

Internet Access Services: Status as of December 31, 2020

Industry Analysis Division
Office of Economics & Analytics
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SECTION 1: OVERVIEW & HIGHLIGHTS

Introduction

This report summarizes information about Internet access connections in the United States as of December 31, 2020 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/internet-access-services-reports>.

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

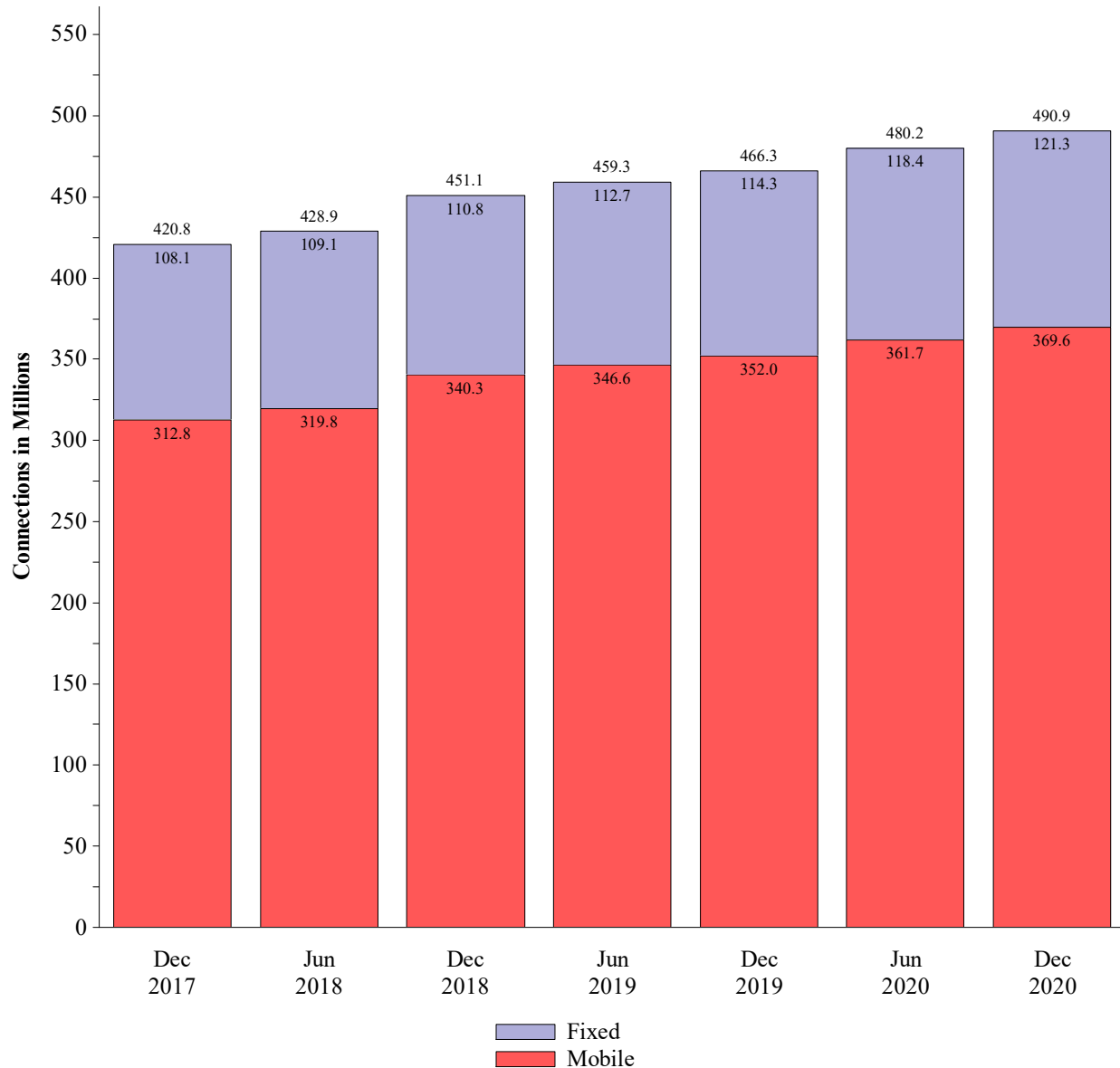
² The Commission began collecting census tract-level data for data as of December 31, 2008. *See High-Speed Services for Internet Access: Status as of December 31, 2008* (February 2010) at 1-4, available at <http://www.fcc.gov/encyclopedia/high-speed-services-internet-access-reports> (December 2008 High-Speed 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 5.3% between December 2019 and December 2020 to 491 million. Mobile Internet connections increased 5.0% year-over-year to 370 million in December 2020, while fixed connections grew to 121 million – up about 6.1% from December 2019.

