

Internet Access Services: Status as of December 31, 2018

Industry Analysis Division
Office of Economics & Analytics
September 2020



This report is available for reference in the FCC's Reference Information Center, Courtyard Level, 445 12th Street, SW, Washington, DC. Copies may be purchased by contacting Best Copy and Printing, Inc., 445 12th Street, SW, Room CY-B402, Washington, DC 20554, telephone (800) 378-3160, or via their website at www.bcpweb.com. The report can also be downloaded from the Internet Access Services Reports webpage at <https://www.fcc.gov/economics-analytics/industry-analysis-division/iad-data-statistical-reports>.

TABLE OF CONTENTS

SECTION 1: OVERVIEW & HIGHLIGHTS	1
Introduction.....	1
Total Connections	2
Figure 1 Fixed and Mobile Connections by Speed 2015-2018	2
Connections by Speed	3
Figure 2(a) Distribution of Fixed Connections by Downstream Speed.....	3
Figure 2(b) Distribution of Fixed Connections by Upstream Speed	4
Figure 3 Fixed Connections by Speed 2015-2018	5
Number of Providers by Census Block	6
Figure 4 Percentages of Developed Census Blocks in which Providers Report Deployment of Residential Fixed Broadband.....	6
Internet Access Subscribership	7
Figure 5 Fixed Connections 2003-2018	7
Other Report Highlights.....	8
 SECTION 2: SUMMARY STATISTICS - THE NATION	 10
SECTION 3: SUMMARY STATISTICS - THE STATES	28
SECTION 4: SUMMARY STATISTICS - COUNTIES AND CENSUS TRACTS	38
SECTION 5: CORRELATION RESULTS - DEMOGRAPHIC MEASURES.....	48
 Technical Notes	 55
Glossary	58

SECTION 1: OVERVIEW & HIGHLIGHTS

Introduction

This report summarizes information about Internet access connections in the United States as of December 31, 2018 as collected by FCC Form 477. For purposes of this report, Internet access *connections* are those in service, over 200 kilobits per second (kbps) in at least one direction, and reported to the FCC through Form 477.¹

The report includes data on total and residential Internet access connections by downstream and upstream speed, by technology, by geography, and over time. Section 2 of the report presents nationwide statistics, Section 3 provides state-level data, and Section 4 includes data on the subscribership differences among counties and census tracts.² In addition, Section 5 of the report includes an analysis of the correlations between subscribership ratios and various demographic measures.³ Maps depicting the number of fixed connections per 1,000 households by census tract are available online at <https://www.fcc.gov/reports-research/reports/internet-access-services-reports/internet-access-services-reports>.

¹ See the Technical Notes and Glossary at the end of this report for more-detailed information about the Form 477 data collection and the meaning of terms used in this report.

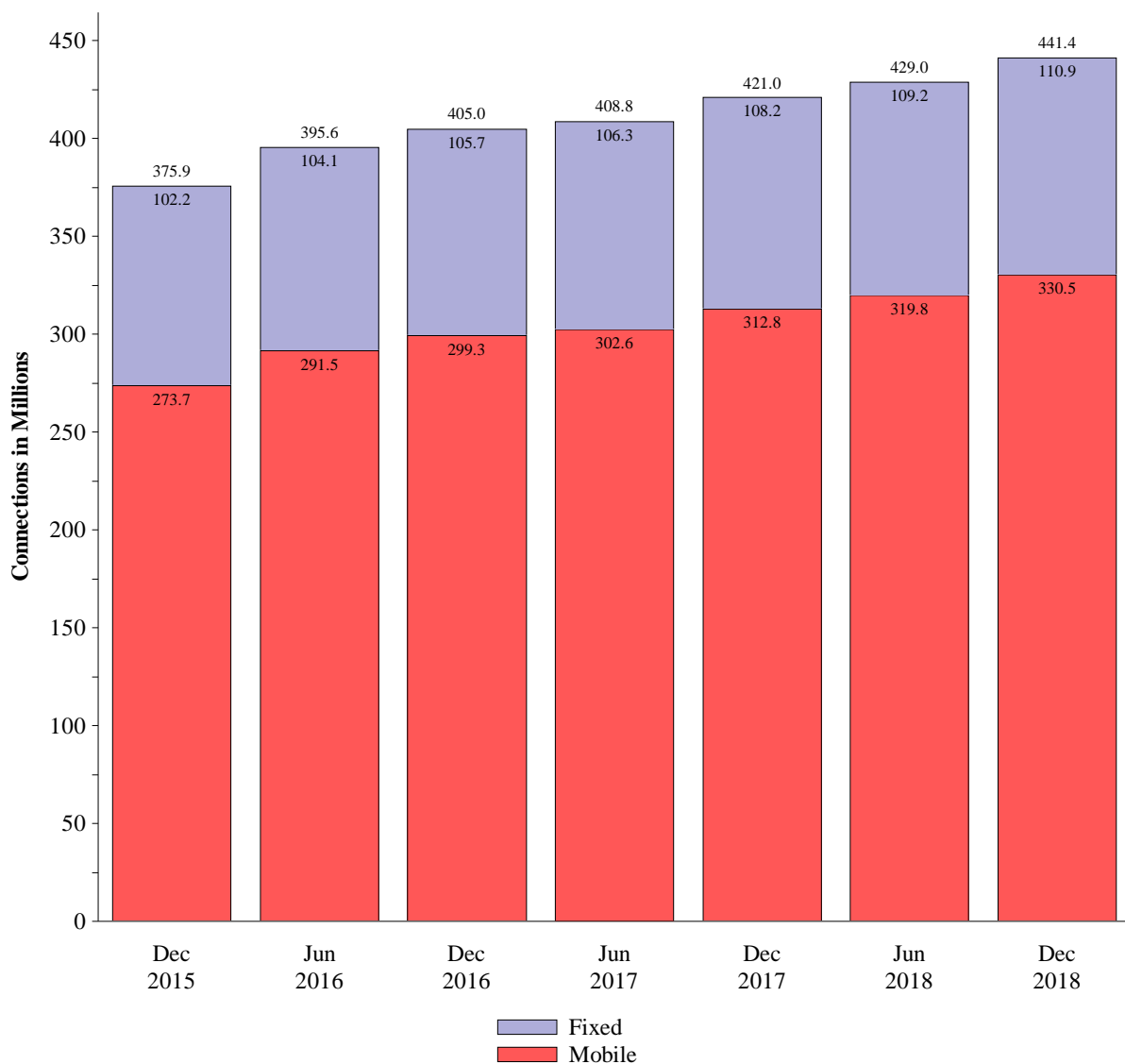
² The Commission began collecting census tract-level data for data as of December 31, 2008. *See High-Speed Services for Internet Access: Status as of December 31, 2008* (February 2010) at 1-4, available at <http://www.fcc.gov/encyclopedia/high-speed-services-internet-access-reports> (December 2008 High-Speed Report).

³ Publicly-available data that are too voluminous to include in this report are available online at <https://www.fcc.gov/general/fcc-form-477-additional-data>.

Total Connections

- As shown in Figure 1, total Internet connections increased by about 4.9% between December 2017 and December 2018 to 441 million. Mobile Internet connections increased 5.7% year-over-year to 331 million in December 2018, while fixed connections grew to 111 million – up about 2.5% from December 2017.
- We believe mobile Internet connections remain underreported by as much as 2% through June 2018 due to inadequate accounting of connections sold by downstream mobile virtual network operators (MVNOs).

Figure 1
Fixed and Mobile Connections 2015-2018

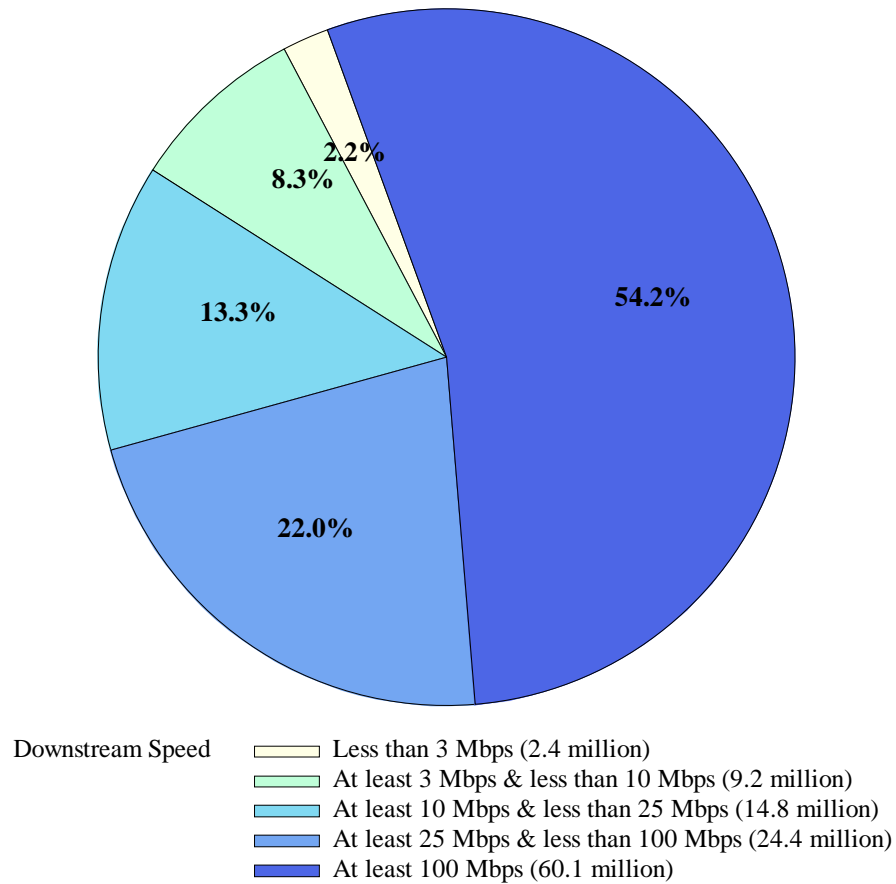


Some previously-published data may have been revised. Figures may not sum to totals elsewhere in this report due to rounding. Connections include both residential and business connections.

Connections by Speed

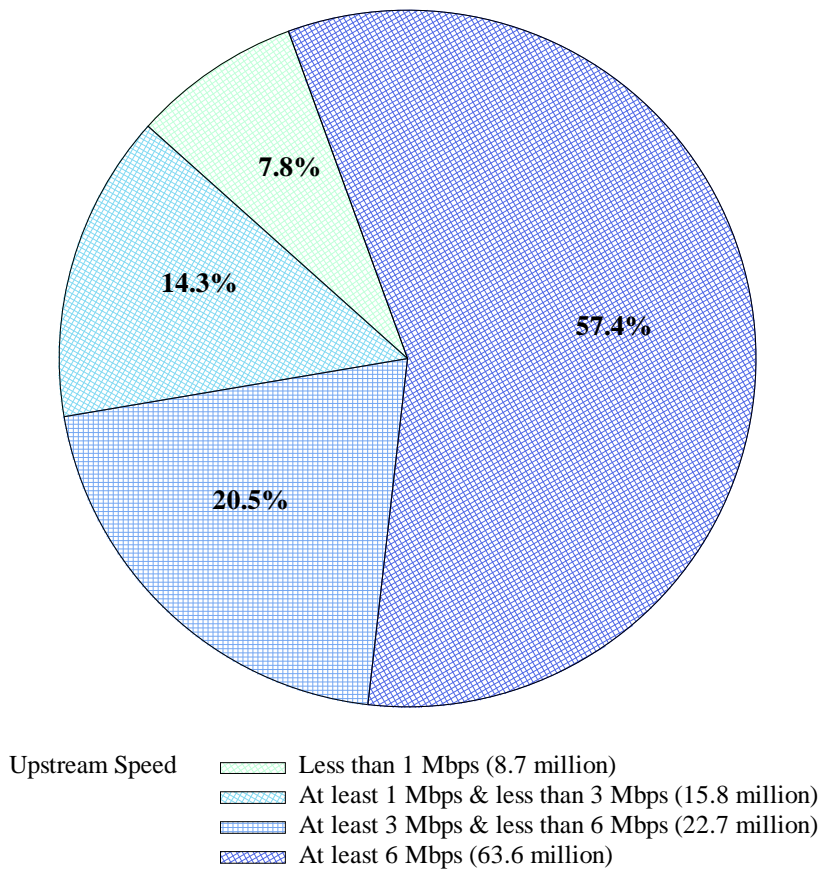
Fixed connections – downstream speeds. Figure 2(a) illustrates how the 111 million fixed connections reported for December 2018 were distributed across the five groups of *downstream speeds* defined by breakpoints at 3 Mbps, 10 Mbps, 25 Mbps, and 100 Mbps. See Figure 9 for more detail.

Figure 2(a)
Distribution of Fixed Connections (110.9 million) by Downstream Speed
as of December 31, 2018



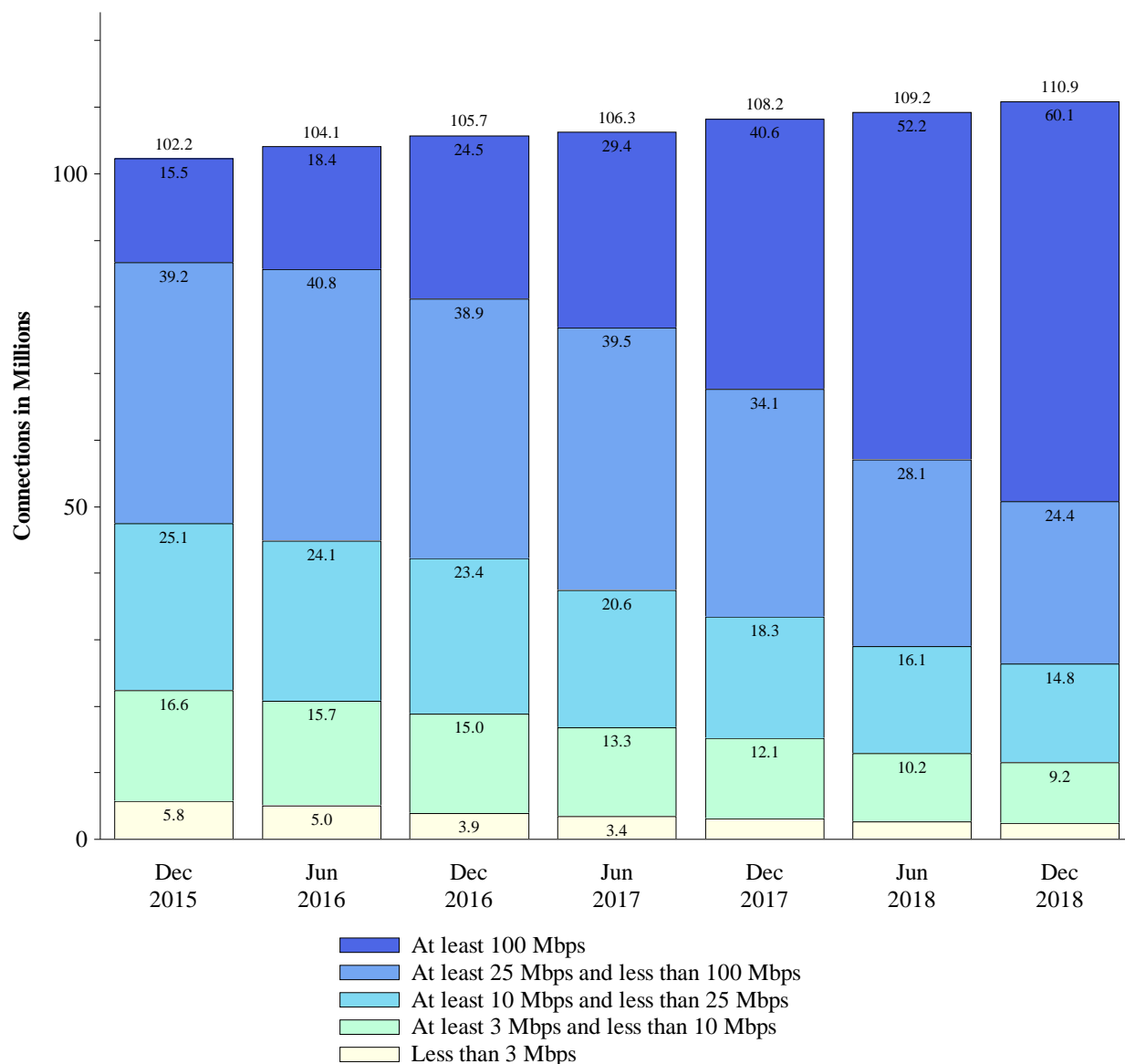
Fixed connections – upstream speeds. Figure 2(b) illustrates how the 111 million fixed connections reported for December 2018 were distributed across the four groups of *upstream speeds* defined by breakpoints at 1 Mbps, 3 Mbps, and 6 Mbps. See Figure 9 for more detail.

Figure 2(b)
Distribution of Fixed Connections (110.9 million) by Upstream Speed
as of December 31, 2018



Fixed connections by downstream speed over time. Figure 3 illustrates how the composition of total fixed Internet connections by different speed groups has changed from 2015 to 2018.

Figure 3
Fixed Connections by Downstream Speed 2015-2018



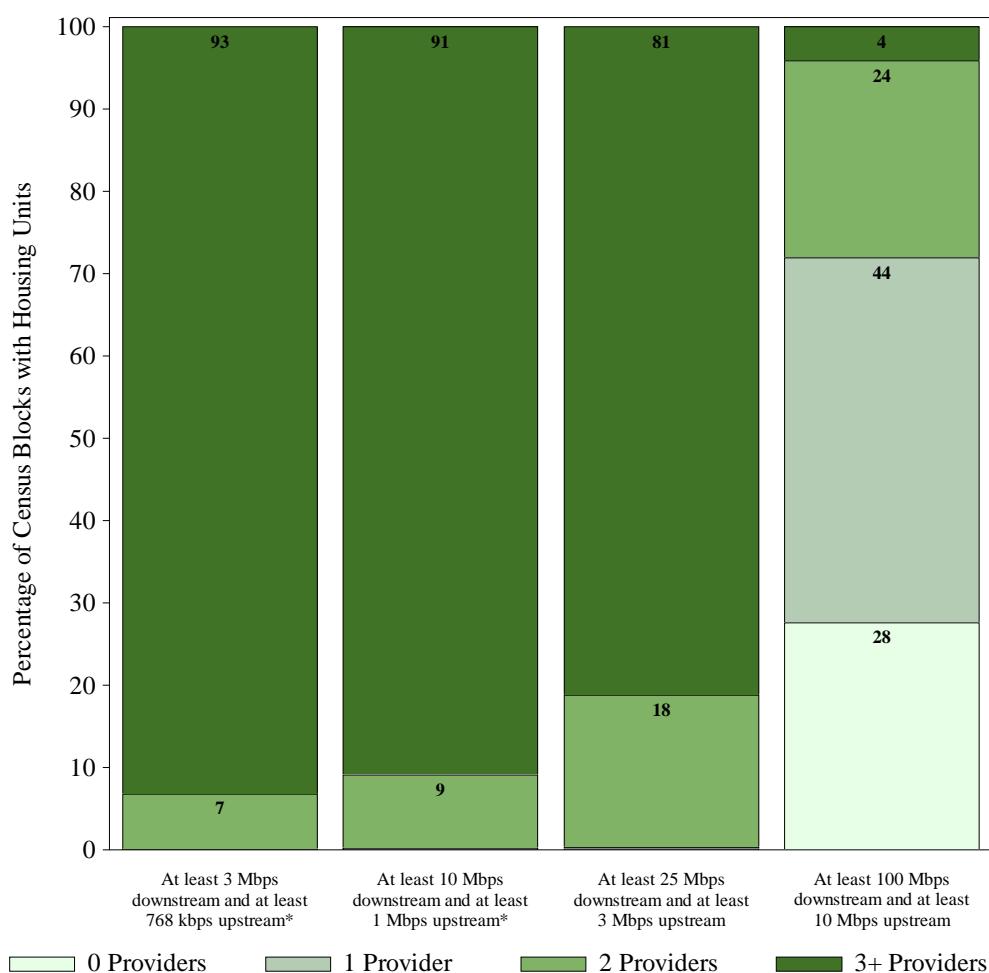
Some previously-published data may have been revised. Figures may not sum to totals elsewhere in this report due to rounding. Connections include both residential and business connections.

