. A variant of these approaches would be to develop an average rate for a selection of similar services, while testing how sensitive the resulting range is to any given choice of similar services. A third approach uses regression analysis to account for the multiple dimensions of broadband service (i.e. download bandwidth, upload bandwidth, and usage allowance).

As a general note, in each methodology, we only present in the main body of the text the point estimates. However, it is important to remember that each point estimate has a statistical error and therefore has a

confidence interval around it. Thus, if the statistical error is known, we could say with 95% confidence that the population value lay within a specific interval of its estimate from the sample.

Rate Estimates for Services with the Specified Download Speed. The first approach we consider is the estimation of candidate benchmark values directly from rates from those observations for the specified download speed. Under this approach, we would specify the relevant download speed, say, 4 Mbps, and the relevant cutoff, say, the sample average plus two standard deviations. If rates were normally distributed, this upper bound would represent an unbiased estimate of the rate that was higher than 97.5% of all rates with the download speed of interest. For the reasons discussed below, we would not recommend this approach. However, it has expositional value because it illustrates both the nature of our sample and the problems in trying to define an upper range of rates.

Table 2 below provides estimates of monthly broadband rate statistics for different download speeds or download speed groups. ''Responses'' is the number of responses out of the 498 received used in the estimate. ''Number of Providers'' is the number of different providers represented in the observations. All of the remaining seven columns starting with ''Median Rate ($)'' contain weighted estimates; for each observation, the weight used was the sum of the weights described earlier for service providers in the census tract of the observation. These weights were used in all methodologies described in this document. ''% with Unlimited Usage Allowance'' is the weighted estimated percentage of offers for services at the specified speed that have an unlimited usage allowance. In Table 2 we present statistics combining all observations for services with download bandwidths between 3 and 4 Mbps. For the combined 3 through 4 Mbps grouping, the mean plus two standard deviations value is $73.22.

TABLE 2—RATE ESTIMATES WITHIN DOWNLOAD SPEED BANDS

Downloan speed (mbps)	Number of providers	Responses	Median rates ($)	Average rates ($)	Std dev rates ($)	Ave+2SD rates ($)	95% Quantile ($)	97.5% Quantile ($)	% With unlimited usage allowance
0–2	28	236	39.78	40.59	10.92	62.43	53.99	69.99	38
3–4	45	242	44.99	47.48	12.87	73.22	64.99	64.99	50
5	12	67	45.99	46.32	7.27	60.85	59.95	61.45	23
6	14	125	49.95	48.78	7.60	63.98	50.94	58.97	23
7	5	33	45.99	48.37	4.94	58.24	54.95	69.49	20
8	4	17	50.94	57.38	19.27	95.93	95.00	95.00	29
9	2	2	62.99	63.82	1.44	66.71	66.32	66.32	100
10	18	47	52.00	58.84	17.44	93.72	99.00	121.45	76
11–15	34	154	55.99	60.56	15.67	91.90	74.99	74.99	78
16–25	26	309	64.95	61.19	14.95	91.10	75.94	96.00	29
26–50	43	292	76.95	86.03	21.17	128.37	115.99	149.00	54
51–100	27	104	94.99	102.45	33.63	169.70	123.00	200.29	87
101–150	18	162	114.95	123.76	16.79	157.34	144.99	144.99	40
151–1000	13	75	304.99	281.91	69.52	420.95	399.95	399.95	82

The key drawback of this approach is that it only takes into consideration one dimension of the service (i.e. download bandwidth) even though *a priori* we would expect upload bandwidth and usage allowances also to be reflected in the price (for example, this approach would average together a 4/0.4/10 service with a 4/4/1,000 service, if both of those existed). The benefit of this approach, if not its practical usefulness, is that it is straightforward and easily understandable.

Rate Estimates for Service Offerings Meeting or Exceeding a Minimum Service Level. Another approach that focuses on urban rates that meet or exceed a specified minimum service level (MSL) would be to compute the average of the minimal monthly rate for each service provider that meets or exceeds the MSL. To illustrate this approach, a subset of the sample was created consisting of all rates for offerings that met or exceeded the MSL. Then, from this subset, the lowest monthly rate was found for each service provider. For each provider, each census tract with service offered at the provider's lowest rate was included in the estimate. The following table presents estimates of several statistics for monthly service rates based on the observations selected as described above with MSL=4/1/100 and for MSL=10/1/100.

TABLE 3—RATE ESTIMATES FOR SERVICE OFFERINGS MEETING OR EXCEEDING A MINIMUM SERVICE LEVEL

MSL	Providers	Observations	Median	Average	Ave+2SD	97.5% Quantile
4/1/100	64	353	$49.95	$54.54	$82.00	$89.00
10/1/100	59	255	54.99	58.05	84.15	79.95

The benefit of this approach is its simplicity and that it includes all providers offering service meeting or exceeding the MSL. The negatives of this approach are that:

- It incorporates observations into the benchmark for urban services with characteristics that are far above the MSL, which are not ''similar'' services; and
- it may exclude services that are very close to, but do not quite meet the MSL.