Figure 1
Fixed and Mobile Connections 2017-2020



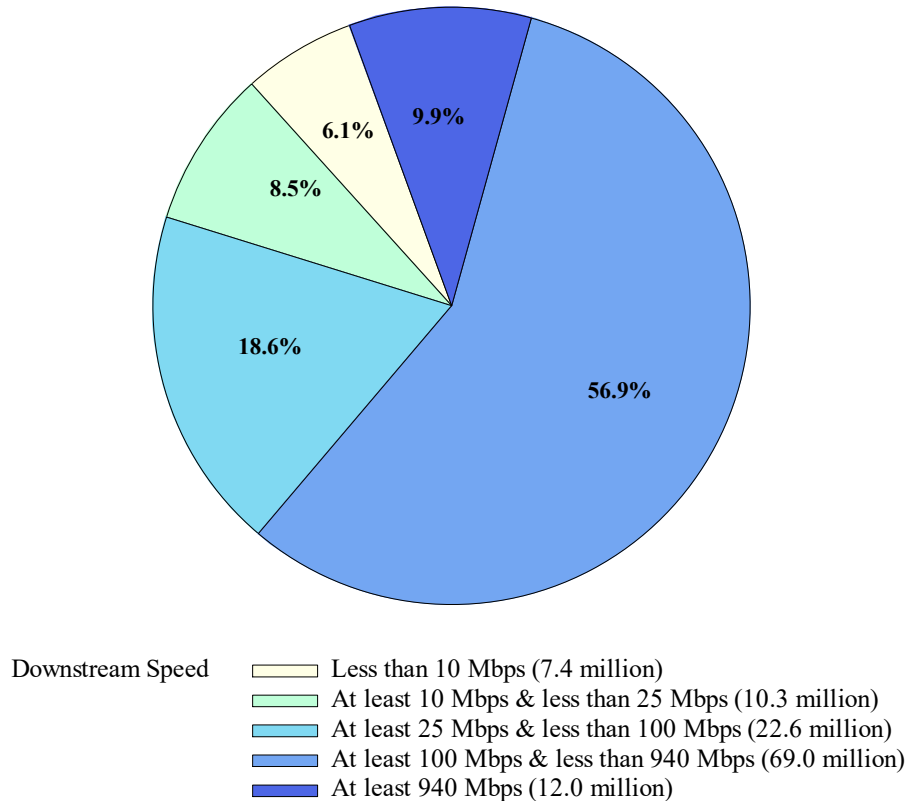
Note: Some previously-published data may have been revised. Numbers may not sum to totals due to rounding. Connections include both residential and business connections. We believe mobile Internet connections remain underreported by as much as 2% through June 2018 due to inadequate accounting of connections sold by downstream mobile virtual network operators (MVNOs).

Source: FCC Form 477.

Connections by Speed

Fixed connections – downstream speeds. Figure 2(a) illustrates how the 121 million fixed connections reported for December 2020 were distributed across the five groups of *downstream speeds* defined by breakpoints at 10 Mbps, 25 Mbps, 100 Mbps, and 940 Mbps. See Figure 9 for more detail.

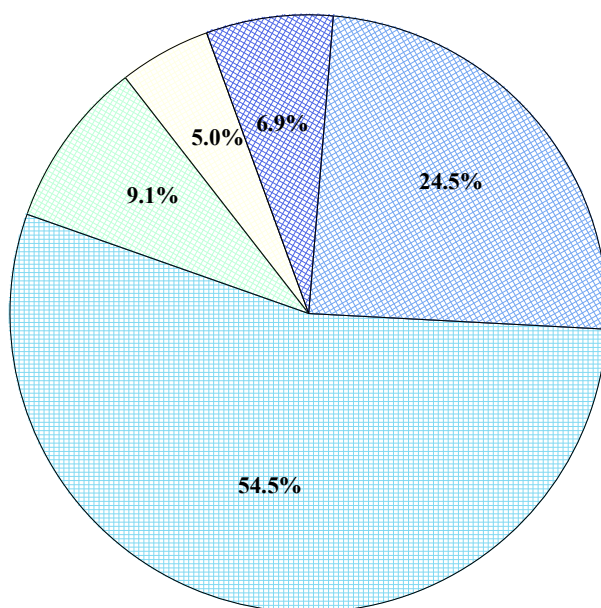
Figure 2(a)
Distribution of Fixed Connections (121.3 million) by Downstream Speed
as of December 31, 2020



Note: Numbers may not sum to total due to rounding.
Source: FCC Form 477.

Fixed connections – upstream speeds. Figure 2(b) illustrates how the 121 million fixed connections reported for December 2020 were distributed across the five groups of *upstream speeds* defined by breakpoints at 1 Mbps, 3 Mbps, 20 Mbps, and 500 Mbps. See Figure 9 for more detail.

Figure 2(b)
Distribution of Fixed Connections (121.3 million) by Upstream Speed
as of December 31, 2020