- The percentage of fixed connections with a downstream speed of at least 25 Mbps has grown from 54% (or 55 million connections) in December 2015 to 76% (or 85 million connections) in December 2018. Over the same period, the percentage of fixed connections with downstream speeds of less than 3 Mbps has decreased from 6% (or 6 million connections) in December 2015 to 2% (or about 2.4 million connections) in December 2018.

Number of Providers by Census Block

In Figure 4, we show the percentage of “developed” census blocks – blocks that contain housing units – with zero, one, two, or three or more fixed broadband providers offering residential Internet access service at different speeds in December 2018. This information is taken from the block-level Form 477 fixed broadband deployment data that the Commission began collecting in 2014.⁴ A provider that reports offering service in a particular census block may not offer service, or service at that speed, to all locations in the census block. Accordingly, the number of providers shown in Figure 4 does not necessarily reflect the number of choices available to a particular household and does not purport to measure competition.

Figure 4
Percentages of Developed Census Blocks in which Providers Reported the Deployment of Residential Fixed Broadband as of December 31, 2018



* Satellite service providers are included in this analysis. Satellite service providers report offering Internet access at bandwidths of at least 25 Mbps downstream and 3 Mbps upstream in 99.8% of developed census blocks.

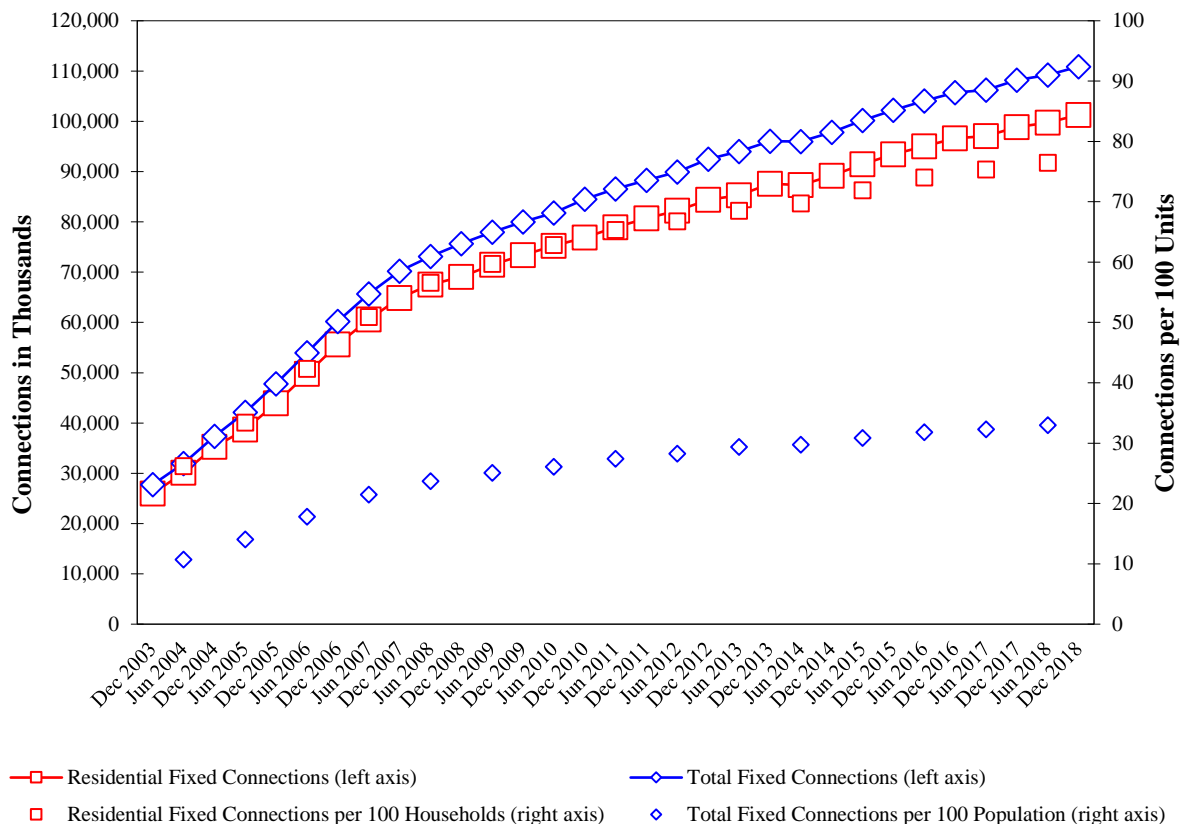
Column figures may not sum to 100% due to rounding. Developed census blocks are those with housing units based on the 2010 census.

⁴ Download these data and explore the interactive map at <https://broadbandmap.fcc.gov/#/>.

Internet Access Subscribership

Figure 5 illustrates the number of total and residential fixed Internet access connections (connections over 200 kbps in at least one direction except mobile wireless connections), as well as the number of total fixed connections per 100 persons and the number of residential fixed connections per 100 households, since 2003.⁵

Figure 5
Fixed Connections 2003-2018
(Connections over 200 kbps in at least one direction)



- Between December 2008 and December 2018, total (business and residential) fixed connections grew from 76 million connections to 111 million connections – at a compound annual growth rate of 4% per year.⁶

⁵ For data through December 2004, only those providers with at least 250 connections in a state were required to report. Historical fixed-location connection counts not included in this report may be found in *June 2008 High-Speed Report* at Tables 1 and 3, available in Excel format at <https://www.fcc.gov/general/reports-high-speed-services-internet-access>.

⁶ The compound annual growth rate (CAGR) is a smoothed rate of growth calculated in three steps: divide the ending value by the beginning value; raise the result of that division to a power equal to one divided by the number of years in the period (in this case, 10 years, so the power is 1/10); subtract the number one from the result of the second step.

- Over the same ten-year period, residential fixed connections grew from 69 million connections to 101 million connections – also at a compound annual growth rate of 4% per year.
- From June 2008 to June 2018, the number of residential fixed connections per 100 U.S. households increased from 57 to 76.⁷

Other Report Highlights

Typical speeds

- The median downstream speed of all reported fixed connections was 100 Mbps and the median upstream speed was 10 Mbps. For residential fixed connections, the median downstream speed was 100 Mbps and the median upstream speed was 10 Mbps.

Residential connections

- Residential fixed Internet access connections increased by about 2.6% between December 2017 and December 2018, to ~101 million. *See Figure 7.*
- Residential (non-business) mobile wireless Internet access connections on mobile devices with data plans for full Internet access increased by about 5.6%, to 267 million, between December 2017 and December 2018. *See Figure 7.*
- Approximately 89% of residential fixed connections had a speed of at least 10 Mbps downstream and 1 Mbps upstream in December 2018, while 76% had a speed of at least 25 Mbps downstream and 3 Mbps upstream. About 50% percent of all residential fixed connections had a downstream speed of at least 100 Mbps. *See Figures 10 and 27.*
- As a national average in December 2018, there were 75 residential fixed connections with speeds of at least 10 Mbps downstream and 1 Mbps upstream per 100 households; 64 residential fixed connections with speeds of at least 25 Mbps downstream and 3 Mbps upstream per 100 households; and 42 residential fixed connections with speeds of at least 100 Mbps downstream and 10 Mbps upstream per 100 households.⁸ *See Figure 32.*

⁷ We calculate residential fixed connections per 100 *households* using, in the denominator, U.S. household estimates from the Census Bureau’s Current Population Survey (CPS) for July of each year and, for Puerto Rico and the other inhabited island areas, Census 2010 households for 2010 and later years and Census 2000 households for the earlier years. (The CPS also estimates U.S. households for March and November of each year.) Figure 5 also shows total (business and residential) fixed connections per 100 *population*, which we calculate using U.S. Census Bureau population estimates for the United States and Puerto Rico – which are as of July 1 each year – and, for the remaining inhabited island areas, Census 2010 population for 2010 and later years and Census 2000 population for the earlier years. This statistic incorporates connections to business locations into a comparison to persons. (We note that the ratio of accurately-measured residential fixed connections to population has a maximum value for any given country and point in time – the value when every household is connected – if we assume that no household would have more than one fixed connection to its premises. For the United States in June, for example, the maximum value would be 39 because there were about 129 million households in the United States and inhabited insular areas and a population of about 329 million according to the sources used for Figure 5.)

⁸ Increases over time in the ratio of residential fixed connections to households indicate that increasing shares of households are connected at home. The ratio is somewhat different from the “take rate” of offered service (which may also be called an “adoption rate”) because some households may be located in areas where no fixed-location service is offered. These methodological differences are discussed in greater detail in *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*,

Census tract and county shares of households with reportable connections

- We estimate the share of households with fixed Internet access connections in individual census tracts and counties as of December 31, 2018.⁹ We continue to observe substantial variation among these estimates. *See* Figures 37 and 39.

Household subscribership rates and demographics

- The report includes charts that illustrate correlations between household subscribership rates and demographic measures. We update charts based on income, household density, education and age. The data indicate that some demographic variables are correlated with Internet access subscribership rates. *See* Figures 44-49.

and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, Amended by the Broadband Data Improvement Act, GN Docket No.11-121, Eighth Broadband Progress Report, 27 FCC Rcd 10342, 10386, para. 94 (2012).

⁹ For both census tracts and counties, we continue to find estimates above 100% for the share of households with fixed Internet access connections. *See* p. 57 for more information.

SECTION 2 SUMMARY STATISTICS: THE NATION

Table of Contents

Figure 6	Connections over 200 kbps in at Least One Direction 2014-2018.....	12
Figure 7	Residential Connections over 200 kbps in at Least One Direction 2014-2018.....	12
Figure 8	Residential Fixed Connections by Speed 2015-2018	13
Figure 9	Distribution of Fixed Connections over 200 kbps in at Least One Direction as of December 31, 2018	14
Figure 10	Distribution of Residential Fixed Connections over 200 kbps in at Least One Direction as of December 31, 2018	15
Figure 11	Connections over 200 kbps in at Least One Direction by Technology 2014-2018.....	16
Figure 12	Connections by Technology as of December 31, 2018	16
Figure 13	Residential Connections over 200 kbps in at Least One Direction by Technology 2014-2018.....	17
Figure 14	Residential Connections by Technology as of December 31, 2018	17
Figure 15	Fixed Connections at Least 3 Mbps Downstream and 768 kbps Upstream by Technology 2014-2018.....	18
Figure 16	Residential Fixed Connections at Least 3 Mbps Downstream and 768 kbps Upstream by Technology 2014-2018	18
Figure 17	Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream by Technology 2014-2018.....	19
Figure 18	Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream by Technology as of December 31, 2018	19
Figure 19	Residential Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream by Technology 2014-2018	20
Figure 20	Residential Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream by Technology as of December 31, 2018.....	20
Figure 21	Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology 2014-2018.....	21
Figure 22	Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology as of December 31, 2018	21
Figure 23	Residential Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology 2014-2018.....	22
Figure 24	Residential Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology as of December 31, 2018	22
Figure 25	Residential Fixed Connections over 200 kbps in at Least One Direction by Technology 2014-2018 (Shares of Selected Technologies)	23

Figure 26	Residential Fixed Connections over 200 kbps in at Least One Direction by Technology 2014-2018 (Net Adds for Selected Technologies)	23
Figure 27	Residential Fixed Connections by Technology as of December 31, 2018 (Shares of Selected Technologies for Selected Speeds)	24
Figure 28	Fixed Connections by Downstream Speed Tier and Technology as of December 31, 2018.....	25
Figure 29	Residential Fixed Connections by Downstream Speed Tier and Technology as of December 31, 2018.....	26
Figure 30	Nationwide Number of Providers of Connections over 200 kbps in at Least One Direction by Technology 2014-2018	27
Figure 31	Nationwide Number of Providers of Connections over 200 kbps in at Least One Direction - Selected Technologies 2014-2018	27

Figure 6
Connections over 200 kbps in at Least One Direction 2014-2018
(In thousands)

<i>Technology</i>	2014	2015		2016		2017		2018	
	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>
Total	338,202	357,613	375,895	395,604	404,971	408,816	420,973	428,983	441,397
Total Fixed	98,245	100,179	102,216	104,088	105,715	106,254	108,200	109,207	110,866
Mobile Wireless	239,957	257,434	273,679	291,516	299,256	302,562	312,773	319,776	330,531

Figure 7
Residential Connections over 200 kbps in at Least One Direction 2014-2018
(In thousands)

<i>Technology</i>	2014	2015		2016		2017		2018	
	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>
Total	290,696	306,292	322,557	330,987	337,978	341,094	351,964	358,851	368,473
Total Fixed	89,530	91,439	93,434	95,001	96,607	97,072	98,843	99,742	101,283
Mobile Wireless	201,166	214,853	229,122	235,985	241,371	244,022	253,121	259,109	267,191

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 8
Residential Fixed Connections by Downstream Speed 2015-2018

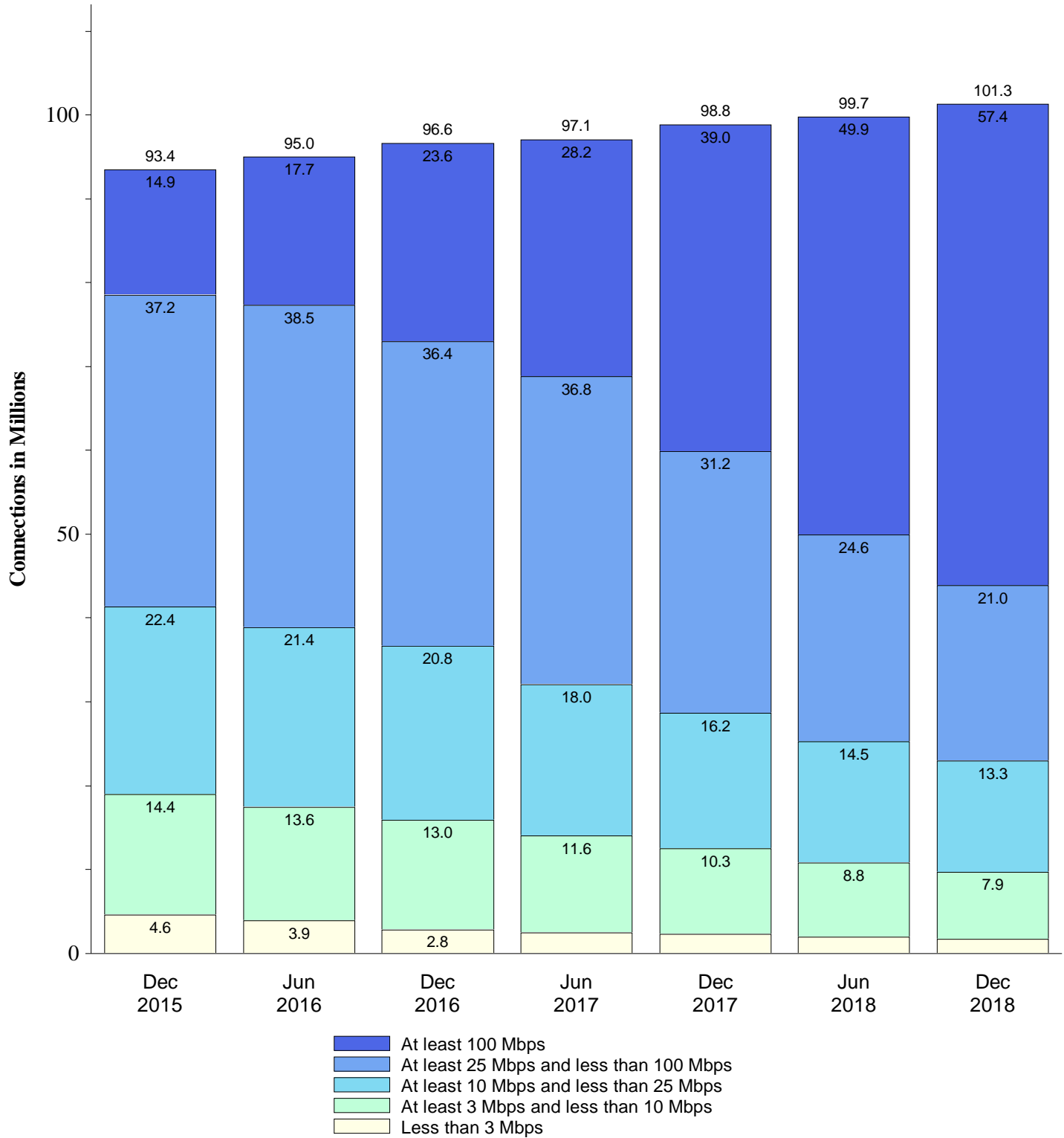
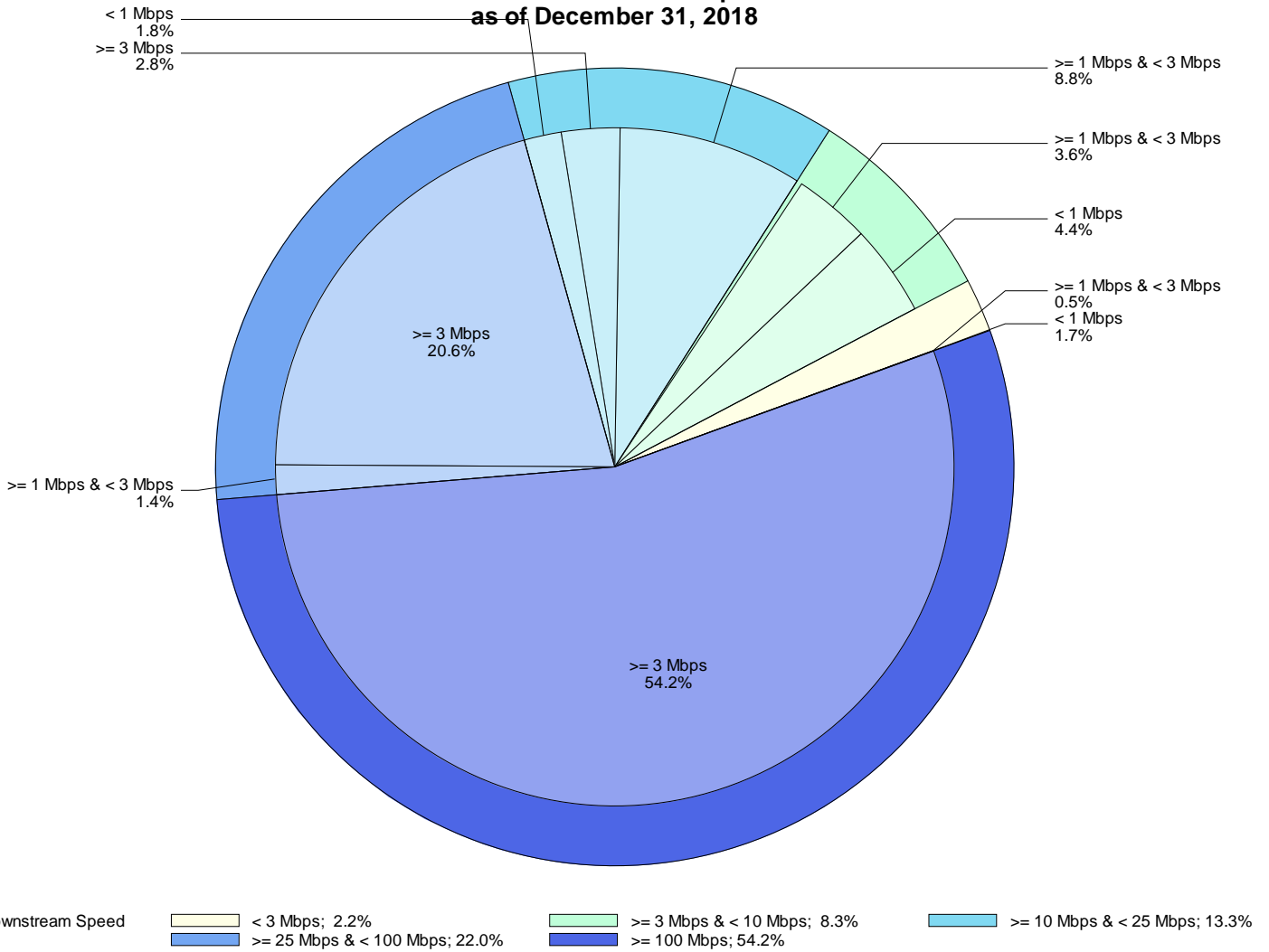


Figure 9
Distribution of Fixed Connections over 200 kbps in at Least One Direction
as of December 31, 2018