A More General Approach to Selecting Sub-samples. Both of the approaches just examined involve the selection of sub-samples for analysis (all those rates for services that deliver the minimum download speed, and the minimum rate for each provider that has

at least one service that meets or exceeds the MSL). However, in both cases observations below the MSL (or its proxy) are excluded. A variation on these approaches is to include observations for offerings with differing characteristics within a certain range or ranges below the chosen MSL as well as above the MSL. The challenge of doing so, however, is deciding what is the appropriate range that should be deemed ''similar'' to the specified performance standard.

Rate Estimates from a Weighted Linear Regression Model. The third approach is based on a weighted linear regression model. This has an important advantage over the use of simple averages in that it provides a formalized means of estimating the various degrees to which the different service characteristics (download speed, upload speed, and usage allowance) influence rates. However, it also requires similar decisions to those made above. Because inclusion of observations from services dramatically different from a MSL plan might influence the ultimate benchmark, it may be appropriate to use a subsample, that is, to fit a model using data only in the region of interest for the MSL. In particular, we found that standard deviations of rates with less than 15 Mbps download speed tend to be smaller than those at higher download speeds. Consequently, using a model fitting all the data as opposed to one fitting data using observations in the lower range of speeds could result in overestimation of the standard deviation appropriate to the MSL and consequently also the benchmark rate.

To illustrate this approach, we applied a multidimensional weighted linear regression technique to all services with download bandwidths of 15 Mbps or less. This sub-sample of the data encompassed 995 rates from 65 different providers. The rates in this sub-sample ranged from $11.46 to $151.45 with a weighted standard deviation of $14.22. We undertook a weighted linear regression fit based on the following model:

$$\text{Average Monthly Rate (\$)} = K_0 + K_D\,D + K_U\,U - K_A\,A$$

for download speed in Mbps (D), upload speed in Mbps (U), and usage allowance in GB (A = 1/UsageAllowance or 0 if unlimited usage) was used. We estimated the parameters as:

$$\text{Average Monthly Rate (\$)} = 41.247 + 1.02463\,D + 2.75597\,U - 335.676\,A.$$

The weighted R Squared was 0.30 and each estimated coefficient was significant at the 0.1% confidence level.

The table below shows the model's average monthly rate estimates for various service levels.

TABLE 4—ESTIMATES OF AVERAGE MONTHLY RATE BASED ON THE LINEAR REGRESSION MODEL

Speed (Mbps) down/up	Usage allowance (GB)		
	100	250	No limit
3/.5	$42.34	$44.36	$45.70
3/1	43.72	45.73	47.08
4/1	44.74	46.76	48.10
5/.5	44.39	46.41	47.75
5/1	45.77	47.78	49.13
6/.5	45.42	47.43	48.77
6/1	46.79	48.81	50.15
10/1	50.89	52.91	54.25

The table below shows the standard deviation of error for the average monthly rate estimates in Table 4.

TABLE 5—STANDARD DEVIATION OF ERROR IN ESTIMATES OF AVERAGE MONTHLY RATE IN TABLE 4

Speed (Mbps) down/up	Usage allowance (GB)		
	100	250	No limit
3/.5	$0.71	$0.44	$0.57
3/1	0.74	0.45	0.57
4/1	0.73	0.40	0.52
5/.5	0.74	0.43	0.54
5/1	0.73	0.39	0.49
6/.5	0.78	0.47	0.56
6/1	0.75	0.40	0.48
10/1	0.96	0.65	0.65

A 95% confidence interval for the estimates in Table 4 would be roughly +/− twice the values in Table 5.

Various quantile levels can be estimated using the following table with the equation

$$\text{Monthly Rate Quantile P} = \text{Average Monthly Rate} + Q_P\,SD$$

where SD is the weighted standard deviation about the regression fit ($11.87).

TABLE 6—QUANTILES OF THE STANDARD NORMAL DISTRIBUTION

P	Q_P
90%	1.282
95%	1.645
97.5%	1.960
99%	2.326

Using the equation above, the table below shows the model's average monthly rates plus twice the standard deviation for the same set of service levels as in Table 4; these values are roughly the 97.5% quantiles for the rates.

TABLE 7—ESTIMATES OF AVERAGE MONTHLY RATE PLUS 2 STANDARD DEVIATIONS BASED ON THE LINEAR REGRESSION MODEL

Speed (Mbps) down/up	Usage allowance (GB)		
	100	250	No limit
3/.5	$66.08	$68.10	$69.44
3/1	67.46	69.47	70.82
4/1	68.48	70.50	71.84
5/.5	68.13	70.15	71.49
5/1	69.51	71.52	72.87
6/.5	69.16	71.17	72.51
6/1	70.53	72.55	73.89
10/1	74.63	76.65	77.99

For example, using the above estimated regression model to set a broadband reasonable comparability benchmark for the minimum service characteristics based on the average rate plus twice the standard deviation:

- If the minimum broadband performance standard is 4/1 Mbps with a 100 GB usage allowance, then the reasonable comparability benchmark would be $68.48.
- If the minimum broadband performance standard is 10/1 Mbps with a 100 GB usage allowance, then the reasonable comparability benchmark would be $74.63.