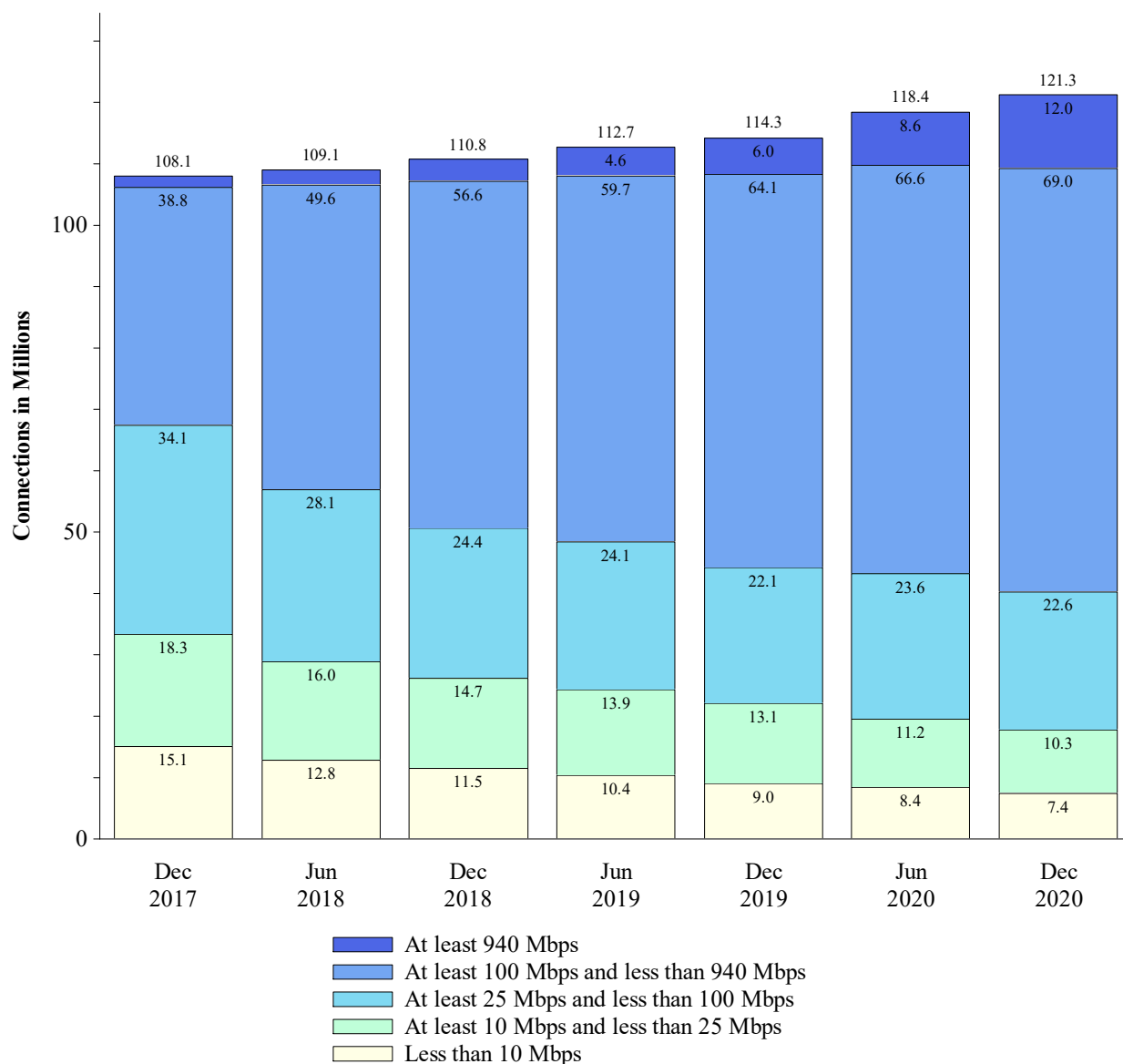


Upstream Speed	Less than 1 Mbps (6.0 million)
	At least 1 Mbps & less than 3 Mbps (11.0 million)
	At least 3 Mbps & less than 20 Mbps (66.1 million)
	At least 20 Mbps & less than 500 Mbps (29.7 million)
	At least 500 Mbps (8.3 million)

Note: Numbers may not sum to total due to rounding.
Source: FCC Form 477.

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 2017 to 2020.

Figure 3
Fixed Connections by Downstream Speed 2017-2020



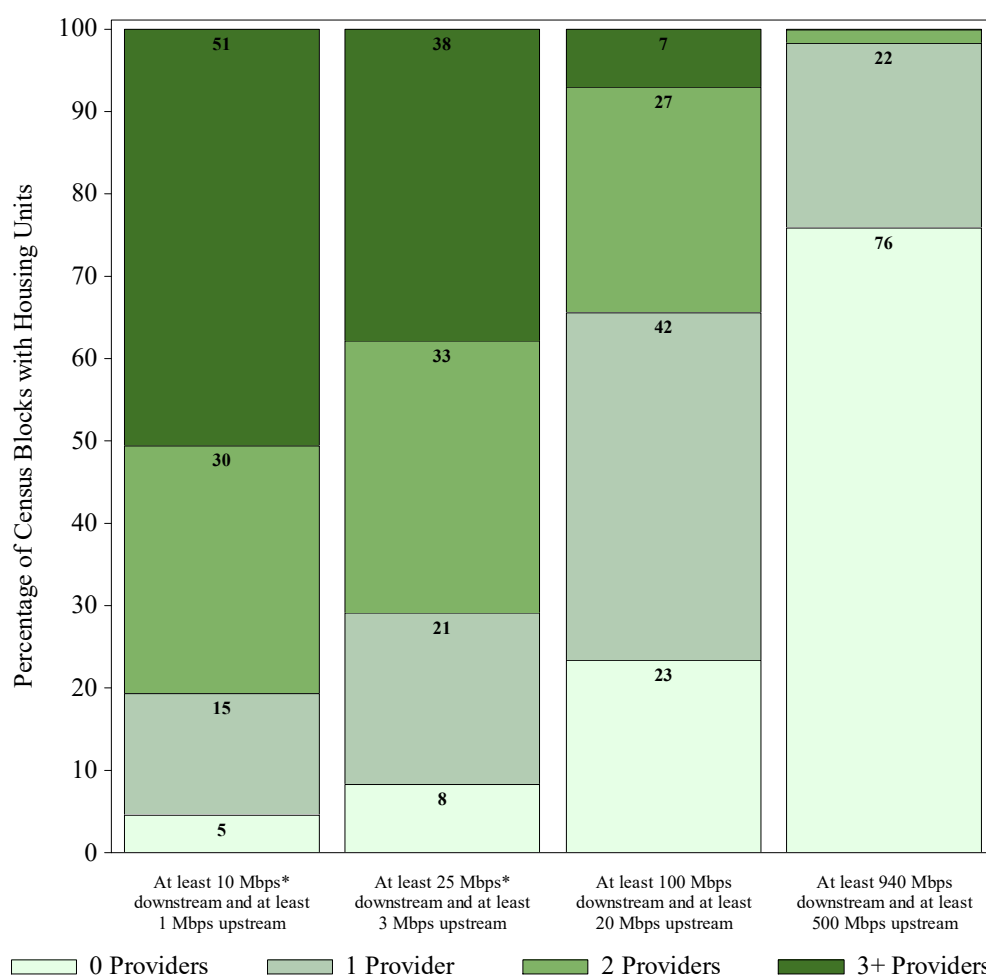
Note: Some previously-published data may have been revised. Numbers may not sum to totals due to rounding. Connections include both residential and business connections.
Source: FCC Form 477.