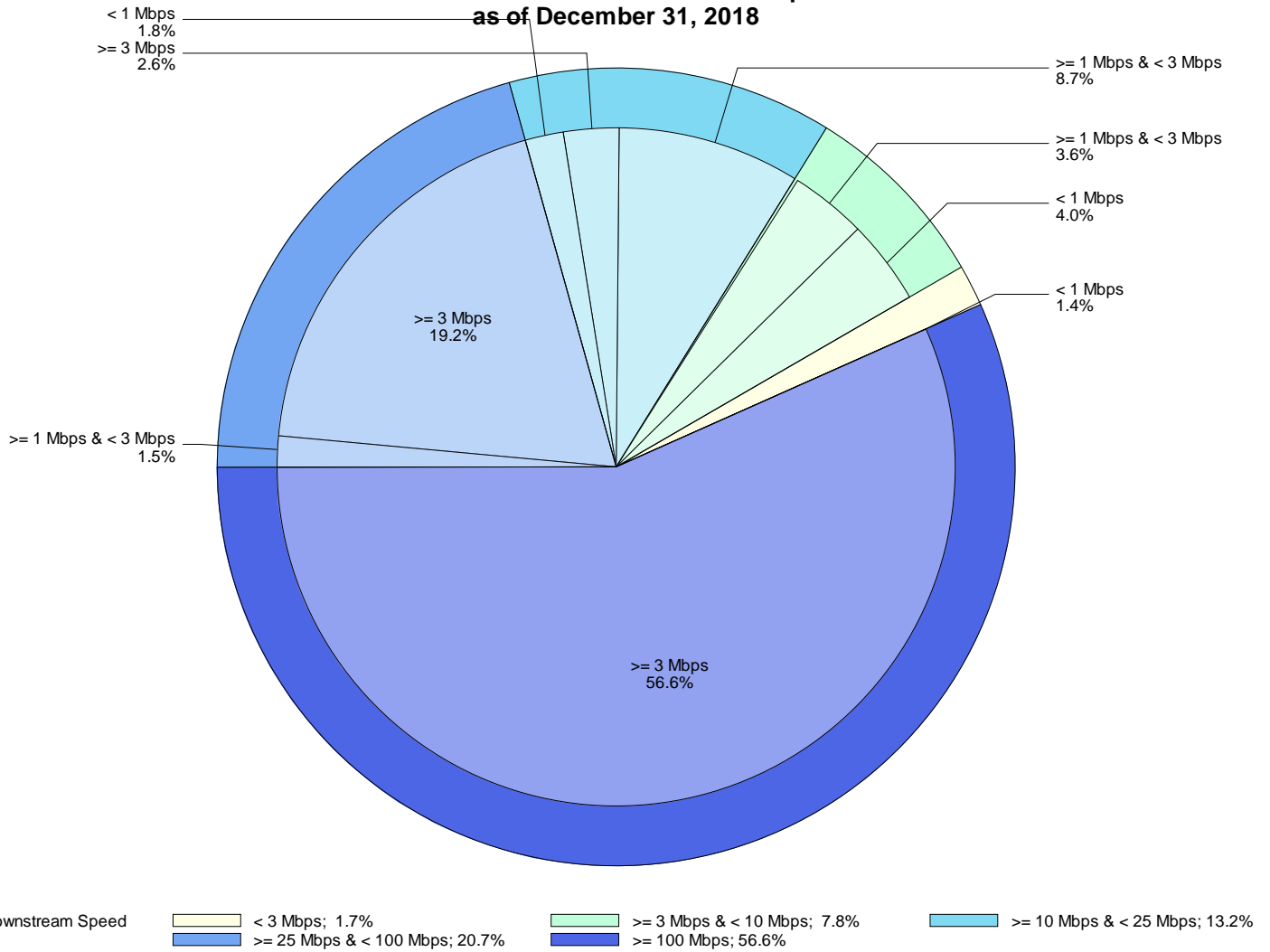
Fixed Connections over 200 kbps in at Least One Direction (in thousands)

Upstream Speed	Downstream Speed					Total
	Less than 3 Mbps	At least 3 Mbps and less than 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps	
Less than 1 Mbps	1,883	4,826	1,961	#	#	8,669
At least 1 Mbps & Less than 3 Mbps	511	4,040	9,728	1,560	6	15,846
At least 3 Mbps	5	285	3,085	22,843	60,131	86,350
Total	2,399	9,151	14,774	24,404	60,137	110,866
Percentages						
Less than 1 Mbps	1.7	4.4	1.8	0.0	0.0	7.8
At least 1 Mbps & Less than 3 Mbps	0.5	3.6	8.8	1.4	0.0	14.3
At least 3 Mbps	0.0	0.3	2.8	20.6	54.2	77.9
Total	2.2	8.3	13.3	22.0	54.2	100.0

Note: Figures may not sum to totals due to rounding. # = Rounds to zero.
Source: FCC Form 477.

Figure 10

**Distribution of Residential Fixed Connections over 200 kbps in at Least One Direction
as of December 31, 2018**



Note: Inner circle (light shading) represents upstream speeds.

Residential Fixed Connections over 200 kbps in at Least One Direction (in thousands)

Upstream Speed	Downstream Speed					Total
	Less than 3 Mbps	At least 3 Mbps and less than 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps	
Less than 1 Mbps	1,441	4,078	1,845	#	#	7,364
At least 1 Mbps & Less than 3 Mbps	261	3,682	8,804	1,502	6	14,254
At least 3 Mbps	5	157	2,676	19,458	57,368	79,665
Total	1,707	7,916	13,325	20,961	57,374	101,283

Percentages						
Less than 1 Mbps	1.4	4.0	1.8	0.0	0.0	7.3
At least 1 Mbps & Less than 3 Mbps	0.3	3.6	8.7	1.5	0.0	14.1
At least 3 Mbps	0.0	0.2	2.6	19.2	56.6	78.7
Total	1.7	7.8	13.2	20.7	56.6	100.0

Note: Figures may not sum to totals due to rounding. # = Rounds to zero.
Source: FCC Form 477.

Figure 11
Connections over 200 kbps in at Least One Direction by Technology 2014-2018
(In thousands)

<i>Technology</i>	2014	2015		2016		2017		2018	
	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>
Total	338,202	357,613	375,895	395,604	404,971	408,816	420,973	428,983	441,397
Total Fixed	98,245	100,179	102,216	104,088	105,715	106,254	108,200	109,207	110,866
aDSL	29,533	29,351	28,134	27,488	26,527	25,506	24,193	23,072	21,932
sDSL	72	77	60	55	42	44	28	28	20
Other Wireline ¹	773	706	694	674	655	668	630	610	600
Cable Modem	55,785	57,244	59,706	61,456	63,325	64,060	66,196	67,163	68,857
FTTP ²	9,077	9,688	10,498	11,143	12,053	12,906	13,978	14,982	16,021
Satellite	2,006	2,058	2,071	2,079	1,864	1,826	1,872	1,939	1,971
Fixed Wireless	999	1,056	1,054	1,192	1,250	1,245	1,304	1,414	1,465
Mobile Wireless	239,957	257,434	273,679	291,516	299,256	302,562	312,773	319,776	330,531

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 12
Connections by Technology as of December 31, 2018

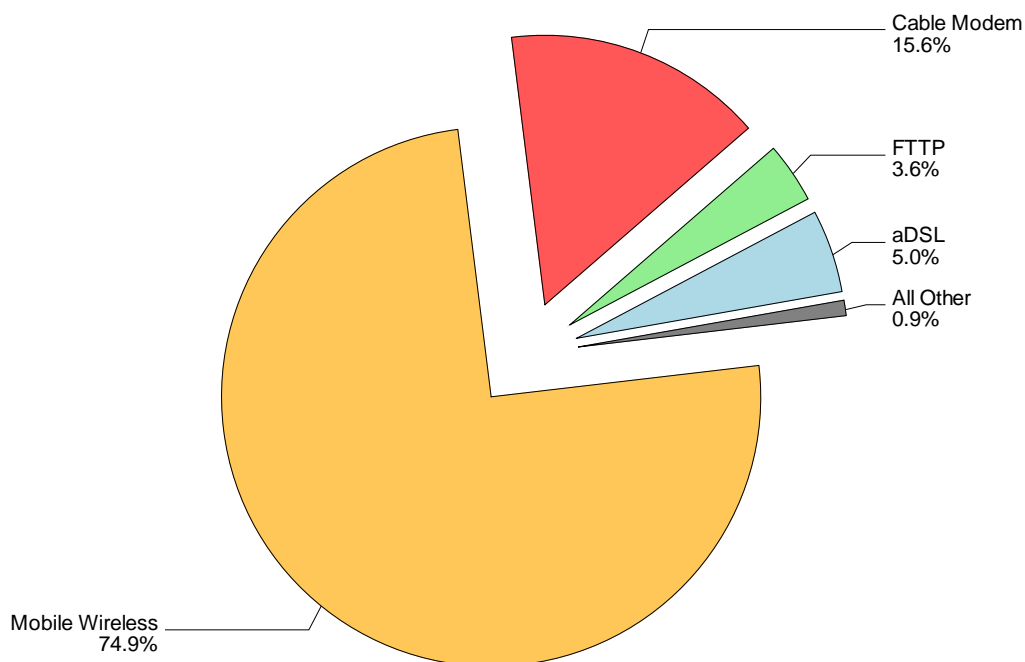


Figure 13
Residential Connections over 200 kbps in at Least One Direction by Technology 2014-2018
(In thousands)

	2014	2015		2016		2017		2018	
Technology	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec
Total	290,696	306,292	322,557	330,987	337,978	341,094	351,964	358,851	368,473
Total Fixed	89,530	91,439	93,434	95,001	96,607	97,072	98,843	99,742	101,283
aDSL	26,442	26,157	25,139	24,486	23,691	22,775	21,653	20,670	19,691
sDSL	19	18	16	10	8	12	9	9	4
Other Wireline ¹	59	59	54	51	32	74	67	74	74
Cable Modem	52,061	53,544	55,799	57,358	59,145	59,687	61,567	62,318	63,788
FTTP ²	8,262	8,842	9,592	10,140	10,956	11,776	12,702	13,661	14,621
Satellite	1,803	1,875	1,891	1,897	1,676	1,637	1,688	1,751	1,787
Fixed Wireless	884	944	943	1,059	1,099	1,111	1,156	1,260	1,318
Mobile Wireless	201,166	214,853	229,122	235,985	241,371	244,022	253,121	259,109	267,191

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 14
Residential Connections by Technology as of December 31, 2018

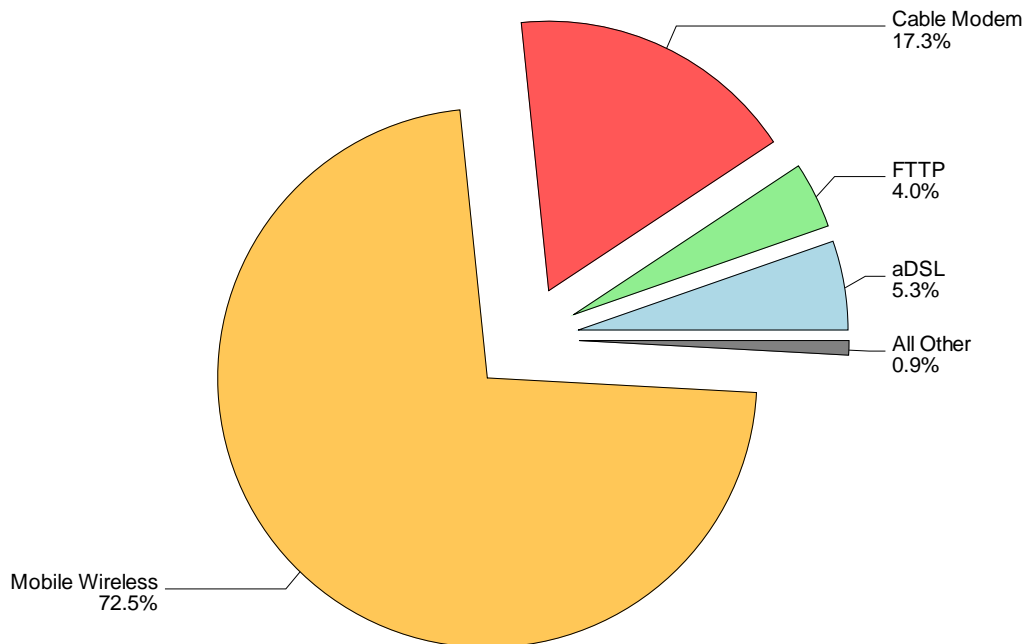


Figure 15
Fixed Connections at Least 3 Mbps Downstream and 768 kbps Upstream by Technology 2014-2018
(In thousands)

	2014	2015		2016		2017		2018	
Technology	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec
Total	83,872	89,011	92,356	95,517	98,761	100,098	102,047	104,054	106,183
aDSL	18,557	20,947	20,744	21,147	21,042	20,621	19,257	18,874	18,123
sDSL	28	24	20	20	20	24	16	17	11
Other Wireline ¹	308	297	330	336	328	355	369	376	386
Cable Modem	53,853	55,819	58,423	60,343	62,855	63,719	65,906	66,959	68,681
FTTP ²	8,974	9,552	10,383	11,030	11,953	12,813	13,870	14,889	15,929
Satellite	1,558	1,690	1,744	1,775	1,609	1,586	1,563	1,722	1,770
Fixed Wireless	594	681	712	865	954	981	1,065	1,216	1,285

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 16
Residential Fixed Connections at Least 3 Mbps Downstream and 768 kbps Upstream by Technology 2014-2018
(In thousands)

	2014	2015		2016		2017		2018	
Technology	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec
Total	77,540	82,320	85,439	88,198	91,258	92,355	93,987	95,741	97,637
aDSL	16,867	18,988	18,866	19,207	19,133	18,719	17,480	17,127	16,461
sDSL	2	1	2	2	2	7	6	6	2
Other Wireline ¹	50	45	47	49	31	73	66	72	71
Cable Modem	50,308	52,254	54,650	56,353	58,784	59,411	61,335	62,165	63,657
FTTP ²	8,246	8,750	9,512	10,063	10,883	11,704	12,616	13,588	14,548
Satellite	1,552	1,682	1,734	1,764	1,596	1,571	1,545	1,700	1,745
Fixed Wireless	516	599	628	759	830	870	940	1,082	1,154

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 17
Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream by Technology 2014-2018
(In thousands)

<i>Technology</i>	<i>2014</i>		<i>2015</i>		<i>2016</i>		<i>2017</i>		<i>2018</i>	
	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Jun</i>	<i>Dec</i>	<i>Dec</i>
Total	68,238	72,713	76,939	80,458	84,112	86,967	90,703	94,148	97,354	
aDSL	8,560	9,471	9,799	10,349	10,810	11,321	11,595	11,817	11,861	
sDSL	6	9	8	8	10	14	9	11	6	
Other Wireline ¹	186	182	203	210	217	253	273	282	302	
Cable Modem	49,837	52,658	55,710	57,951	60,349	61,704	63,978	65,807	67,691	
FTTP ²	8,320	8,874	9,575	10,143	11,001	11,884	12,954	13,988	15,074	
Satellite	1,136	1,298	1,393	1,467	1,342	1,373	1,402	1,595	1,677	
Fixed Wireless	193	221	252	330	383	418	492	649	743	

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 18
Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream
by Technology as of December 31, 2018

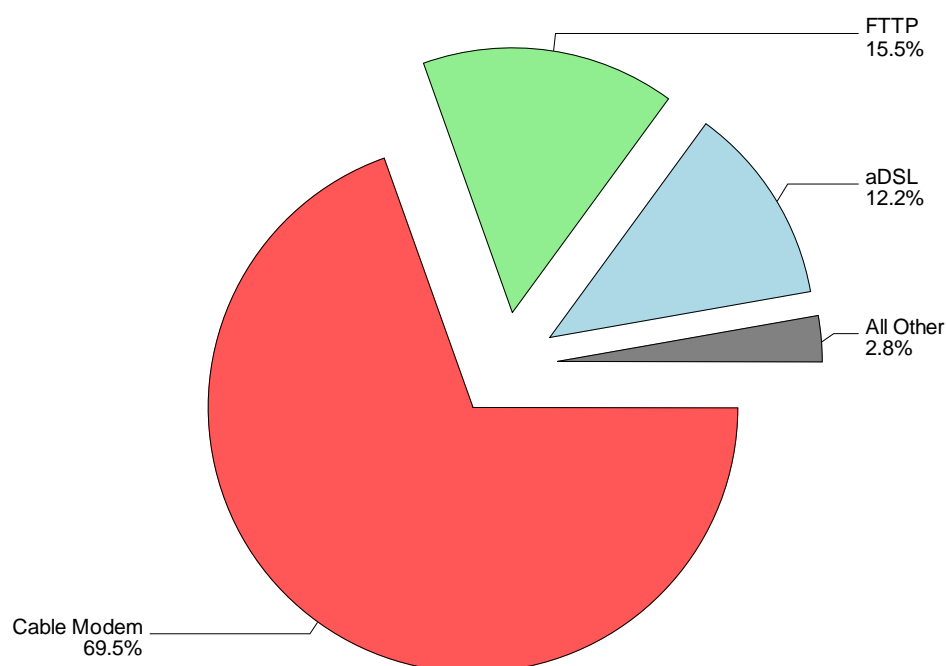


Figure 19
Residential Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream
by Technology 2014-2018
(In thousands)

	2014	2015		2016		2017		2018	
Technology	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec
Total	63,732	67,898	71,784	74,841	78,202	80,671	84,164	86,959	89,815
aDSL	7,970	8,743	9,069	9,526	9,963	10,415	10,657	10,859	10,902
sDSL	#	#	1	2	2	6	5	6	2
Other Wireline ¹	36	38	43	47	30	71	64	65	66
Cable Modem	46,772	49,487	52,294	54,274	56,538	57,617	59,864	61,141	62,786
FTTP ²	7,653	8,144	8,776	9,248	10,004	10,835	11,762	12,739	13,742
Satellite	1,133	1,293	1,386	1,460	1,333	1,362	1,387	1,575	1,655
Fixed Wireless	167	191	213	283	332	365	426	574	661

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 20
Residential Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream
by Technology as of December 31, 2018

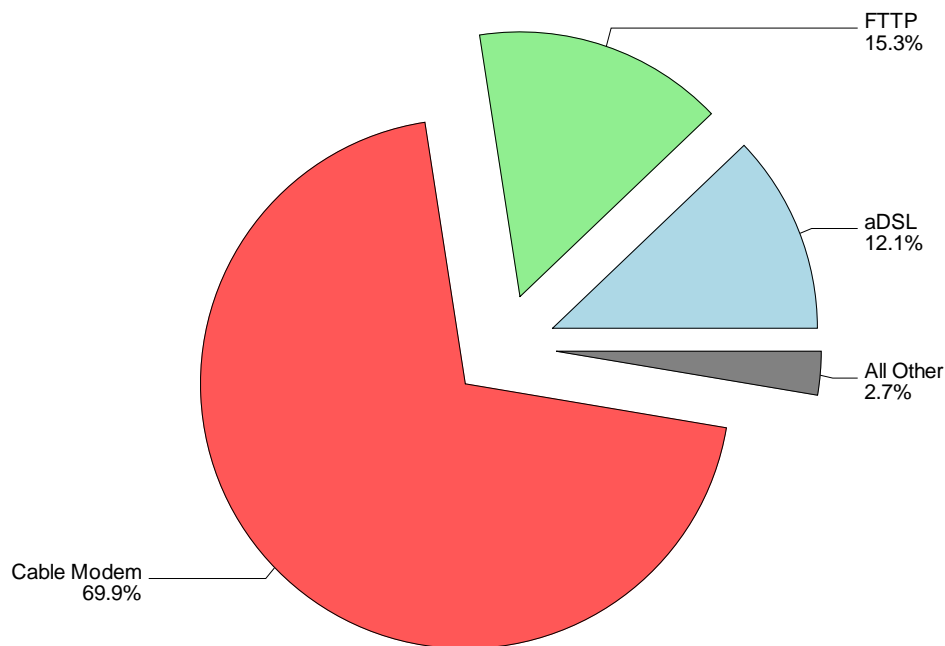


Figure 21
Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology 2014-2018
(In thousands)

	2014	2015	2016	2017	2018
Technology	Dec	Jun	Dec	Jun	Dec
Total	42,713	48,784	54,335	58,753	62,907
aDSL	587	762	938	1,239	1,476
sDSL	1	1	*	*	*
Other Wireline ¹	125	125	141	158	170
Cable Modem	36,383	40,979	45,530	48,696	51,740
FTTP ²	5,589	6,871	7,691	8,609	9,449
Satellite	#	#	*	*	*
Fixed Wireless	28	47	55	72	92

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

* = Data withheld to maintain firm confidentiality.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 22
Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream
by Technology as of December 31, 2018

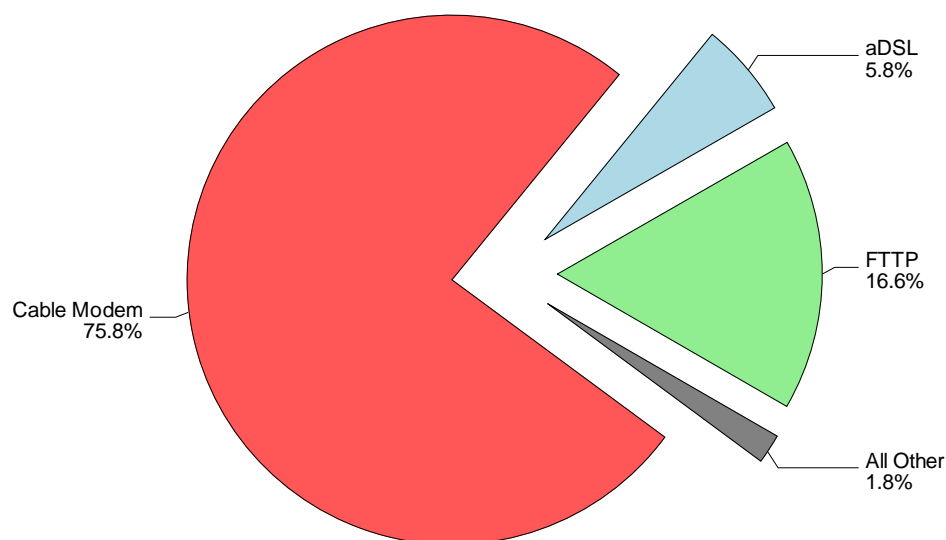


Figure 23
Residential Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream
by Technology 2014-2018
(In thousands)

	2014	2015	2016	2017	2018
Technology	Dec	Jun	Dec	Jun	Dec
Total	40,916	46,532	51,788	55,694	59,463
aDSL	556	727	897	1,173	1,408
sDSL	#	#	*	*	*
Other Wireline ¹	26	26	31	41	27
Cable Modem	35,202	39,416	43,746	46,527	49,300
FTTP ²	5,111	6,323	7,089	7,916	8,674
Satellite	0	0	*	*	*
Fixed Wireless	22	40	46	57	75

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

* = Data withheld to maintain firm confidentiality.