Not surprisingly, these numbers are lower than the results of the second approach which includes observations that exceed the specified minimum service standard. These estimates from linear regression take into account various service characteristics, while the previous approach utilized observations for services with differing service characteristics without adjusting for those characteristics. We note, however, these are only examples.

Technical Background. The sample process was designed to estimate the mean and standard deviation of the distribution of available service rates for broadband service in urban areas. These estimates could then be used as input for establishing benchmarks; for example, the mean plus twice the standard deviation is a possible upper limit based on the approximate 97.5 percentile of a normal distribution.

At a conceptual level, the ''distribution of available service rates in urban areas'' could be captured through the following process:

1. For each household in an urban area in the United States, list all the service providers offering fixed broadband service to that household and the service rates they offer for each level of service.

2. Concatenate all the lists from each household into a single list.

The resulting list of rates is the distribution of available service rates in urban areas for fixed broadband service at various levels of service.

If we were to focus on the rates for a specific level of service, the mean and standard deviation of available rates would be

$$\bar{R} = \sum_{i=1}^{N} \sum_{j=1}^{J_i} R_{ij} / N_R$$

$$\sigma_R = \sqrt{\sum_{i=1}^{N} \sum_{j=1}^{J_i} \left(R_{ij} - \bar{R}\right)^2 / N_R}$$

where

R_{ij} = jth rate available to household i

J_i = number of rates available to household i

N = number of eligible households

N_R = Total number of available rates = $\sum_{i=1}^{N} J_i$

From a practical standpoint, an equivalent result may be obtained by surveying service providers offering the relevant service in urban areas to obtain data on their rates. In this frame, the equivalent mean of the distribution of available rates is obtained as the weighted sum of rates offered by service providers in each census tract. Similarly, the equivalent standard deviation of the distribution of available rates is obtained as the square root of the weighted sum of squared differences between the mean rate of the distribution and rates offered by service providers in each census tract.

$$\bar{R} = \sum_{i=1}^{U} \sum_{k=1}^{K_i} W_{ik} Y_{ik} / N_R$$

$$\sigma_R = \sqrt{\sum_{i=1}^{N} \sum_{k=1}^{K_i} W_{ik} (Y_{ik} - \bar{R})^2 / N_R}$$

where

Y_{ik} = rate offered in census tract i by service provider k

W_{ik} = number of households in census tract i offered service by service provider k

K_i = number of service providers offering service in census tract i

U = number of urban census tracts

W_i = Total number of available rates in census tract i = $\sum_{k=1}^{K_i} W_{ik}$

N_R = Total number of available rates = $\sum_{i=1}^{U} W_i$

In order to estimate the mean and the standard deviation, a sample of service providers offering fixed broadband service were surveyed for rates they offer in a sample of urban census tracts. The sampling process was as follows:

- A census tract i was randomly selected with probability H_i/H where H_i is the number of households in census tract i and H is the sum of the H_i over all census tracts.
- A carrier k was randomly selected from the K_i carriers offering service in census tract i with probability W_{ik}/W_i
- This process is repeated n = 500 times to obtain 500 sampling units. We note that sampling units could appear multiple times in the sample.

The mean of the rate distribution was estimated as the ratio of total dollars in rate offers to the total number of rates. We note that the total number of available rates is not known, so it must be estimated from the sample as well as the estimate of total dollars in rate offers. Consequently, an estimate of the mean of available rates based on this sample is

$$\hat{\bar{R}} = \left(\frac{\sum_{j=1}^{n} X_j / P_j}{n}\right) / \left(\frac{\sum_{j=1}^{n} Z_j / Q_j}{n}\right)$$

where

$X_j = W_{ik}\ Y_{ik}$ from the jth sampling unit (census tract i and carrier k),

P_j = probability of selecting the jth sampling unit = $(H_i/H)(W_{ik}/W_i)$ for the jth sampling unit,

Z_j = W_i from the jth sampling unit,

Q_j = probability of selecting the jth urban area = H_i/H)

The estimate of the mean can be simplified to

$$\hat{\bar{R}} = \frac{\sum_{j=1}^{n} F_j Y_j}{\sum_{j=1}^{n} F_j}$$

where Y_j is the rate Y_{ik} and F_j is W_i/H_i for the jth sampling unit.

The values for the W_i are not known. As described in the main text, weights between 0 and 1 were assigned to carriers in each census tract of the sample based on their share of residential subscribers in the tract. These weights are expressions of W_{ik}/H_i (the fraction of households carrier k offers service in census tract i) and therefore F_i is the sum of these weights for carriers in census tract i. Similarly, the estimate of the standard deviation is

$$\widehat{\sigma_R} = \sqrt{\frac{\sum_{j=1}^{n} F_j \left(Y_j - \hat{\bar{R}}\right)^2}{\sum_{j=1}^{n} F_j}}.$$

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