- The percentage of fixed connections with a downstream speed of at least 100 Mbps has grown from 38% (or 41 million connections) in December 2017 to 67% (or 81 million connections) in December 2020. Over the same period, the percentage of fixed connections with downstream speeds of less than 10 Mbps has decreased from 14% (or 15 million connections) in December 2017 to about 6% (or about 7 million connections) in December 2020.

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 2020. This information is taken from the block-level FCC 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, 2020



* Satellite service providers are excluded from 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.

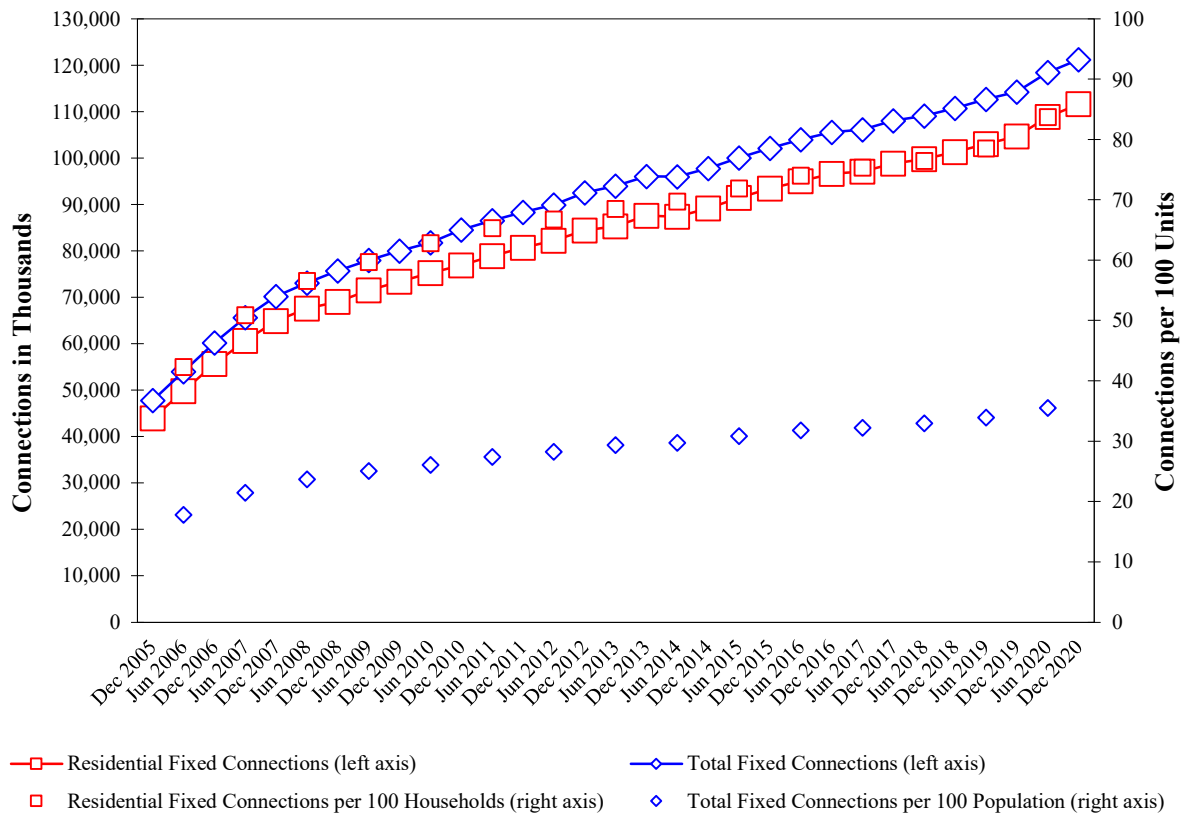
Note: Numbers may sum to totals due to rounding. Developed census blocks are those with housing units based on the 2010 census.
Source: FCC Form 477.

⁴ Download these data and explore the interactive map at <https://broadband477map.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 2005.

Figure 5
Fixed Connections 2005-2020
(Connections over 200 kbps in at least one direction)



- Between December 2010 and December 2020, total (business and residential) fixed connections grew from 85 million connections to 121 million connections – at a compound annual growth rate of 4% per year.⁵
- Over the same ten-year period, residential fixed connections grew from 77 million connections to 112 million connections – also at a compound annual growth rate of 4% per year.