= Rounds to zero.

Some previously published data may have been revised. Figures may not sum to totals due to rounding.

Figure 24
Residential Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream
by Technology as of December 31, 2018

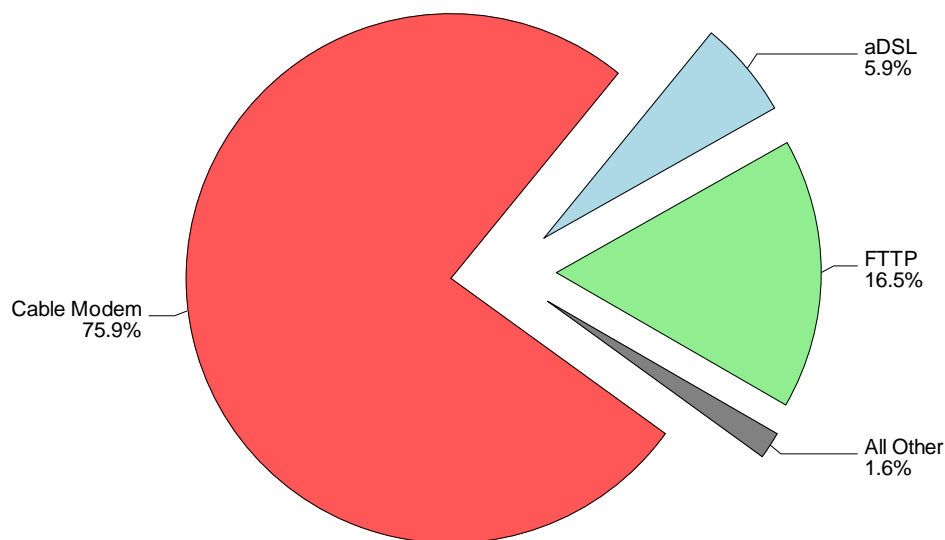


Figure 25
Residential Fixed Connections over 200 kbps in at Least One Direction 2014-2018
 (Shares of selected technologies)



Some previously-published data may have been revised. Figures may not sum to totals due to rounding.

Figure 26
Residential Fixed Connections over 200 kbps in at Least One Direction 2014-2018
 (Net adds for selected technologies)

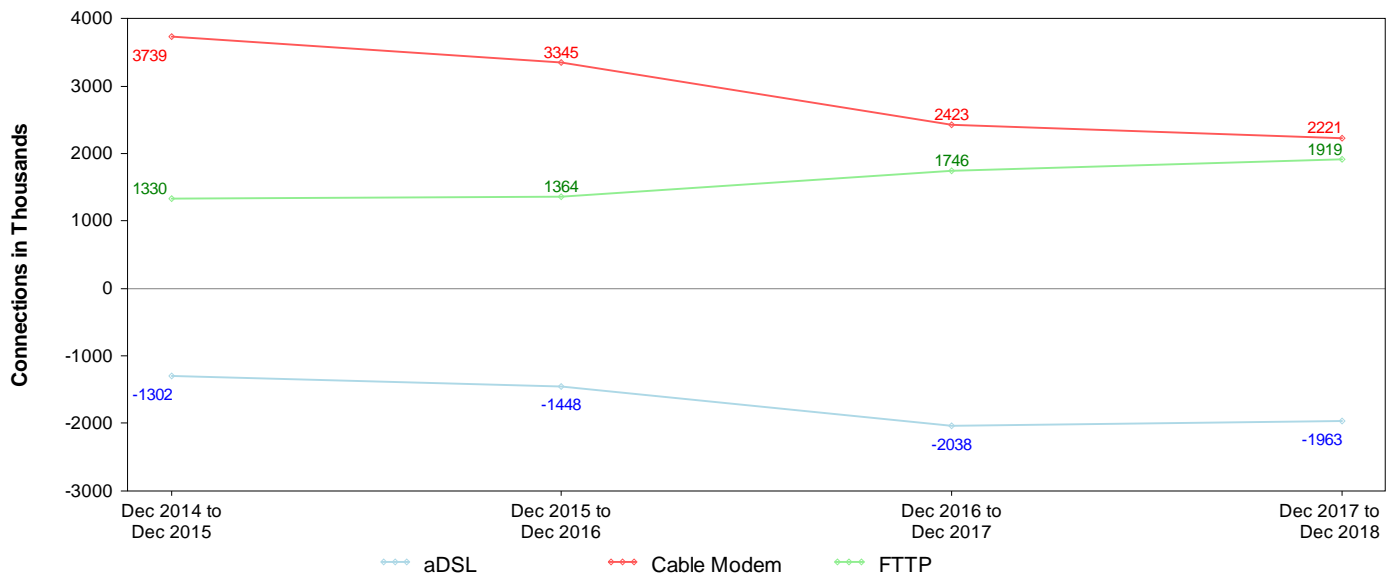


Figure 27
Residential Fixed Connections by Technology as of December 31, 2018
(Shares of selected technologies for selected speeds, connections in thousands)

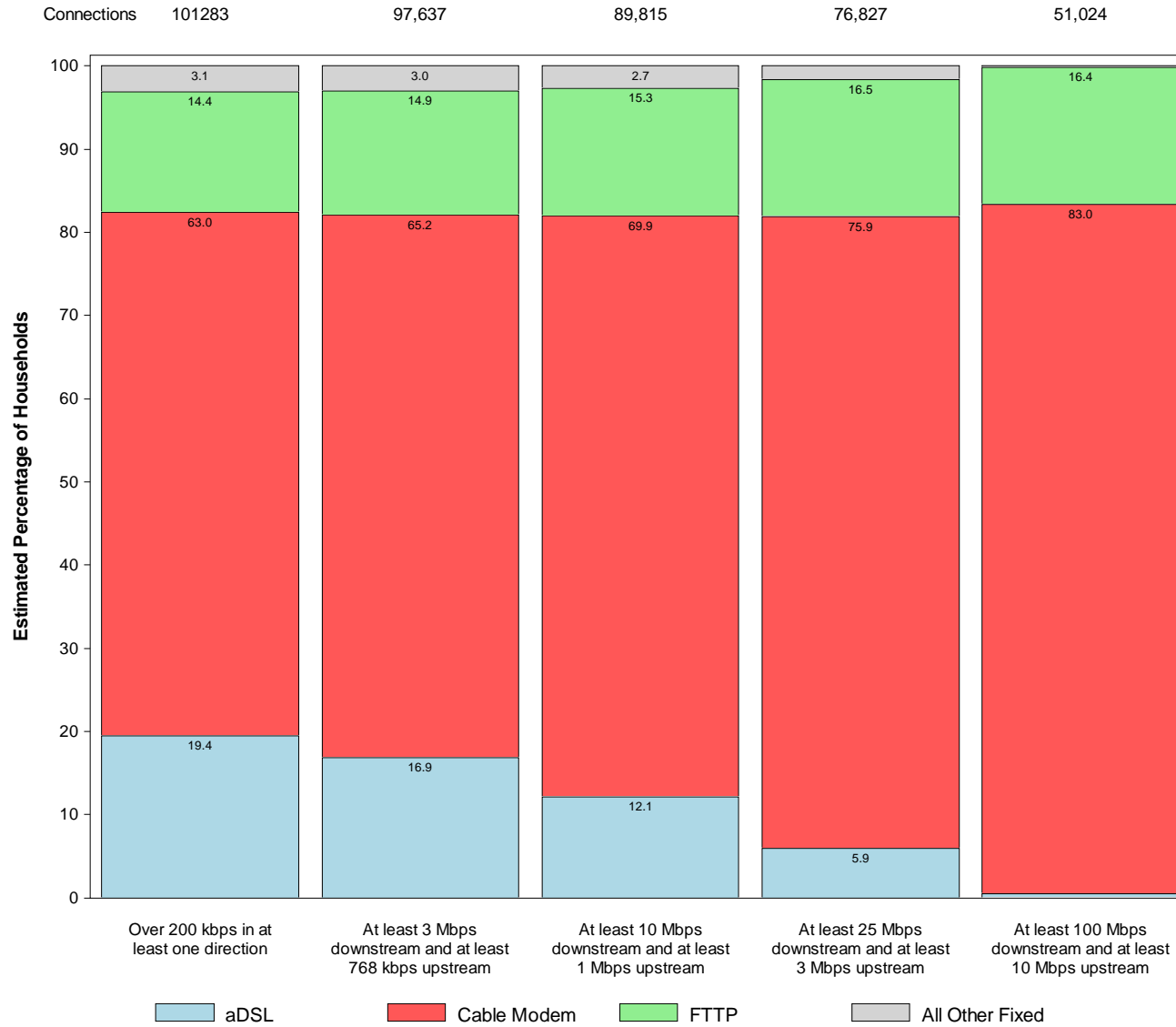


Figure 28
Fixed Connections by Downstream Speed Tier and Technology as of December 31, 2018
(In thousands)

Technology	Downstream Speed						Total
	Less than 1.5 Mbps	At least 1.5 Mbps and less than 3 Mbps	At least 3 Mbps and less than 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps	
aDSL	544	1,130	6,779	8,010	5,189	281	21,932
sDSL	4	5	5	3	*	*	20
Other Wireline ¹	27	186	85	67	36	199	600
Cable Modem	37	56	1,044	3,991	13,102	50,625	68,857
FTTP	40	34	564	1,543	4,882	8,958	16,021
Satellite	179	20	95	683	*	*	1,971
Fixed Wireless	45	92	579	477	202	70	1,465
Total	877	1,522	9,151	14,774	24,404	60,137	110,866

Percentages							
aDSL	0.5	1.0	6.1	7.2	4.7	0.3	19.8
sDSL	0.0	0.0	0.0	0.0	*	*	0.0
Other Wireline ¹	0.0	0.2	0.1	0.1	0.0	0.2	0.5
Cable Modem	0.0	0.1	0.9	3.6	11.8	45.7	62.1
FTTP	0.0	0.0	0.5	1.4	4.4	8.1	14.5
Satellite	0.2	0.0	0.1	0.6	*	*	1.8
Fixed Wireless	0.0	0.1	0.5	0.4	0.2	0.1	1.3
Total	0.8	1.4	8.3	13.3	22.0	54.2	100.0

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Note: Figures may not sum to totals due to rounding.

Source: FCC Form 477.

Figure 29
Residential Fixed Connections by Downstream Speed Tier and Technology as of December 31, 2018
(In thousands)

Technology	Downstream Speed						Total
	Less than 1.5 Mbps	At least 1.5 Mbps and less than 3 Mbps	At least 3 Mbps and less than 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps	
aDSL	485	934	5,859	7,251	4,902	260	19,691
sDSL	2	#	#	#	*	*	4
Other Wireline ¹	1	3	5	7	12	46	74
Cable Modem	31	30	915	3,639	10,544	48,629	63,788
FTTP	31	27	517	1,321	4,349	8,376	14,621
Satellite	34	6	91	679	*	*	1,787
Fixed Wireless	40	83	528	428	179	60	1,318
Total	624	1,083	7,916	13,325	20,961	57,374	101,283

Percentages							
aDSL	0.5	0.9	5.8	7.2	4.8	0.3	19.4
sDSL	0.0	0.0	0.0	0.0	*	*	0.0
Other Wireline ¹	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Cable Modem	0.0	0.0	0.9	3.6	10.4	48.0	63.0
FTTP	0.0	0.0	0.5	1.3	4.3	8.3	14.4
Satellite	0.0	0.0	0.1	0.7	*	*	1.8
Fixed Wireless	0.0	0.1	0.5	0.4	0.2	0.1	1.3
Total	0.6	1.1	7.8	13.2	20.7	56.6	100.0

¹ Power Line and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Note: Figures may not sum to totals due to rounding.

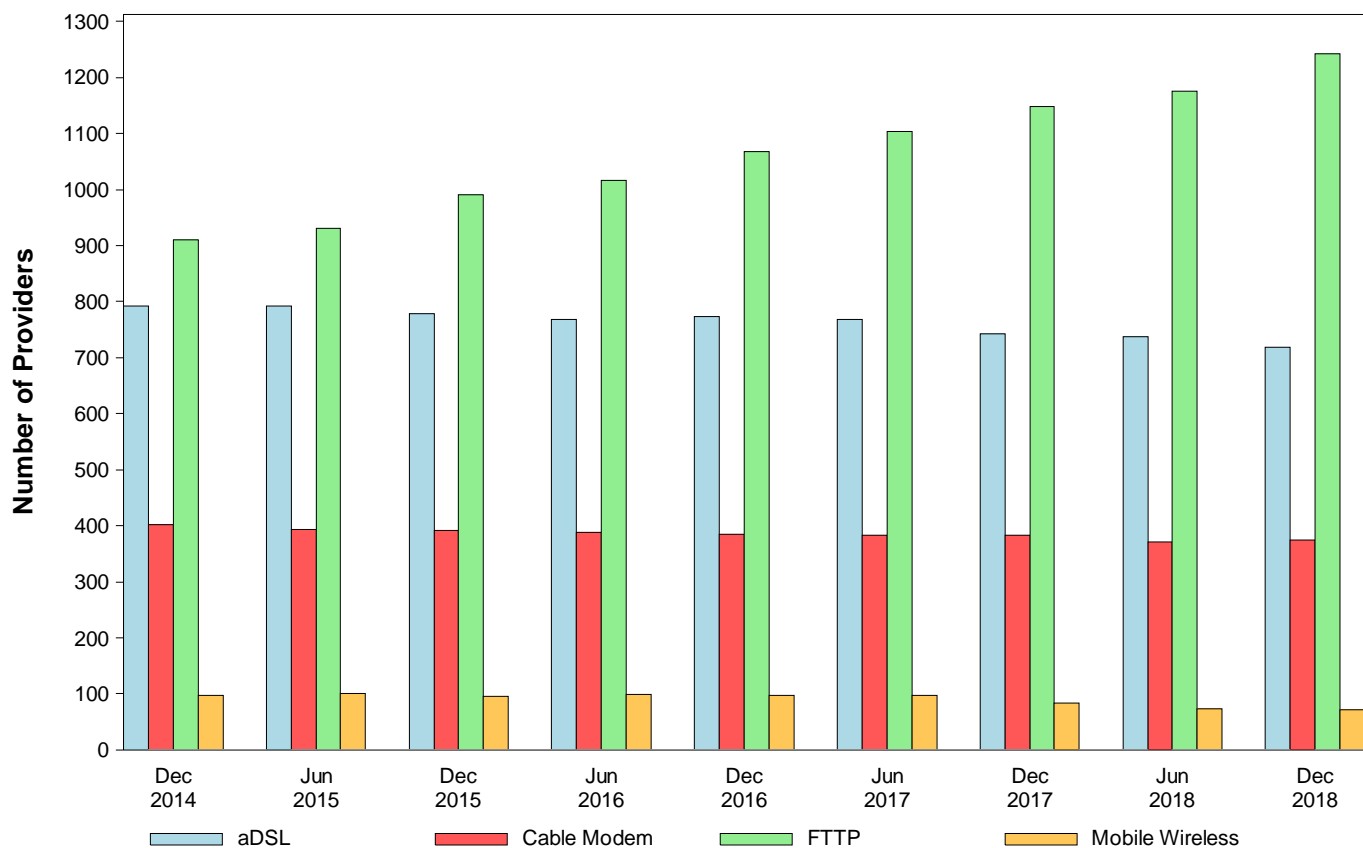
Source: FCC Form 477.

Figure 30
Nationwide Number of Providers of Connections over 200 kbps in at Least One Direction
by Technology 2014-2018

	2014		2015		2016		2017		2018	
Technology	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec	
aDSL	793	792	778	769	774	769	743	738	719	
sDSL	187	177	180	171	160	161	150	136	125	
Other Wireline ¹	245	240	250	244	236	243	235	249	239	
Cable Modem	402	393	392	388	385	384	383	371	374	
FTTP	910	931	990	1,017	1,067	1,103	1,148	1,176	1,243	
Satellite	14	10	10	6	6	5	6	6	6	
Fixed Wireless	922	948	982	1,026	1,070	1,094	1,157	1,176	1,209	
Mobile Wireless	98	100	96	99	98	98	83	73	71	
Total	1,872	1,881	1,917	1,956	2,000	2,030	2,087	2,113	2,165	

¹ For this Figure, the categories Power Line and All Other were combined with Other Wireline.
Multiple Form 477 filers within a holding company structure count as one provider. * = 1-3 providers.
Some previously-published data may have been revised.

Figure 31
Nationwide Number of Providers of Connections over 200 kbps in at Least One Direction
Selected Technologies 2014-2018



SECTION 3
SUMMARY STATISTICS: THE STATES

Table of Contents

Figure 32	Residential Fixed Connections and Households by State as of December 31, 2018	29
Figure 33	Connections by Type of End User by State as of December 31, 2018.....	31
Figure 34	Connections by Technology by State as of December 31, 2018	32
Figure 35	Percentage of Fixed Connections by Downstream Speed by State as of December 31, 2018.....	34
Figure 36	Providers of Connections by Technology by State as of December 31, 2018.....	36

Figure 32
Residential Fixed Connections and Households by State as of December 31, 2018
(Connections and households, in thousands)

State	Households	At least 200 kbps in at least One Direction		At least 10 Mbps Down and 1 Mbps Up		At least 25 Mbps Down and 3 Mbps Up		At least 100 Mbps Down and 10 Mbps Up	
		Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio
Alabama	1,860	1,381	0.74	1,150	0.62	912	0.49	647	0.35
Alaska	253	201	0.79	169	0.67	125	0.49	*	*
American Samoa	10	*	*	*	*	*	*	0	0.00
Arizona	2,524	2,201	0.87	1,873	0.74	1,625	0.64	1,070	0.42
Arkansas	1,152	787	0.68	619	0.54	429	0.37	205	0.18
California	12,965	11,427	0.88	10,450	0.81	9,028	0.70	5,717	0.44
Colorado	2,113	1,940	0.92	1,635	0.77	1,487	0.70	643	0.30
Connecticut	1,367	1,218	0.89	1,137	0.83	947	0.69	625	0.46
Delaware	358	344	0.96	331	0.93	319	0.89	171	0.48
District of Columbia	281	253	0.90	241	0.86	228	0.81	144	0.51
Florida	7,622	7,229	0.95	6,688	0.88	5,724	0.75	4,257	0.56
Georgia	3,709	3,124	0.84	2,756	0.74	2,203	0.59	1,605	0.43
Guam	42	*	*	*	*	*	*	*	*
Hawaii	457	429	0.94	409	0.89	*	*	*	*
Idaho	618	507	0.82	349	0.56	273	0.44	73	0.12
Illinois	4,830	3,918	0.81	3,516	0.73	2,799	0.58	2,021	0.42
Indiana	2,554	1,992	0.78	1,706	0.67	1,338	0.52	924	0.36
Iowa	1,257	959	0.76	734	0.58	602	0.48	269	0.21
Kansas	1,125	900	0.80	765	0.68	590	0.52	391	0.35
Kentucky	1,729	1,312	0.76	1,083	0.63	831	0.48	599	0.35
Louisiana	1,736	1,302	0.75	1,133	0.65	889	0.51	599	0.35
Maine	557	498	0.89	395	0.71	311	0.56	229	0.41
Maryland	2,193	1,964	0.90	1,881	0.86	1,758	0.80	1,006	0.46
Massachusetts	2,602	2,389	0.92	2,277	0.88	2,196	0.84	1,277	0.49
Michigan	3,910	3,104	0.79	2,769	0.71	2,291	0.59	1,729	0.44
Minnesota	2,168	1,763	0.81	1,449	0.67	1,261	0.58	656	0.30
Mississippi	1,106	713	0.64	562	0.51	367	0.33	170	0.15
Missouri	2,396	1,846	0.77	1,506	0.63	1,200	0.50	883	0.37
Montana	423	342	0.81	264	0.62	216	0.51	*	*
Nebraska	754	590	0.78	496	0.66	404	0.54	304	0.40

Figure 32 - Continued
Residential Fixed Connections and Households by State as of December 31, 2018
(Connections and households, in thousands)

State	Households	At least 200 kbps in at least One Direction		At least 10 Mbps Down and 1 Mbps Up		At least 25 Mbps Down and 3 Mbps Up		At least 100 Mbps Down and 10 Mbps Up	
		Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio
Nevada	1,076	949	0.88	867	0.81	740	0.69	590	0.55
New Hampshire	528	502	0.95	448	0.85	413	0.78	204	0.39
New Jersey	3,213	3,022	0.94	2,915	0.91	2,824	0.88	1,987	0.62
New Mexico	776	581	0.75	412	0.53	338	0.44	109	0.14
New York	7,317	6,313	0.86	6,005	0.82	5,623	0.77	4,686	0.64
North Carolina	3,919	3,271	0.83	2,783	0.71	2,460	0.63	1,972	0.50
North Dakota	315	257	0.82	238	0.76	213	0.68	159	0.50
Northern Mariana Isl	16	*	*	*	*	*	*	0	0.00
Ohio	4,654	3,719	0.80	3,249	0.70	2,572	0.55	1,780	0.38
Oklahoma	1,475	1,072	0.73	871	0.59	661	0.45	400	0.27
Oregon	1,592	1,349	0.85	1,155	0.73	1,031	0.65	493	0.31
Pennsylvania	5,025	4,170	0.83	3,746	0.75	3,380	0.67	1,831	0.36
Puerto Rico	1,205	494	0.41	249	0.21	161	0.13	*	*
Rhode Island	411	368	0.89	363	0.88	344	0.84	*	*
South Carolina	1,895	1,573	0.83	1,392	0.73	1,096	0.58	813	0.43
South Dakota	342	269	0.79	248	0.73	222	0.65	150	0.44
Tennessee	2,567	2,000	0.78	1,781	0.69	1,457	0.57	1,127	0.44
Texas	9,553	7,860	0.82	7,060	0.74	5,849	0.61	3,650	0.38
Utah	958	860	0.90	727	0.76	632	0.66	268	0.28
Vermont	260	241	0.93	181	0.70	150	0.58	72	0.28
Virgin Islands	43	27	0.61	*	*	7	0.15	*	*
Virginia	3,128	2,637	0.84	2,402	0.77	2,215	0.71	1,446	0.46
Washington	2,800	2,484	0.89	2,168	0.77	1,969	0.70	937	0.33
West Virginia	735	541	0.74	422	0.57	341	0.46	173	0.24
Wisconsin	2,343	1,861	0.79	1,589	0.68	1,256	0.54	967	0.41
Wyoming	231	186	0.81	149	0.65	130	0.56	*	*
Total	121,046	101,283	0.84	89,815	0.74	76,827	0.63	51,024	0.42

= Rounds to Zero; * = Data withheld to maintain firm confidentiality.

Note: Figures may not sum to totals due to rounding.

Sources: FCC Form 477 (Connections); 2014-2018 ACS 5-year estimates; Census 2010.

Figure 33
Connections by Type of End User by State as of December 31, 2018
(Connections over 200 kbps in at least one direction, in thousands)

State	Connections		Percentages		Total
	Residential	Business	Residential	Business	
Alabama	5,170	1,196	81.2	18.8	6,366
Alaska	821	123	87.0	13.0	944
American Samoa	*	*	*	*	*
Arizona	7,377	1,347	84.6	15.4	8,724
Arkansas	2,870	782	78.6	21.4	3,651
California	46,733	7,676	85.9	14.1	54,409
Colorado	6,290	1,243	83.5	16.5	7,534
Connecticut	4,081	900	81.9	18.1	4,981
Delaware	1,080	209	83.8	16.2	1,289
District of Columbia	982	524	65.2	34.8	1,506
Florida	24,716	4,484	84.6	15.4	29,200
Georgia	11,442	2,602	81.5	18.5	14,044
Guam	182	53	77.5	22.5	235
Hawaii	1,701	283	85.7	14.3	1,984
Idaho	1,763	360	83.0	17.0	2,123
Illinois	14,289	2,979	82.7	17.3	17,269
Indiana	6,870	1,466	82.4	17.6	8,337
Iowa	3,247	753	81.2	18.8	4,000
Kansas	5,069	706	87.8	12.2	5,775
Kentucky	4,837	833	85.3	14.7	5,670
Louisiana	5,189	932	84.8	15.2	6,121
Maine	1,409	408	77.5	22.5	1,817
Maryland	7,141	1,259	85.0	15.0	8,400
Massachusetts	8,372	1,619	83.8	16.2	9,991
Michigan	10,814	2,438	81.6	18.4	13,252
Minnesota	6,070	1,350	81.8	18.2	7,421
Mississippi	2,993	559	84.3	15.7	3,552
Missouri	6,452	1,373	82.5	17.5	7,825
Montana	1,056	284	78.8	21.2	1,340
Nebraska	1,890	544	77.6	22.4	2,434
Nevada	3,387	566	85.7	14.3	3,954
New Hampshire	1,483	362	80.4	19.6	1,845
New Jersey	10,584	2,060	83.7	16.3	12,644
New Mexico	2,102	383	84.6	15.4	2,485
New York	24,394	4,407	84.7	15.3	28,801
North Carolina	10,646	2,448	81.3	18.7	13,094
North Dakota	806	214	79.1	20.9	1,019
Northern Mariana Isl	*	*	*	*	*
Ohio	12,806	2,839	81.9	18.1	15,645
Oklahoma	4,063	760	84.2	15.8	4,823
Oregon	4,569	962	82.6	17.4	5,531
Pennsylvania	14,198	2,940	82.8	17.2	17,138
Puerto Rico	3,679	407	90.0	10.0	4,086
Rhode Island	1,141	233	83.1	16.9	1,374
South Carolina	5,151	1,146	81.8	18.2	6,297
South Dakota	855	236	78.4	21.6	1,091
Tennessee	7,005	1,683	80.6	19.4	8,688
Texas	31,260	5,529	85.0	15.0	36,789
Utah	3,077	644	82.7	17.3	3,722
Vermont	679	191	78.1	21.9	870
Virgin Islands	124	14	89.8	10.2	138
Virginia	8,678	2,171	80.0	20.0	10,850
Washington	8,503	1,625	84.0	16.0	10,128
West Virginia	1,636	309	84.1	15.9	1,945
Wisconsin	6,015	1,327	81.9	18.1	7,342
Wyoming	624	161	79.5	20.5	785
Total	368,473	72,924	83.5	16.5	441,397

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Figures may not sum to totals due to rounding.

Source: FCC Form 477.

Figure 34
Connections by Technology by State as of December 31, 2018
(Connections over 200 kbps in at least one direction, in thousands)

<i>State</i>	<i>ADSL</i>	<i>SDSL</i>	<i>Other Wireline¹</i>	<i>Cable Modem</i>	<i>Fiber</i>	<i>Satellite</i>	<i>Fixed Wireless</i>	<i>Mobile Wireless</i>	<i>Total</i>
Alabama	460	#	*	805	174	*	6	4,853	6,366
Alaska	76	*	2	*	6	*	9	707	944
American Samoa	0	0	0	*	*	0	*	*	*
Arizona	519	*	11	1,581	174	*	43	6,359	8,724
Arkansas	334	#	*	409	60	*	8	2,785	3,651
California	2,774	3	*	8,176	1,234	*	142	41,863	54,409
Colorado	*	#	17	1,355	209	*	77	5,425	7,534
Connecticut	*	*	3	1,029	21	*	#	3,644	4,981
Delaware	*	*	3	236	*	*	*	916	1,289
District of Columbia	*	*	6	*	*	*	*	1,217	1,506
Florida	1,435	#	*	5,305	1,002	*	18	21,317	29,200
Georgia	902	#	*	1,933	499	*	6	10,616	14,044
Guam	*	0	0	*	*	0	0	193	235
Hawaii	*	*	1	*	*	*	2	1,522	1,984
Idaho	164	#	*	232	91	*	47	1,569	2,123
Illinois	1,090	1	*	2,815	236	*	80	12,975	17,269
Indiana	579	#	*	1,201	280	*	44	6,175	8,337
Iowa	265	#	*	489	214	*	43	2,954	4,000
Kansas	230	#	*	478	208	*	40	4,796	5,775
Kentucky	390	*	4	788	188	*	18	4,243	5,670
Louisiana	394	*	5	829	140	*	8	4,687	6,121
Maine	118	1	*	398	10	*	6	1,270	1,817
Maryland	*	#	16	1,157	*	*	5	6,270	8,400
Massachusetts	*	*	21	1,948	*	*	8	7,374	9,991
Michigan	774	2	*	2,332	119	*	43	9,885	13,252
Minnesota	449	2	*	1,172	225	*	35	5,502	7,421
Mississippi	340	#	*	332	51	*	5	2,762	3,552
Missouri	624	1	*	957	298	*	44	5,819	7,825
Montana	96	*	2	215	32	*	24	957	1,340
Nebraska	140	#	*	391	75	*	30	1,787	2,434

Figure 34 - Continued
Connections by Technology by State as of December 31, 2018
(Connections over 200 kbps in at least one direction, in thousands)

<i>State</i>	<i>ADSL</i>	<i>SDSL</i>	<i>Other Wireline¹</i>	<i>Cable Modem</i>	<i>Fiber</i>	<i>Satellite</i>	<i>Fixed Wireless</i>	<i>Mobile Wireless</i>	<i>Total</i>
Nevada	197	#	6	*	47	*	26	2,920	3,954
New Hampshire	68	#	*	446	30	*	1	1,290	1,845
New Jersey	128	*	27	2,146	*	*	#	9,312	12,644
New Mexico	219	*	4	322	54	*	23	1,848	2,485
New York	330	*	40	4,881	1,653	*	9	21,831	28,801
North Carolina	751	#	*	2,281	426	*	8	9,544	13,094
North Dakota	32	1	*	157	90	*	4	733	1,019
Northern Mariana Isl	*	0	*	*	*	0	*	*	*
Ohio	961	*	14	2,650	311	*	48	11,610	15,645
Oklahoma	359	#	*	598	115	*	54	3,640	4,823
Oregon	228	#	*	992	183	*	28	4,057	5,531
Pennsylvania	510	#	27	2,976	*	*	7	12,570	17,138
Puerto Rico	*	0	11	*	8	*	19	3,436	4,086
Rhode Island	*	*	2	*	*	*	*	972	1,374
South Carolina	417	#	*	1,049	192	*	5	4,590	6,297
South Dakota	39	*	#	177	64	*	10	793	1,091
Tennessee	500	#	*	1,226	370	*	14	6,506	8,688
Texas	2,005	#	*	4,550	1,574	*	230	28,186	36,789
Utah	155	*	6	532	181	*	54	2,788	3,722
Vermont	82	*	3	151	26	*	4	599	870
Virgin Islands	*	0	*	*	*	*	*	*	138
Virginia	265	#	*	1,545	944	*	18	7,963	10,850
Washington	400	#	*	1,925	239	*	37	7,447	10,128
West Virginia	*	*	1	380	12	*	3	1,349	1,945
Wisconsin	586	*	11	*	148	*	32	5,312	7,342
Wyoming	47	#	*	114	13	*	26	576	785
Total	21,932	20	600	68,857	16,021	1,971	1,465	330,531	441,397

¹ PowerLine and Other are summarized with Other Wireline to maintain firm confidentiality. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Figures may not sum to totals due to rounding.

Source: FCC Form 477.

Figure 35
Percentage of Fixed Connections by Downstream Speed by State as of December 31, 2018

State	% over 200 kbps Downstream	% at least 3 Mbps Downstream	Over 200 kbps Upstream and		
			% at least 10 Mbps Downstream	% at least 25 Mbps Downstream	% at least 100 Mbps Downstream
Alabama	99.6	96.2	84.7	67.6	46.2
Alaska	98.8	94.1	81.9	60.4	44.1
American Samoa	*	*	*	*	*
Arizona	99.8	98.1	92.3	73.9	51.3
Arkansas	99.7	95.7	81.7	56.9	28.6
California	99.8	98.3	90.3	77.5	55.5
Colorado	99.8	97.4	91.8	76.7	50.4
Connecticut	99.7	99.4	92.2	77.1	61.4
Delaware	99.9	99.0	95.2	91.8	66.2
District of Columbia	99.9	98.5	92.8	87.5	69.8
Florida	99.8	98.6	93.9	82.2	56.6
Georgia	99.4	97.2	88.3	73.3	49.1
Guam	*	*	*	*	*
Hawaii	99.9	99.8	93.1	86.5	61.2
Idaho	99.7	96.5	81.2	54.7	37.6
Illinois	99.8	98.3	89.2	74.5	49.7
Indiana	99.6	97.9	86.3	69.6	44.9
Iowa	99.8	95.9	83.4	64.5	28.5
Kansas	99.9	97.5	86.0	64.2	42.4
Kentucky	99.4	96.3	83.1	65.3	44.9
Louisiana	99.6	96.5	87.1	68.9	45.5
Maine	99.3	93.4	77.8	61.1	47.7
Maryland	99.9	98.9	94.6	88.8	64.9
Massachusetts	99.9	98.9	94.4	90.9	69.9
Michigan	99.5	98.1	88.9	76.0	53.1
Minnesota	99.8	97.4	88.4	72.0	47.0
Mississippi	99.4	94.7	79.3	55.3	30.3
Missouri	99.7	96.6	84.7	66.0	48.4
Montana	99.8	95.1	82.8	64.2	50.5
Nebraska	99.7	97.6	87.2	69.1	50.6

Figure 35 - Continued
Percentage of Fixed Connections by Downstream Speed by State as of December 31, 2018

State	% over 200 kbps Downstream	% at least 3 Mbps Downstream	Over 200 kbps Upstream and		
			% at least 10 Mbps Downstream	% at least 25 Mbps Downstream	% at least 100 Mbps Downstream
Nevada	99.9	98.8	93.8	79.7	59.3
New Hampshire	99.4	95.0	87.8	80.6	64.7
New Jersey	99.8	99.0	95.8	92.7	73.8
New Mexico	99.8	95.0	82.9	59.7	32.4
New York	99.7	99.0	94.1	87.8	72.4
North Carolina	99.4	97.5	87.7	75.1	58.8
North Dakota	99.9	98.4	93.4	82.7	61.1
Northern Mariana Isl	*	*	*	*	*
Ohio	99.9	97.9	87.5	69.3	47.8
Oklahoma	99.8	97.5	81.4	60.7	38.7
Oregon	99.8	97.4	90.2	76.9	52.0
Pennsylvania	99.8	98.0	90.3	82.6	57.1
Puerto Rico	100.0	89.0	57.3	37.5	17.7
Rhode Island	99.7	99.0	97.8	91.8	73.2
South Carolina	99.7	97.8	88.8	71.2	51.6
South Dakota	99.7	98.4	93.4	82.1	52.7
Tennessee	99.6	97.6	89.1	74.8	54.0
Texas	99.8	98.3	89.7	73.9	50.9
Utah	99.9	98.4	90.8	74.2	45.3
Vermont	97.9	89.0	74.3	62.0	44.2
Virgin Islands	99.9	99.0	62.8	*	*
Virginia	99.5	97.9	91.0	82.9	61.3
Washington	99.7	97.7	91.3	79.2	57.2
West Virginia	98.6	97.5	76.9	62.3	42.4
Wisconsin	99.4	96.8	86.7	67.6	50.5
Wyoming	99.8	95.6	84.6	71.6	45.9
Total	99.7	97.8	89.6	76.3	54.2

Figure 36
Providers of Connections by Technology by State as of December 31, 2018
(Connections over 200 kbps in at least one direction, in thousands)

<i>State</i>	<i>ADSL</i>	<i>SDSL</i>	<i>Other Wireline¹</i>	<i>Cable Modem</i>	<i>Fiber</i>	<i>Satellite</i>	<i>Fixed Wireless</i>	<i>Mobile Wireless</i>	<i>Total</i>
Alabama	25	4	*	19	41	*	21	7	82
Alaska	14	*	11	*	13	*	14	9	36
American Samoa	0	0	0	*	*	0	*	*	*
Arizona	23	*	24	14	41	*	46	6	102
Arkansas	24	4	*	21	43	*	22	5	84
California	34	11	*	31	83	*	127	5	211
Colorado	*	6	25	15	62	*	64	9	137
Connecticut	*	*	12	8	21	*	4	4	34
Delaware	*	*	9	6	*	*	*	4	25
District of Columbia	*	*	14	*	*	*	*	4	39
Florida	22	7	*	22	70	*	32	6	112
Georgia	27	4	*	32	82	*	23	5	123
Guam	*	0	0	*	*	0	0	4	4
Hawaii	*	*	11	*	*	*	5	5	25
Idaho	23	5	*	20	40	*	40	9	76
Illinois	53	7	*	20	101	*	91	6	194
Indiana	35	4	*	13	72	*	60	5	116
Iowa	88	16	*	40	166	*	87	8	230
Kansas	25	9	*	26	65	*	51	9	112
Kentucky	18	*	12	29	48	*	31	8	102
Louisiana	17	*	19	20	40	*	21	6	75
Maine	11	5	*	9	18	*	10	5	37
Maryland	*	5	19	15	*	*	20	5	69
Massachusetts	*	*	15	11	*	*	22	5	68
Michigan	33	5	*	25	69	*	47	6	125
Minnesota	44	8	*	21	81	*	51	5	129
Mississippi	19	4	*	14	30	*	14	6	60
Missouri	35	8	*	19	67	*	71	7	144
Montana	22	*	14	8	33	*	31	7	63
Nebraska	31	4	*	18	56	*	46	7	104

Figure 36 - Continued
Providers of Connections by Technology by State as of December 31, 2018
(Connections over 200 kbps in at least one direction, in thousands)

<i>State</i>	<i>ADSL</i>	<i>SDSL</i>	<i>Other Wireline¹</i>	<i>Cable Modem</i>	<i>Fiber</i>	<i>Satellite</i>	<i>Fixed Wireless</i>	<i>Mobile Wireless</i>	<i>Total</i>
Nevada	18	7	18	*	33	*	23	5	68
New Hampshire	8	4	*	5	20	*	7	5	36
New Jersey	10	*	27	10	*	*	10	4	62
New Mexico	21	*	16	11	32	*	35	7	73
New York	32	*	33	22	73	*	33	6	125
North Carolina	23	5	*	26	58	*	23	6	99
North Dakota	21	7	*	9	31	*	12	6	47
Northern Mariana Isl	*	0	*	*	*	0	*	*	*
Ohio	32	*	30	32	67	*	61	4	149
Oklahoma	37	6	*	13	55	*	49	12	113
Oregon	38	8	*	17	61	*	46	6	104
Pennsylvania	22	5	25	25	*	*	25	8	107
Puerto Rico	*	0	5	*	8	*	8	5	19
Rhode Island	*	*	8	*	*	*	*	4	24
South Carolina	20	4	*	17	33	*	15	6	56
South Dakota	22	*	13	9	32	*	20	8	71
Tennessee	23	4	*	22	69	*	35	7	116
Texas	65	14	*	33	131	*	153	10	260
Utah	19	*	15	13	29	*	34	9	72
Vermont	8	*	7	6	18	*	5	6	32
Virgin Islands	*	0	*	*	*	*	*	*	7
Virginia	24	6	*	20	68	*	39	6	110
Washington	27	6	*	24	62	*	55	6	117
West Virginia	*	*	11	17	23	*	16	6	59
Wisconsin	42	*	22	*	70	*	41	6	116
Wyoming	15	4	*	7	20	*	24	8	49
Total	719	125	239	374	1,243	6	1,209	71	2,165

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

= Rounds to Zero.