⁵ The compound annual growth rate (CAGR) is a smoothed rate of growth calculated in three steps: (1) divide the ending value by the beginning value; (2) 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); (3) subtract the number one from the result of the second step.

- From June 2010 to June 2020, the number of residential fixed connections per 100 U.S. households increased from 63 to 83.⁶

Other Report Highlights

Typical speeds

- The median downstream speed of all reported fixed connections was 115 Mbps and the median upstream speed was 10 Mbps. For residential fixed connections, the median downstream speed was 150 Mbps and the median upstream speed was 10 Mbps.

Residential connections

- Residential fixed Internet access connections increased by about 6.6% between December 2019 and December 2020, to about 112 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 4.4%, to 296 million, between December 2019 and December 2020. *See Figure 7.*
- Approximately 93% of residential fixed connections had a speed of at least 10 Mbps downstream and 1 Mbps upstream in December 2020, while 85% had a speed of at least 25 Mbps downstream and 3 Mbps upstream. About 69% percent of all residential fixed connections had a downstream speed of at least 100 Mbps. *See Figures 10 and 29.*
- As a national average in December 2020, there were about 84 residential fixed connections with speeds of at least 10 Mbps downstream and 1 Mbps upstream per 100 households; 76 residential fixed connections with speeds of at least 25 Mbps downstream and 3 Mbps upstream per 100 households; and 26 residential fixed connections with speeds of at least 100 Mbps downstream and 20 Mbps upstream per 100 households.⁷ *See Figure 34.*

⁶ 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 40 because there were about 131 million households in the United States and inhabited insular areas and a population of about 332 million according to the sources used for Figure 5.)

⁷ 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, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*,

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, 2020.⁸ We continue to observe substantial variation among these estimates. *See* Figures 39 and 41.

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 46-51.

Amended by the Broadband Data Improvement Act, GN Docket No.11-121, Eighth Broadband Progress Report, 27 FCC Rcd 10342, 10386, para. 94 (2012).

⁸ 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

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Figure 6
Connections over 200 kbps in at Least One Direction 2016-2020
(in thousands)

<i>Technology</i>	2016	2017		2018		2019		2020	
	<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	404,849	408,692	420,838	428,864	451,062	459,327	466,302	480,185	490,888
Total Fixed	105,593	106,130	108,065	109,087	110,784	112,725	114,291	118,449	121,250
Mobile Wireless	299,256	302,562	312,773	319,776	340,278	346,603	352,012	361,737	369,638

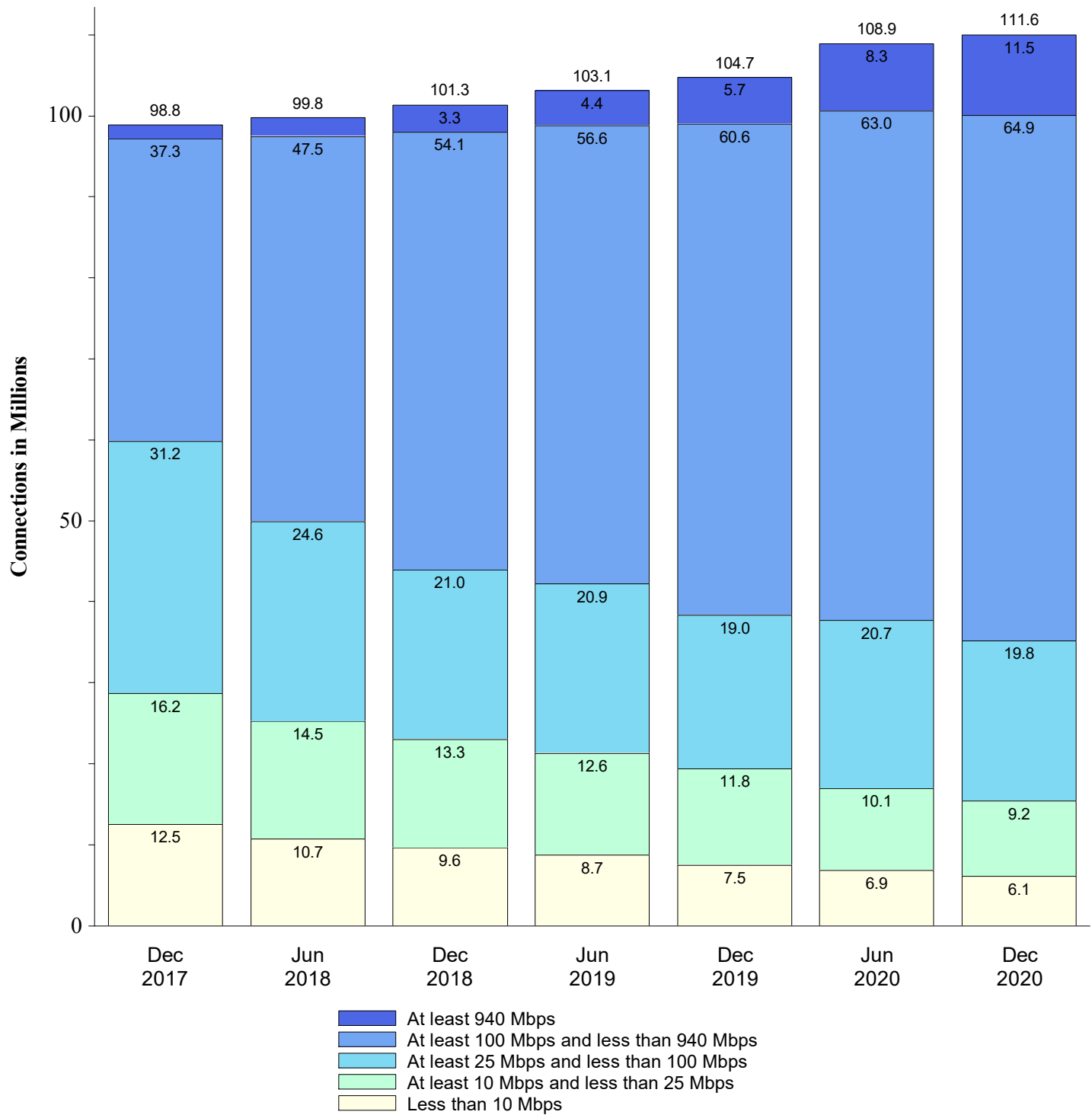
Some previously-published data may have been revised. Numbers may not sum to totals due to rounding.
Source: FCC Form 477.