* = Data withheld to maintain firm confidentiality.

Figures may not sum to totals due to rounding.

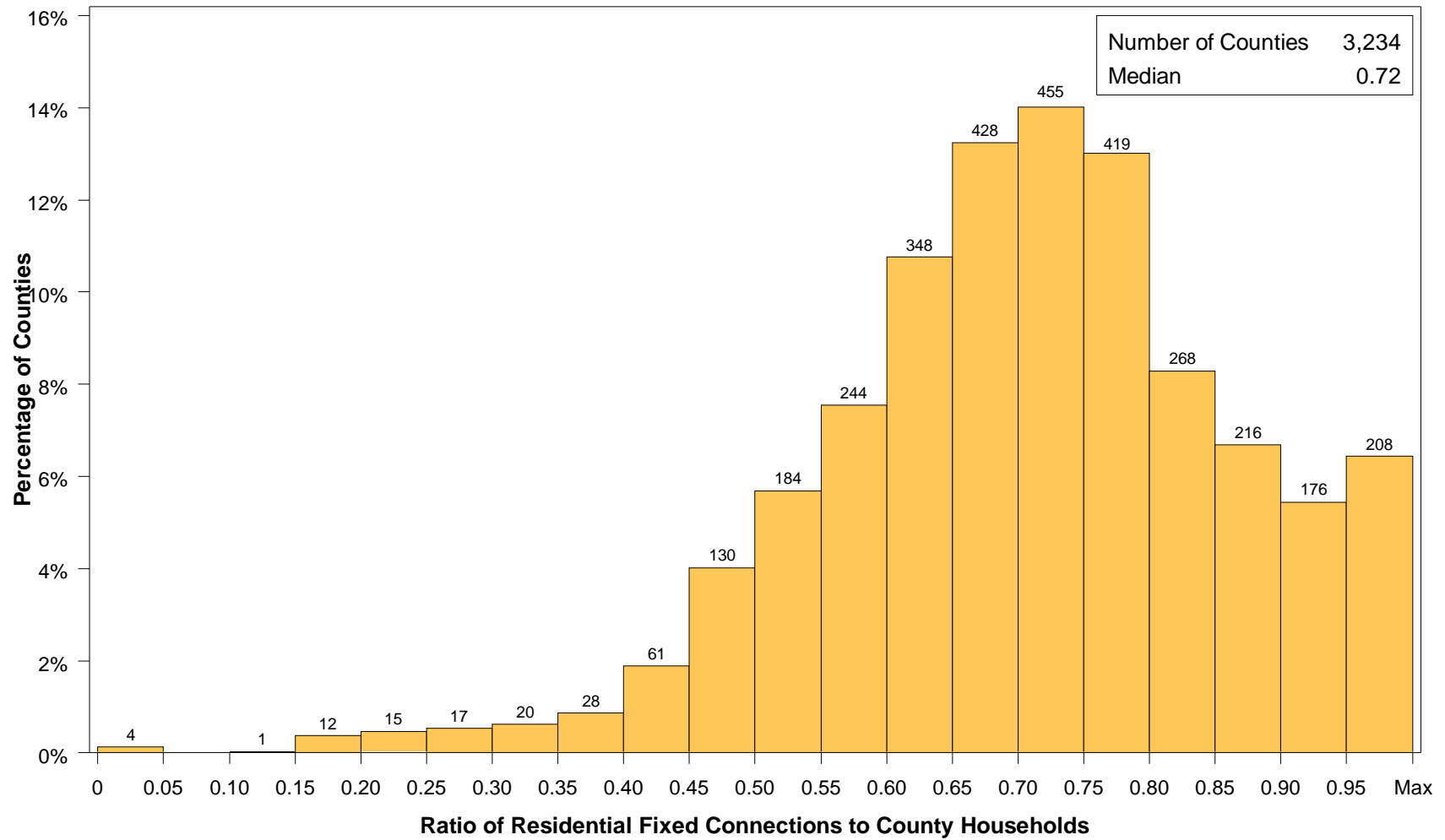
Source: FCC Form 477.

SECTION 4
SUMMARY STATISTICS: COUNTIES AND CENSUS TRACTS

Table of Contents

Figure 37	Distribution of Counties by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to County Households as of December 31, 2018	39
Figure 38	Distribution of Counties by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to County Households by Technology as of December 31, 2018	40
Figure 39	Distribution of Census Tracts by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households as of December 31, 2018	41
Figure 40	Distribution of Census Tracts by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households by Technology as of December 31, 2018	42
Figure 41	Percentage of Developed Census Blocks with Residential Fixed Connections by Technology as of December 31, 2018	43
Figure 42	Distribution of Counties by Ratio of Residential Fixed Connections to County Households by State as of December 31, 2018	44
Figure 43	Distribution of Census Tracts by Ratio of Residential Fixed Connections to Tract Households by State as of December 31, 2018	46

Figure 37
Distribution of Counties by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to County Households as of December 31, 2018



Note: Ratios over 1 were set to 1. See Technical Notes at the end of the report.
 Sources: FCC Form 477; 2014-2018 ACS 5-year estimates; and Census 2010.

Figure 38
Distribution of Counties by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction
to County Households by Technology as of December 31, 2018

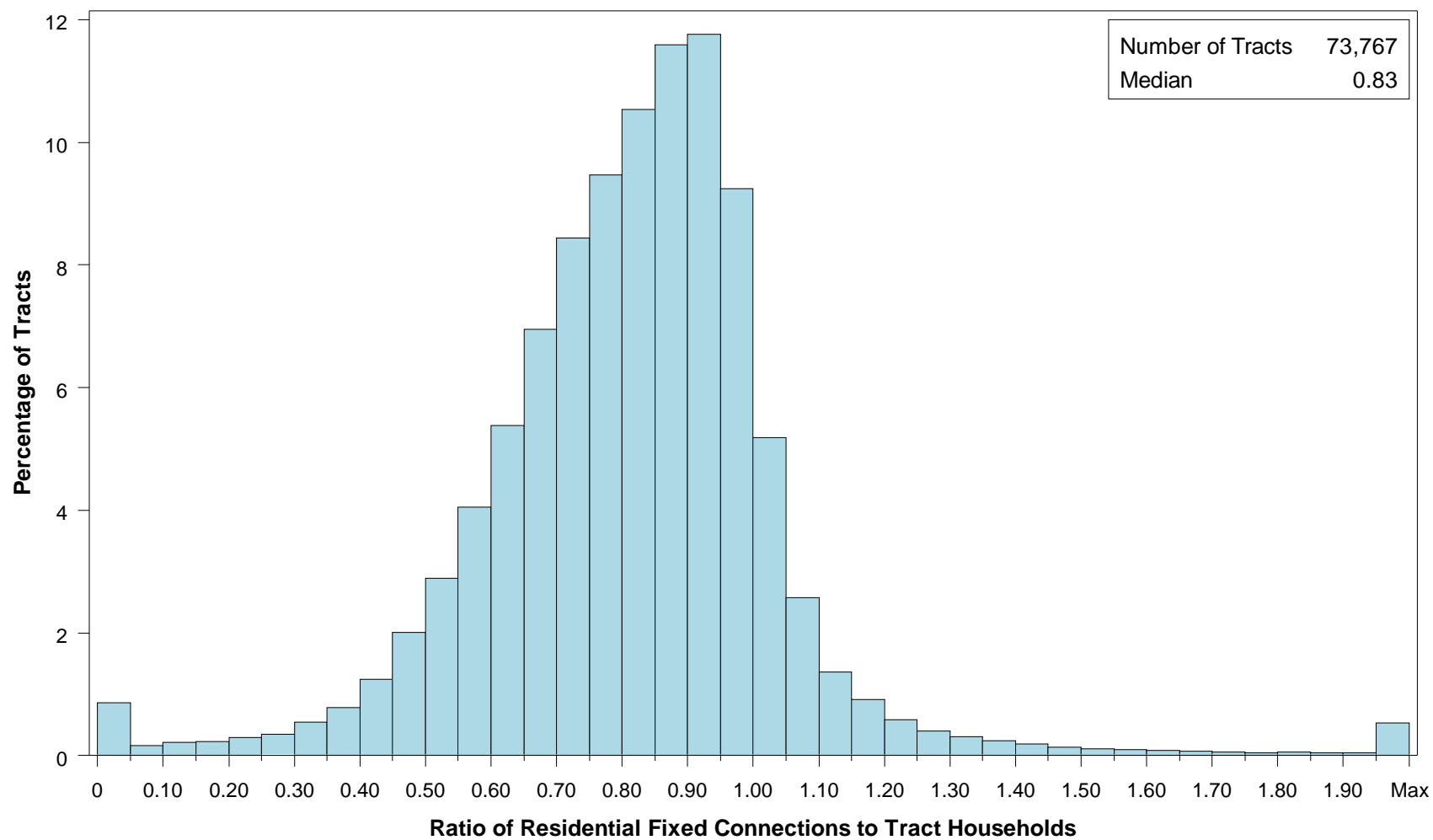
<i>Technology</i>	<i>Ratio of Residential Fixed Connections to County Households</i>										<i>100% or more</i>
	<i>Zero</i>	<i>Greater than 0 and no more than 5%</i>	<i>Greater than 5 and no more than 10%</i>	<i>Greater than 10 and no more than 20%</i>	<i>Greater than 20 and no more than 30%</i>	<i>Greater than 30 and no more than 40%</i>	<i>Greater than 40 and no more than 50%</i>	<i>Greater than 50 and no more than 60%</i>	<i>Greater than 60 and no more than 80%</i>	<i>Greater than 80 and no more than 100%</i>	
aDSL	1.5	6.9	8.8	29.1	27.1	15.6	6.9	2.5	1.3	0.3	0.1
sDSL	94.6	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Wireline	92.7	7.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cable Modem	12.0	7.1	5.9	13.7	13.0	12.3	12.4	11.5	10.1	1.5	0.4
FTTP	20.2	43.0	10.4	10.5	5.9	3.1	2.5	1.8	2.3	0.3	0.0
Satellite	0.4	64.5	22.8	11.0	0.9	0.4	0.0	0.0	0.0	0.0	0.0
Fixed Wireless	18.1	58.4	12.0	8.1	2.1	1.0	0.2	0.1	0.1	0.0	0.1
Total	0.1	0.0	0.0	0.4	1.0	1.5	5.9	13.2	51.0	23.0	3.8

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

Note: Figures may not sum to totals due to rounding.

Sources: FCC Form 477; 2014-2018 ACS 5-year estimates; and Census 2010.

Figure 39
Distribution of Census Tracts by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households as of December 31, 2018



Note: Ratios over 2 were set to 2. See Technical Notes at the end of the report.
 Sources: FCC Form 477; 2014-2018 ACS 5-year estimates; and Census 2010.

Figure 40
Distribution of Census Tracts by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction
to Tract Households by Technology as of December 31, 2018

Technology	Ratio of Residential Fixed Connections to Tract Households										100% or more
	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	
aDSL	3.1	23.6	14.8	25.3	17.6	9.1	3.7	1.5	0.9	0.2	0.2
sDSL	99.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Wireline	98.8	1.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cable Modem	5.2	2.6	1.6	3.6	5.7	10.7	16.1	19.1	25.7	7.8	1.9
FTTP	37.2	21.6	7.9	10.9	7.2	5.5	4.1	2.7	2.4	0.4	0.2
Satellite	23.8	65.9	5.6	3.7	0.8	0.2	0.1	0.0	0.0	0.0	0.0
Fixed Wireless	71.3	22.1	2.8	2.3	0.8	0.3	0.1	0.1	0.0	0.0	0.0
Total	0.8	0.1	0.2	0.5	0.6	1.3	3.3	6.9	30.3	43.2	12.9

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

Note: Figures may not sum to totals due to rounding.

Sources: FCC Form 477; 2014-2018 ACS 5-year estimates; and Census 2010.

Figure 41
Percentage of Developed Census Blocks with Residential Fixed Service by Technology as of December 31, 2018
 (Internet Access Service over 200 kbps in at least one direction)

<i>Technology</i>	<i>Number of Providers</i>							
	<i>Zero</i>	<i>One</i>	<i>Two</i>	<i>Three</i>	<i>Four</i>	<i>Five</i>	<i>Six</i>	<i>Seven or More</i>
aDSL	22.4	74.9	2.7	0.1	0.0	0.0	0.0	0.0
sDSL	99.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Other Wireline ¹	99.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Cable Modem	80.3	19.1	0.6	0.0	0.0	0.0	0.0	0.0
FTTP	74.1	24.8	1.1	0.1	0.0	0.0	0.0	0.0
Satellite	0.0	0.1	0.9	98.9	0.0	0.0	0.0	0.0
Fixed Wireless	58.6	26.8	10.8	3.3	0.5	0.0	0.0	0.0
aDSL and/or Cable Modem and/or FTTP	14.2	62.0	21.4	2.3	0.1	0.0	0.0	0.0
Any Technology	0.0	0.1	0.1	5.1	17.6	43.8	22.6	10.9

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of Form 477 technology categories and other reporting requirements.

Note: Figures may not sum to totals due to rounding. The number of providers in a census block does not necessarily reflect the number of choices available to a particular household, and does not purport to measure competition. Providers may list a census block on Form 477 if service can be provided to at least one location in the block. Developed census blocks are those with housing units based on the 2010 census.

Sources: FCC Form 477 and Census 2010.

Figure 42
Distribution of Counties by Ratio of Residential Fixed Connections to County Households by State as of December 31, 2018
(Connections over 200 kbps in at least one direction)

Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to County Households												
State	Counties	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	100% or more
Alabama	67	0	0	0	0	0	0	15	13	31	8	0
Alaska	29	0	0	0	1	1	1	3	1	11	8	3
American Samoa	5	2	0	0	0	2	0	1	0	0	0	0
Arizona	15	0	0	0	0	0	0	1	1	6	7	0
Arkansas	75	0	0	0	0	0	2	18	29	23	3	0
California	58	0	0	0	0	0	0	0	0	16	39	3
Colorado	64	0	0	0	0	0	1	0	7	19	22	15
Connecticut	8	0	0	0	0	0	0	0	0	0	8	0
Delaware	3	0	0	0	0	0	0	0	0	0	2	1
District of Columbia	1	0	0	0	0	0	0	0	0	0	1	0
Florida	67	0	0	0	0	0	0	0	5	19	28	15
Georgia	159	0	0	0	1	2	6	17	29	63	32	9
Guam	1	0	0	0	0	0	0	0	0	1	0	0
Hawaii	5	0	1	0	0	0	0	0	0	1	1	2
Idaho	44	0	0	0	0	0	0	2	2	26	10	4
Illinois	102	0	0	0	0	0	1	3	19	63	16	0
Indiana	92	0	0	0	0	0	0	0	15	62	15	0
Iowa	99	0	0	0	0	0	0	0	6	86	6	1
Kansas	105	0	0	0	0	0	0	2	12	73	18	0
Kentucky	120	0	0	0	0	1	1	7	12	84	15	0
Louisiana	64	0	0	0	0	0	2	11	14	28	9	0
Maine	16	0	0	0	0	0	0	0	0	3	11	2
Maryland	24	0	0	0	0	0	0	0	0	7	16	1
Massachusetts	14	0	0	0	0	0	0	0	0	0	11	3
Michigan	83	0	0	0	0	0	0	1	8	55	16	3
Minnesota	87	0	0	0	0	0	0	0	3	62	21	1
Mississippi	82	0	0	0	0	1	8	23	30	16	3	1
Missouri	115	0	0	0	0	0	1	12	27	60	14	1
Montana	56	0	0	0	0	0	0	0	4	33	17	2
Nebraska	93	0	0	0	0	0	0	4	14	72	3	0

Figure 42 - Continued
Distribution of Counties by Ratio of Residential Fixed Connections to County Households by State as of December 31, 2018
(Connections over 200 kbps in at least one direction)

Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to County Households												
State	Counties	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	100% or more
Nevada	17	0	0	0	0	0	1	1	1	9	5	0
New Hampshire	10	0	0	0	0	0	0	0	0	0	7	3
New Jersey	21	0	0	0	0	0	0	0	0	0	19	2
New Mexico	33	0	0	0	0	0	0	2	5	16	8	2
New York	62	0	0	0	0	0	0	0	0	35	24	3
North Carolina	100	0	0	0	1	1	2	2	12	41	34	7
North Dakota	53	0	0	0	0	0	0	0	3	35	12	3
Northern Mariana Isl	4	1	0	0	0	0	0	3	0	0	0	0
Ohio	88	0	0	0	0	0	0	1	8	59	20	0
Oklahoma	77	0	0	0	0	0	2	10	26	33	5	1
Oregon	36	0	0	0	0	0	0	1	1	16	14	4
Pennsylvania	67	0	0	0	0	0	0	0	0	39	25	3
Puerto Rico	78	0	0	0	10	22	11	15	16	4	0	0
Rhode Island	5	0	0	0	0	0	0	0	0	0	4	1
South Carolina	46	0	0	0	0	0	0	5	13	17	9	2
South Dakota	66	0	0	0	0	0	1	1	6	43	14	1
Tennessee	95	0	0	0	0	0	0	3	20	61	10	1
Texas	254	0	0	0	0	0	3	14	47	132	51	7
Utah	29	0	0	0	0	0	0	0	0	9	13	7
Vermont	14	0	0	0	0	0	0	0	0	0	11	3
Virgin Islands	3	0	0	0	0	0	0	0	1	1	1	0
Virginia	134	0	0	0	0	1	5	11	12	65	38	2
Washington	39	0	0	0	0	0	0	1	1	15	21	1
West Virginia	55	0	0	0	0	1	0	0	4	42	8	0
Wisconsin	72	0	0	0	0	0	0	0	1	45	24	2
Wyoming	23	0	0	0	0	0	0	1	0	13	8	1
Total	3,234	3	1	0	13	32	48	191	428	1650	745	123

Note: Figures may not sum to totals due to rounding. See Technical Notes at the end of the report.

Sources: FCC Form 477; 2014-2018 ACS 5-year estimates (Households for U.S. and District of Columbia); Census 2010 (Households for Puerto Rico, American Samoa, Guam, Northern Mariana Islands and U.S. Virgin Islands).

Figure 43
Distribution of Census Tracts by Ratio of Residential Fixed Connections to Tract Households by State as of December 31, 2018
(Connections over 200 kbps in at least one direction)

Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households												
State	Tracts	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	100% or more
Alabama	1,179	5	0	0	0	8	64	109	193	433	290	77
Alaska	167	1	0	1	4	3	3	4	13	54	64	20
American Samoa	18	2	0	0	0	7	6	0	1	0	1	1
Arizona	1,526	12	4	7	14	13	17	45	91	383	586	354
Arkansas	686	1	0	0	0	6	46	106	137	240	128	22
California	8,036	55	3	1	4	20	47	70	260	1,849	4,726	1,001
Colorado	1,249	14	1	0	0	1	5	11	36	260	663	258
Connecticut	829	2	0	0	2	0	1	6	20	144	536	118
Delaware	215	1	0	0	0	1	0	0	6	48	103	56
District of Columbia	179	1	0	0	0	0	0	2	8	53	81	34
Florida	4,199	40	3	1	3	7	12	60	148	814	1,835	1,276
Georgia	1,964	11	1	0	2	14	37	109	172	571	740	307
Guam	56	7	0	1	4	2	3	5	5	8	9	12
Hawaii	326	14	1	0	3	2	3	9	7	58	125	104
Idaho	298	0	0	0	1	3	2	4	18	131	115	24
Illinois	3,121	6	1	0	5	7	21	93	283	1,118	1,353	234
Indiana	1,508	4	1	1	3	3	20	59	169	654	501	93
Iowa	825	4	0	0	0	0	3	20	69	509	197	23
Kansas	770	10	0	0	1	2	2	24	74	327	276	54
Kentucky	1,115	10	0	1	5	9	26	44	125	480	367	48
Louisiana	1,136	12	2	0	1	12	33	103	138	430	341	64
Maine	351	0	0	0	0	0	0	0	2	104	185	60
Maryland	1,394	9	0	0	0	0	8	21	65	260	776	255
Massachusetts	1,471	13	1	0	0	2	1	3	24	273	901	253
Michigan	2,767	28	1	2	8	19	60	153	260	850	1,191	195
Minnesota	1,335	4	0	0	1	2	10	33	60	506	639	80
Mississippi	661	4	0	0	0	10	49	137	137	206	100	18
Missouri	1,393	4	0	0	1	7	32	98	180	476	502	93
Montana	271	2	0	0	1	0	4	5	11	114	114	20
Nebraska	532	4	0	0	0	0	1	10	41	275	167	34

Figure 43 - Continued
Distribution of Census Tracts by Ratio of Residential Fixed Connections to Tract Households by State as of December 31, 2018
(Connections over 200 kbps in at least one direction)

Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households												
State	Tracts	Zero	Greater than 0 and no more than 5%	Greater than 5 and no more than 10%	Greater than 10 and no more than 20%	Greater than 20 and no more than 30%	Greater than 30 and no more than 40%	Greater than 40 and no more than 50%	Greater than 50 and no more than 60%	Greater than 60 and no more than 80%	Greater than 80 and no more than 100%	100% or more
Nevada	683	5	0	1	0	2	6	14	28	177	321	129
New Hampshire	294	2	0	0	0	0	0	0	1	36	178	77
New Jersey	2,004	10	0	0	1	1	2	2	21	339	1,149	479
New Mexico	499	2	2	3	2	12	13	25	74	183	151	32
New York	4,900	77	1	1	9	18	15	40	151	1,541	2,348	699
North Carolina	2,183	20	3	11	26	22	23	38	136	699	835	370
North Dakota	205	0	0	0	0	0	0	2	12	111	63	17
Northern Mariana Isl	22	2	0	0	1	2	4	6	2	3	2	0
Ohio	2,946	7	0	0	2	5	28	101	264	1,186	1,183	170
Oklahoma	1,046	0	0	1	6	13	39	105	190	367	229	96
Oregon	827	2	0	0	0	0	6	12	26	238	478	65
Pennsylvania	3,217	22	0	0	5	4	12	42	141	1,225	1,469	297
Puerto Rico	903	18	54	78	196	138	127	89	46	45	29	83
Rhode Island	241	1	0	0	0	0	0	1	2	51	147	39
South Carolina	1,097	13	0	0	0	13	18	75	123	344	353	158
South Dakota	222	0	0	0	2	0	2	8	13	113	72	12
Tennessee	1,497	21	1	0	1	7	25	83	189	586	450	134
Texas	5,253	39	1	2	4	31	90	281	614	1,707	1,792	692
Utah	588	4	2	1	1	1	0	4	10	116	348	101
Vermont	184	1	0	0	0	0	0	1	0	33	110	39
Virgin Islands	29	0	0	0	1	2	1	3	7	10	3	2
Virginia	1,895	22	0	0	4	13	35	71	132	469	831	318
Washington	1,446	2	1	0	0	4	4	14	27	276	920	198
West Virginia	484	0	0	1	3	2	12	24	66	201	146	29
Wisconsin	1,393	3	1	2	9	16	6	26	76	586	587	81
Wyoming	132	1	0	0	1	0	1	2	4	55	61	7
Total	73,767	554	85	116	337	466	985	2,412	5,108	22,325	31,867	9,512

Note: Figures may not sum to totals due to rounding. See Technical Notes at the end of the report.

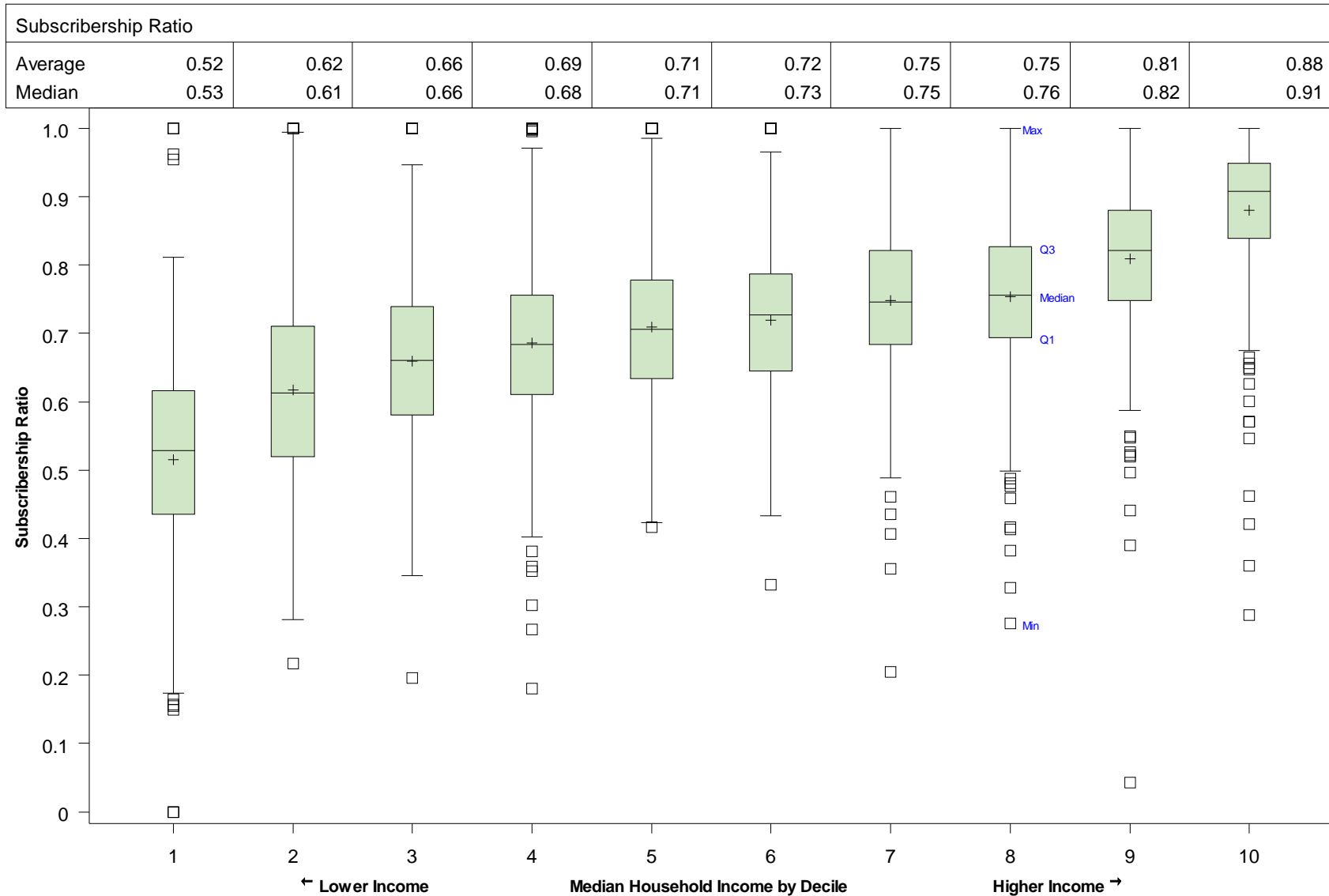
Sources: FCC Form 477; 2014-2018 ACS 5-year estimates (Households for U.S. and District of Columbia); Census 2010 (Households for Puerto Rico, American Samoa, Guam, Northern Mariana Islands and U.S. Virgin Islands).

SECTION 5
CORRELATED RESULTS: DEMOGRAPHIC MEASURES

Table of Contents

Figure 44	Subscribership Ratio Distributions by Income Deciles as of December 31, 2018..	49
Figure 45	Subscribership Ratio Distributions by Density Deciles as of December 31, 2018..	50
Figure 46	Subscribership Ratio Distributions by Share of Population with a College Degree (in Deciles) as of December 31, 2018	51
Figure 47	Subscribership Ratio Distributions by Average Age of County Population (in Deciles) as of December 31, 2018	52
Figure 48	Subscribership Ratios by Technology and Tract Household Density as of December 31, 2018.....	53
Figure 49	Average Subscribership Ratios by Income and Household Density as of December 31, 2018.....	54

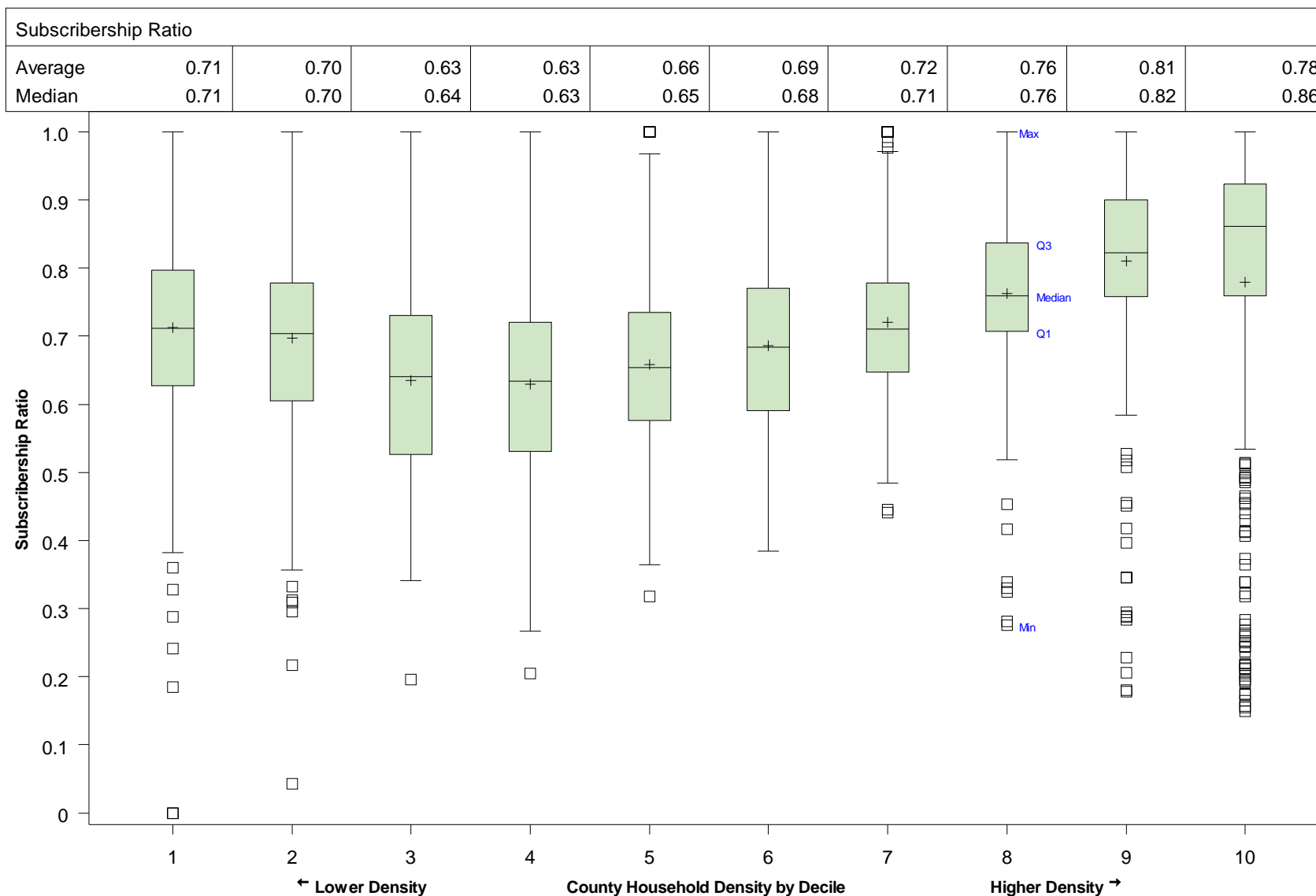
Figure 44
Subscribership Ratio Distributions by Income Deciles as of December 31, 2018



Note: Each box plot shows the distribution of residential subscribership to connections over 200 kbps in at least one direction for counties in the income decile. Some of the features are labeled, but note also that + denotes the position of the average residential subscribership ratio taken across all counties in the decile; ⊥ is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and □ is any data point beyond $Q1-1.5(Q3-Q1)$ or $Q3+1.5(Q3-Q1)$. Ratios greater than 1 were set to 1.

Sources: FCC Form 477; 2014-2018 ACS 5-year Estimates; Census 2010.

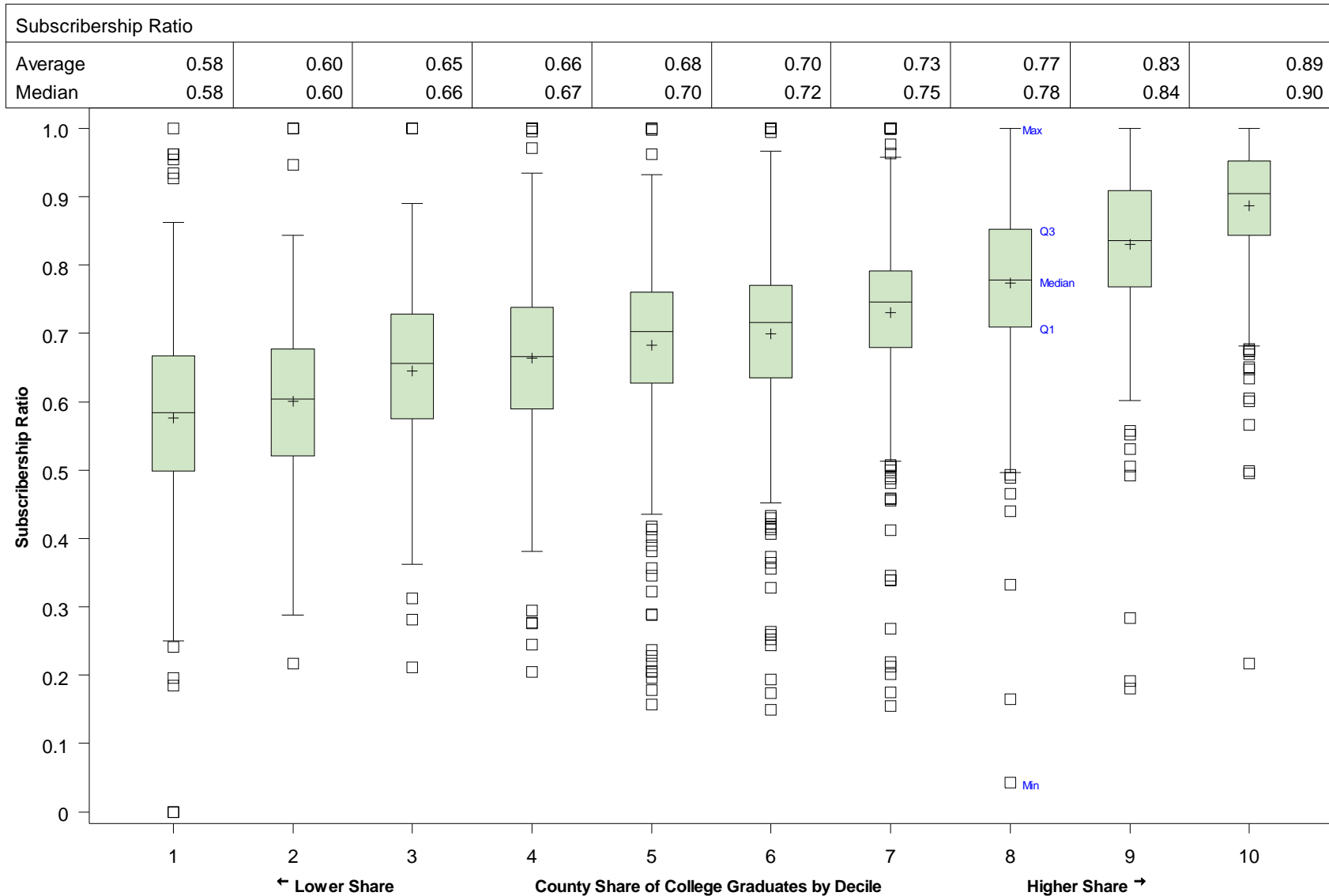
Figure 45
Subscribership Ratio Distributions by Density Deciles as of December 31, 2018



Note: Each box plot shows the distribution of residential subscribership to connections over 200 kbps in at least one direction for counties in the density decile. Some of the features are labeled, but note also that + denotes the position of the average residential subscribership ratio taken across all counties in the decile; ⊥ is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and □ is any data point beyond $Q1-1.5(Q3-Q1)$ or $Q3+1.5(Q3-Q1)$. Ratios greater than 1 were set to 1.

Sources: FCC Form 477; 2014-2018 ACS 5-year Estimates; Census 2010.

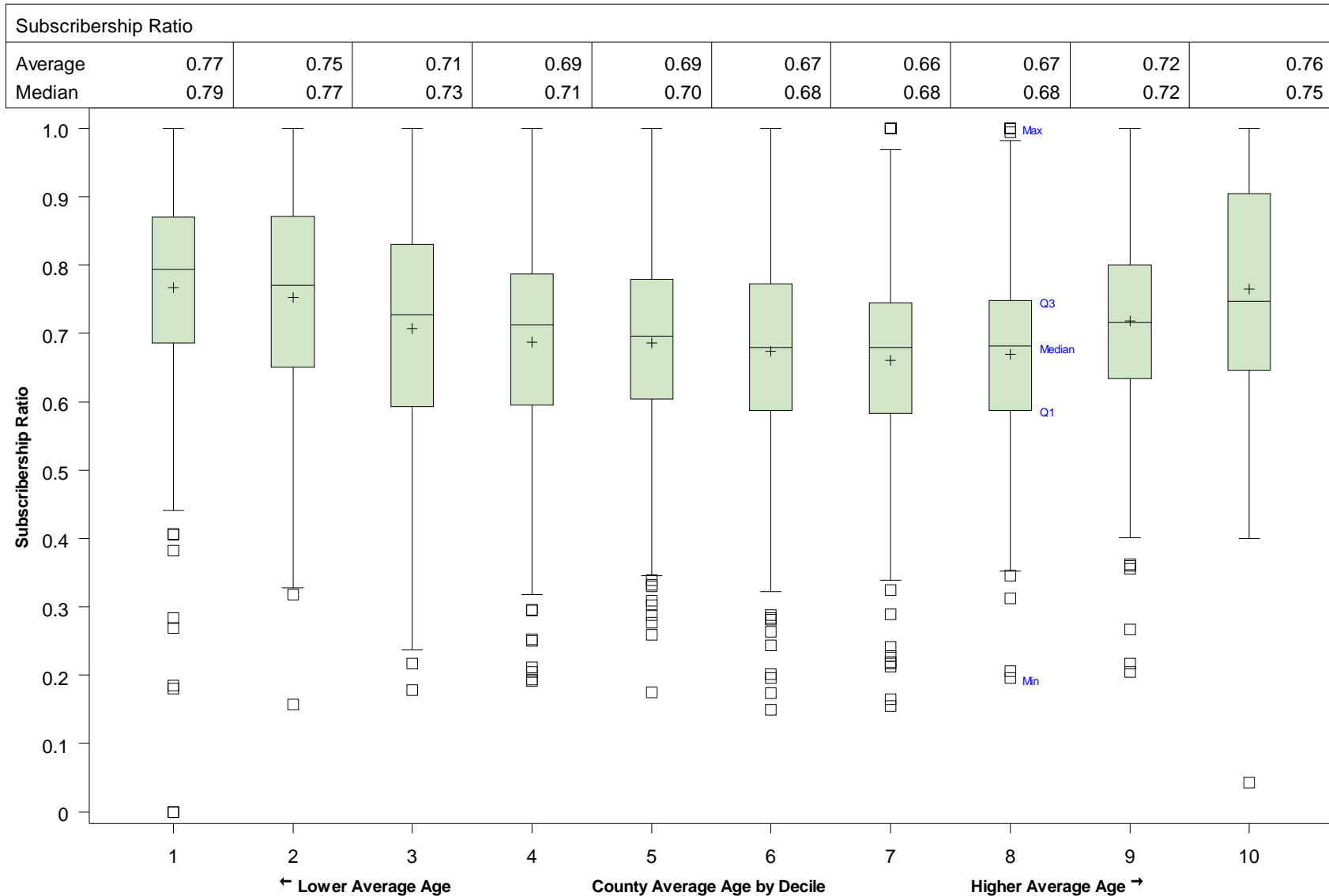
Figure 46
Subscribership Ratio Distributions by Share of Population with a College Degree (in Deciles) as of December 31, 2018



Note: Each box plot shows the distribution of residential subscribership to connections over 200 kbps in at least one direction for counties in the share decile. Some of the features are labeled, but note also that + denotes the position of the average residential subscribership ratio taken across all counties in the decile; ⊥ is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and □ is a data point beyond $Q1-1.5(Q3-Q1)$ or $Q3+1.5(Q3-Q1)$. Ratios greater than 1 were set to 1.