Figure 7
Residential Connections over 200 kbps in at Least One Direction 2016-2020
(in thousands)

<i>Technology</i>	2016	2017		2018		2019		2020	
	<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	337,978	341,094	351,966	358,867	378,286	383,605	388,344	403,212	407,652
Total Fixed	96,607	97,071	98,845	99,758	101,348	103,118	104,703	108,909	111,621
Mobile Wireless	241,371	244,022	253,121	259,109	276,938	280,486	283,641	294,303	296,031

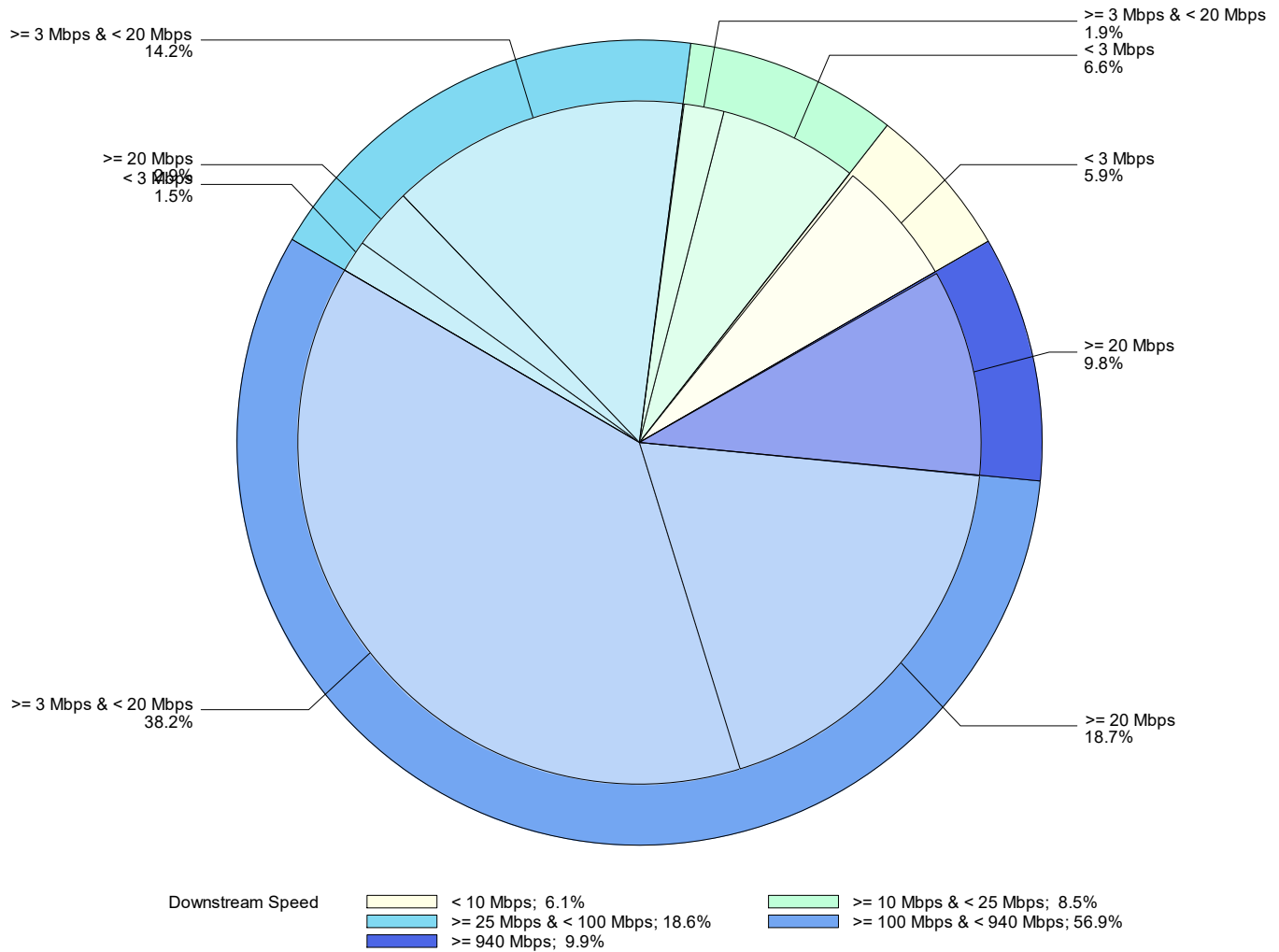
Some previously-published data may have been revised. Numbers may not sum to totals due to rounding.
Source: FCC Form 477.

Figure 8
Residential Fixed Connections by Downstream Speed 2017-2020



Note: Numbers may not sum to totals due to rounding.
Source: FCC Form 477.

Figure 9
Distribution of Fixed Connections over 200 kbps in at Least One Direction
as of December 31, 2020



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

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

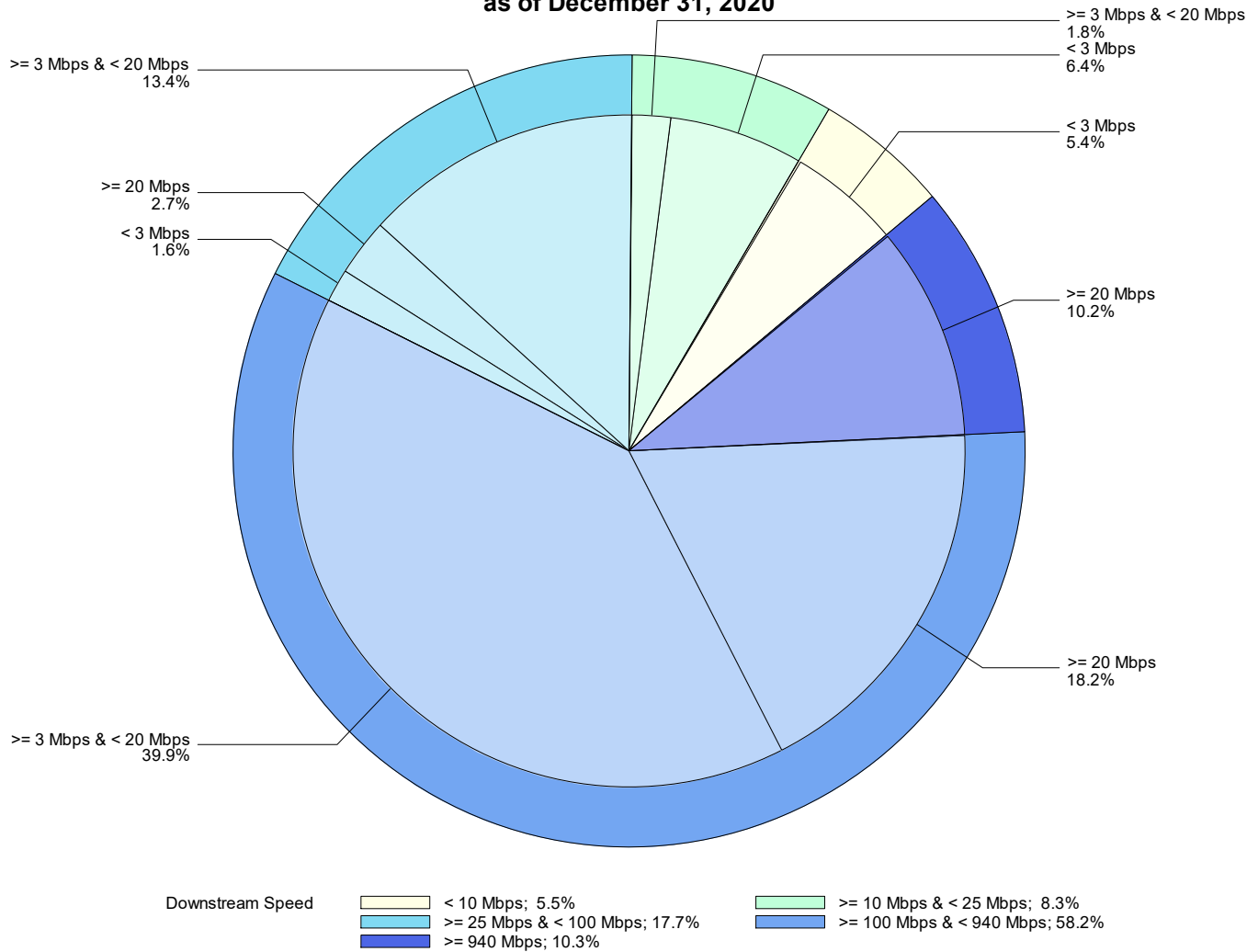
Upstream Speed	Downstream Speed					Total
	Less than 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps and less than 940 Mbps	At least 940 Mbps	
Less than 3 Mbps	7,189	7,976	1,832	38	3	17,038
At least 3 Mbps & Less than 20 Mbps	222	2,295	17,208	46,295	110	66,132
At least 20 Mbps	2	63	3,523	22,653	11,840	38,081
Total	7,414	10,334	22,563	68,986	11,953	121,250

Percentages

Less than 3 Mbps	5.9	6.6	1.5	0.0	0.0	14.1
At least 3 Mbps & Less than 20 Mbps	0.2	1.9	14.2	38.2	0.1	54.5
At least 20 Mbps	0.0	0.1	2.9	18.7	9.8	31.4
Total	6.1	8.5	18.6	56.9	9.9	100.0