Sources: FCC Form 477; 2014-2018 ACS 5-year Estimates; Census 2010.

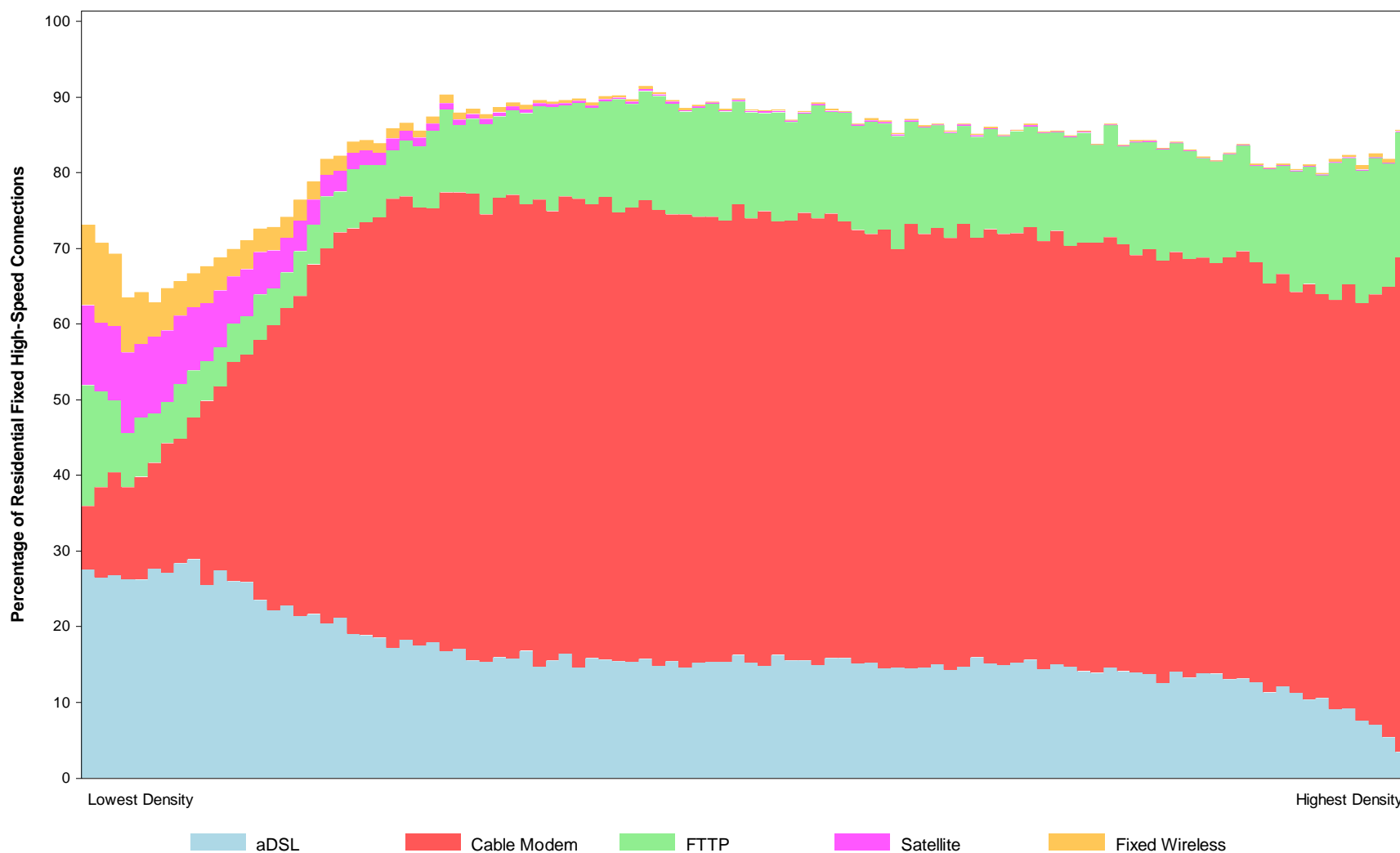
Figure 47
Subscribership Ratio Distributions by Average Age of County Population (in Deciles) as of December 31, 2018



Note: Each box plot shows the distribution of residential subscribership to connections over 200 kbps in at least one direction for counties in the average age decile. Some of the features are labeled, but note also that + denotes the position of the average residential subscribership ratio taken across all counties in the decile; ⊥ is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and □ is a data point beyond $Q1-1.5(Q3-Q1)$ or $Q3+1.5(Q3-Q1)$. Ratios greater than 1 were set to 1.

Sources: FCC Form 477; 2014-2018 ACS 5-year Estimates; Census 2010.

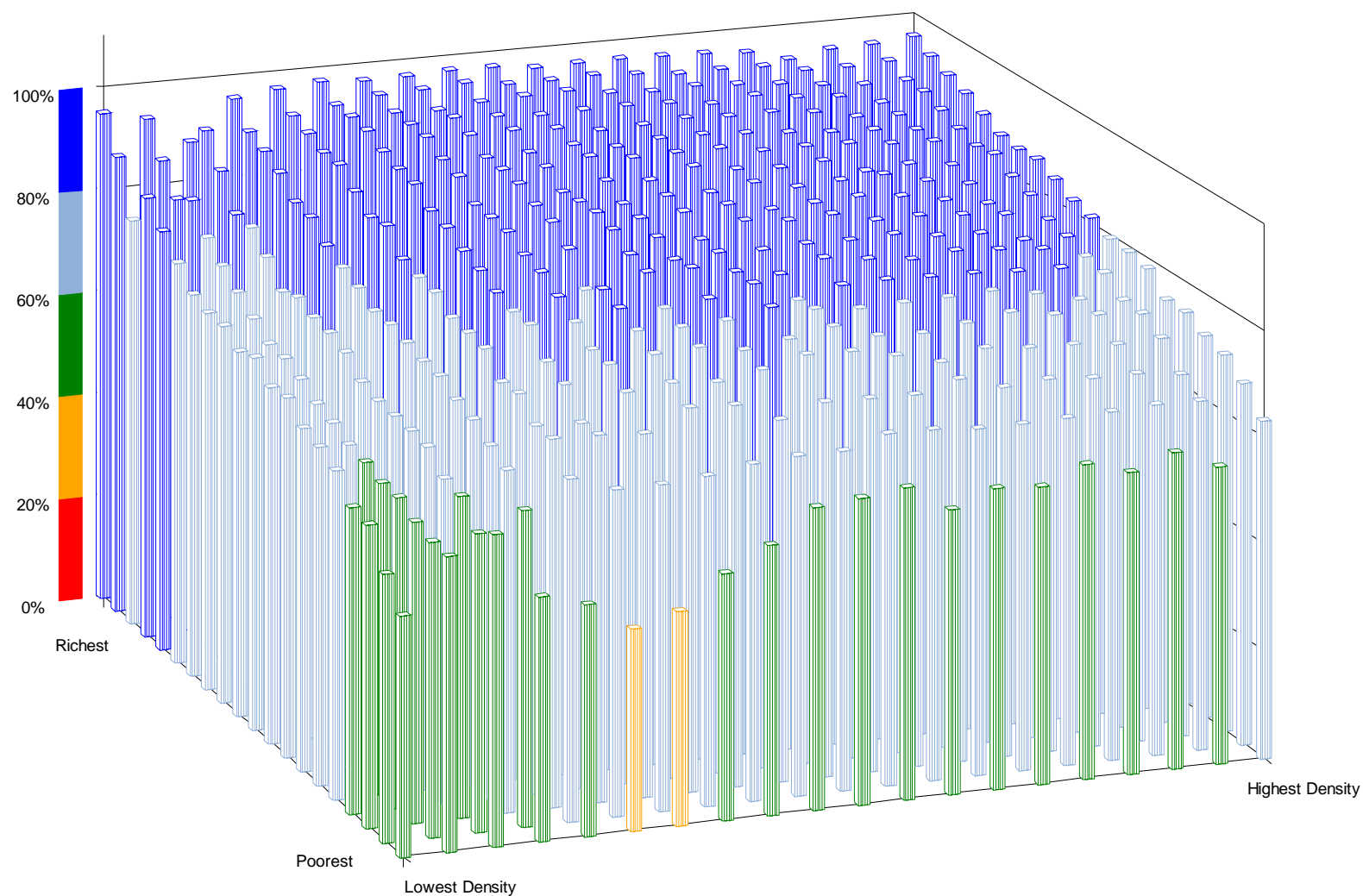
Figure 48
Subscribership Ratios by Technology and Tract Household Density as of December 31, 2018
(Residential fixed connections over 200 kbps in at least one direction)



This chart shows subscribership ratios by technology and household density. Tracts were grouped into 100 density percentiles based on households per square mile, calculated as the ratio of estimated tract households to tract land area from the Census Bureau. For each percentile, the height of the bar represents the household-weighted average ratio of residential fixed connections to households across tracts in the percentile.

Sources: FCC Form 477; 2014-2018 ACS 5-year estimates; and Census 2010.

Figure 49
Average Subscribership Ratios by Income and Household Density as of December 31, 2018
(Residential fixed connections over 200 kbps in at least one direction by Tract)



This chart shows subscribership ratios by household density and income quantiles. Tracts were grouped into 400 density/income quantiles based on households per square mile, calculated as the ratio of estimated tract households to tract land area, and median household income. For each quantile, the height of the grid represents the household-weighted average ratio of residential fixed connections to households across tracts in the decile.

Sources: FCC Form 477; 2014-2018 ACS 5-year estimates; and Census 2010.

Technical Notes

General

The information presented in this report is based on data from FCC Form 477. Through Form 477, facilities-based broadband providers submit information to the FCC about where they offer and have subscribers to Internet access services over 200 kilobits per second (kbps) in at least one direction. In June 2013, the Commission adopted several changes to Form 477.¹ Detailed information about those changes and about the Form 477 reporting requirements in general is available at www.fcc.gov/form477. Due to technical difficulties in 2014 with the redesigned Form 477 filing interface, the filing deadline for Form 477 data as of June 30, 2014 was moved to December 11, 2014. Because of that delay, the Commission staff were not able to perform their typical process of identifying anomalies or errors in the data, following up with filers, and requesting updates to the data where appropriate – a process which usually generates a significant number of corrections and hence a more accurate Form 477 data set.

Form 477 collects information about *Internet access connections in service* to end-user locations that are advertised to deliver information to and/or from the end user – that is, in at least one direction – at transfer rates (speeds) above 200 kilobits per second (kbps). Information is collected about the number of connections by the advertised speeds associated with each product subscribed to in the relevant geographic area, census tracts for fixed and states for mobile. Fixed providers report connections by the maximum advertised upload and download speeds, while mobile providers report connections by minimum advertised upload and download speeds. Fixed connections are further categorized by the technology employed by the part of the connection that terminates at the end-user location. Wherever a *number of providers* is cited in this report, multiple Form 477 filers within a holding company structure count as one provider.

“End users” are residential, business, institutional, or government entities who use services for their own purposes and who do not resell such services to other entities. *Facilities-based providers* report information about connections they provide directly to their own end-user customers and also connections that they provide to Internet Service Providers for resale to end users. For Form 477 purposes, the facilities-based provider of a connection is the entity that owns the portion of the physical facility that terminates at the end-user location, obtains an unbundled network element (UNE), special access line, or other leased facility that terminates at the end-user location and provisions/equips it as a connection that transfers information at rates over 200 kbps in at least one direction, or provisions/equips a wireless channel that transfers information at rates over 200 kbps in at least one direction to the end-user location over licensed spectrum or over spectrum that the provider uses on an unlicensed basis.

The mutually exclusive Form 477 *technology categories* are: asymmetric Digital Subscriber Line (aDSL in this report); symmetric Digital Subscriber Line (sDSL); other copper wireline; cable modem; optical carrier / fiber to the end user; satellite; terrestrial fixed wireless (using licensed or unlicensed spectrum); mobile wireless; and all other (which is included to capture deployment of additional technologies over time). In the Form 477 data collection, aDSL-based services delivered over fiber-to-the-node architecture are reported in the aDSL category. The other wireline category comprises T1/DS1, T3/DS3, and other copper-based connections, not elsewhere categorized, that deliver *Internet access* service at the end-user

¹ *Modernizing the FCC Form 477 Data Program*, WC Docket No. 11-10, Report and Order, 28 FCC Rcd 9887 (2013). See also *High-Speed Services for Internet Access: Status as of December 31, 2014* (March 2016) at 1-2, available at <https://www.fcc.gov/reports-research/reports/internet-access-services-reports/internet-access-services-reports>.

location. Ethernet connections delivering Internet access service are reported in the other wireline category if the connection terminates over copper and in the FTTP category if the connection terminates over fiber. Connections deployed over hybrid fiber-coax (HFC) architecture are reported in the cable modem category. Wireless ISPs (WISPs) report in the fixed wireless category if providing service to dispersed, fixed end-user locations and report in the mobile wireless category if providing a commercial service that can be received at any location within a service footprint. Wireless local area networks (such as Wi-Fi hotspots) that only enable local distribution and sharing of a premises connection are not included, although the shared premises connection is included.

Numbers of connections presented in this report are not adjusted for the number of persons at a single end-user location who have access to, or who use, the Internet access services delivered over the connection to that location.

Numbers of residential connections are estimated based on the total connections and percentage-residential connections information reported on Form 477.

Census tracts

Since the collection of data as of December 31, 2008, facilities-based providers of reportable fixed-location Internet access connections have been reporting connection counts at the census tract level of detail. Facilities-based mobile wireless providers report connection counts by state rather than census tract.

The census tract-level data summarized in this report were collected for tracts in the 2010 decennial census. For the purposes of this report, there are 73,767 census tracts because we exclude census tracts delineated specifically to cover large bodies of water.

About 110 of the census tracts have population but no households because the population resides in group living quarters. For the purpose of estimating residential subscribership rates by census tract, we assume these census tracts have no reportable *residential* Internet access service because persons residing in group quarters would have Internet access over a business connection provided to the operator of the group quarters. Therefore, these census tracts are included in the “zero” column.

Ratios of residential fixed-location connections to households that exceed 100%

We estimate the share of households with fixed-location connections in individual census tracts by taking the ratio of the reported number of fixed-location residential service connections to the estimated number of households. We continue to find “outlier” estimates at or above 100% and to find that the number of outliers is substantially reduced when estimates are made for individual counties rather than for individual census tracts.

Possible explanations of ratios at or above 100% include: (1) geocoding misallocations of service locations to census tracts; (2) proper allocation of connections to the county level by some filers, but improper allocation of all connections to a single tract in the county; (3) possible overestimation of residential connections in service plans for which the customer base is primarily residential; and (4) connections at seasonally or occasionally occupied housing units, such as vacation homes, while the household is counted elsewhere. The numbers of households in census tracts that were used to generate the estimated ratios are themselves estimates (from Census 2011-2015 ACS 5-year estimates), which could have an independent effect.

Maps showing residential subscribership rates by census tract

The two maps based on estimated Internet access connections over 200 kbps in at least one direction per 1,000 households (that is, estimated household subscribership rates) exclude all connections identified as business connections and necessarily exclude residential mobile wireless connections (which are reported for the state but not for individual census tracts).

Glossary

Term	Definition
aDSL	Asymmetric Digital Subscriber Line: A digital local loop typically using copper facilities and providing greater bandwidth in one direction than the other.
Cable modem service	A service which offers customers access to the Internet over a cable system.
Downstream speed	Speed of transmission from the Internet to the end user.
End users	Residential, business, institutional, or government entities who use services for their own purposes and who do not resell such services to other entities.
Facilities-based provider	Entity that owns the portion of the physical facility that terminates at the end-user location, obtains an unbundled network element (UNE), special access line, or other leased facility that terminates at the end-user location and provisions/equips it as a connection that transfers information at rates over 200 kbps in at least one direction, or provisions/equips a wireless channel that transfers information at rates over 200 kbps in at least one direction to the end-user location over licensed spectrum or over spectrum that the provider uses on an unlicensed basis.
Fixed wireless	A radio communication service between specified fixed points.
Fixed technologies	All technologies other than terrestrial mobile wireless.
FTTH or FTTP	Fiber to the Home (Premises): A network access architecture in which optical fiber is deployed all the way to the customer's home (premises).
Internet access service	Service that provides end users access to the Internet.
ISPs	Internet Service Providers: Companies or organizations that provide Internet access service (see above).
Mobile wireless service	A radio communication service between mobile and fixed stations, or between mobile stations.
Mobile wireless provider	Provider of mobile wireless service (see above).
Other wireline	All copper-wire based technologies other than DSL technologies; Ethernet over copper and T-1 are examples.
Power line	Internet access service delivered over electric power transmission lines.
Satellite communications	A telecommunications service provided via one or more satellite relays and their associated uplinks and downlinks.
sDSL	Symmetric Digital Subscriber Line: DSL technology that provides equal bandwidth for both uploads and downloads.
Speed tiers	Sub-groupings defined by ranges of upstream speeds and downstream speeds.
Upstream speed	Speed of transmission from the end user to the Internet.
Wi-Fi hotspot	Wireless Fidelity: Generic term referring to any type of IEEE 802.11 wireless network. A hotspot is a small geographic area in which users

	can gain access to a Wi-Fi network which in turn connects to the Internet.
Wireless service	Telephone, Internet, data, and other services provided to customers through the transmission of signals over networks of radio towers.
Wireless service provider	Provider of wireless service (see above).
WISP	Wireless ISP: A company that provides end users with wireless access to the Internet, most commonly by using radio spectrum designated for unlicensed use.

Customer Response

Publication: *Internet Access Services: Status as of December 31, 2018*

You can help us provide the best possible information to the public by completing this form and returning it to the Industry Analysis Division of the FCC's Office of Economics and Analytics.

1. Please check the category that best describes you:

- ☐ press
- ☐ current telecommunications carrier
- ☐ potential telecommunications carrier
- ☐ business customer evaluating vendors/service options
- ☐ consultant, law firm, lobbyist
- ☐ other business customer
- ☐ academic/student
- ☐ residential customer
- ☐ FCC employee
- ☐ other federal government employee
- ☐ state or local government employee
- ☐ Other (please specify)

2. Please rate the report: Excellent Good Satisfactory Poor No opinion

- | | | | | | |
|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Data accuracy | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Data presentation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Timeliness of data | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Completeness of data | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Text clarity | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Completeness of text | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. Overall, how do you rate this report? Excellent Good Satisfactory Poor No opinion

- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|

4. How can this report be improved?

5. May we contact you to discuss possible improvements?

Name:

Telephone #:

To discuss the information in this report, contact: 202-418-0940 or for users of TTY equipment, call 202-418-0484		
Fax this response to 202-418-0520	or	Mail this response to FCC/OEA/IAD, Mail Stop 1600 F Washington, DC 20554
Scan and email to OEA-IADreports@fcc.gov		