Note: Numbers 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, 2020



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 10 Mbps	At least 10 Mbps and less than 25 Mbps	At least 25 Mbps and less than 100 Mbps	At least 100 Mbps and less than 940 Mbps	At least 940 Mbps	
Less than 3 Mbps	5,985	7,173	1,767	37	3	14,964
At least 3 Mbps & Less than 20 Mbps	130	2,049	14,955	44,546	108	61,789
At least 20 Mbps	1	27	3,067	20,344	11,429	34,868
Total	6,115	9,249	19,790	64,927	11,540	111,621

Percentages						
Less than 3 Mbps	5.4	6.4	1.6	0.0	0.0	13.4
At least 3 Mbps & Less than 20 Mbps	0.1	1.8	13.4	39.9	0.1	55.4
At least 20 Mbps	0.0	0.0	2.7	18.2	10.2	31.2
Total	5.5	8.3	17.7	58.2	10.3	100.0

Note: Numbers 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 2016-2020
(in thousands)

	2016	2017		2018		2019		2020	
Technology	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec
Total	404,849	408,692	420,838	428,864	451,062	459,327	466,302	480,185	490,888
Total Fixed	105,593	106,130	108,065	109,087	110,784	112,725	114,291	118,449	121,250
aDSL	26,527	25,505	24,193	23,074	22,377	21,163	20,214	19,639	18,786
sDSL	42	44	28	28	20	17	16	19	13
Other Wireline ¹	599	619	581	558	557	501	525	516	527
Cable Modem	63,325	64,060	66,196	67,165	68,882	70,750	72,516	75,986	77,909
FTTP ²	11,986	12,831	13,890	14,889	15,492	16,748	17,376	18,443	19,945
Satellite	1,864	1,826	1,872	1,939	1,971	1,984	1,975	1,993	1,931
Fixed Wireless	1,250	1,245	1,306	1,434	1,485	1,561	1,669	1,853	2,140
Mobile Wireless	299,256	302,562	312,773	319,776	340,278	346,603	352,012	361,737	369,638

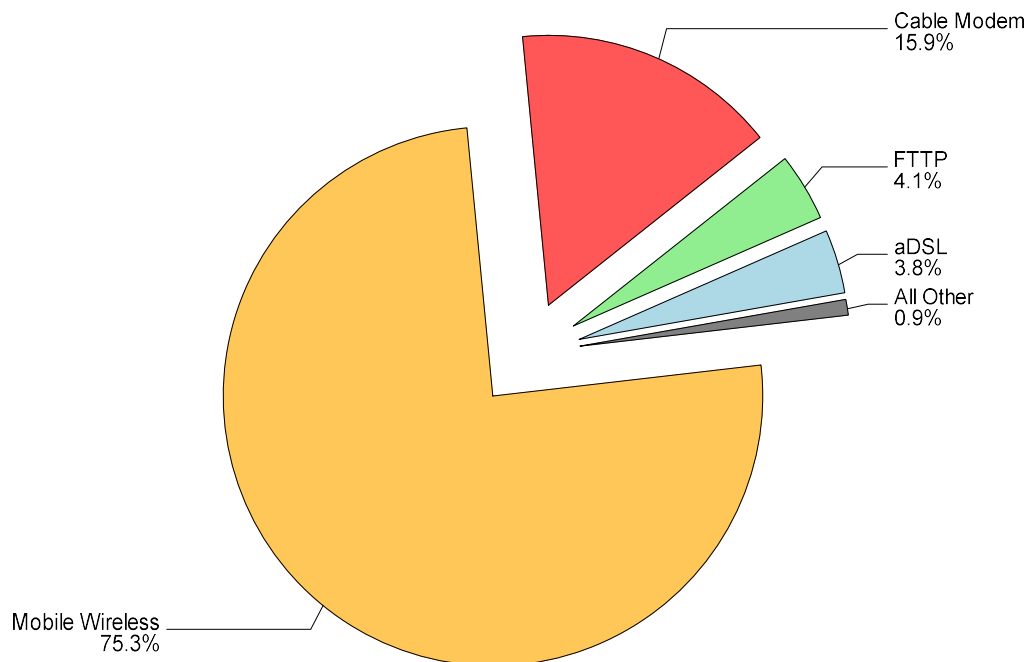
¹ Power Line and Other are summarized with Other Wireline for confidentiality reasons. See Technical Notes at the end of the report for a description of FCC Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

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

Source: FCC Form 477.

Figure 12
Connections by Technology as of December 31, 2020



Source: FCC Form 477.

Figure 13
Residential Connections over 200 kbps in at Least One Direction by Technology 2016-2020
(in thousands)

Technology	2016	2017		2018		2019		2020	
	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec
Total	337,978	341,094	351,966	358,867	378,286	383,605	388,344	403,212	407,652
Total Fixed	96,607	97,071	98,845	99,758	101,348	103,118	104,703	108,909	111,621
aDSL	23,691	22,774	21,653	20,671	20,126	18,976	18,159	17,647	16,920
sDSL	8	12	9	9	4	4	5	7	3
Other Wireline ¹	32	74	67	74	76	62	74	64	59
Cable Modem	59,145	59,687	61,567	62,320	63,813	65,457	67,141	70,710	72,543
FTTP ²	10,956	11,776	12,702	13,663	14,205	15,410	16,011	16,971	18,384
Satellite	1,676	1,637	1,688	1,751	1,787	1,805	1,795	1,815	1,752
Fixed Wireless	1,100	1,112	1,158	1,270	1,338	1,405	1,520	1,694	1,958
Mobile Wireless	241,371	244,022	253,121	259,109	276,938	280,486	283,641	294,303	296,031

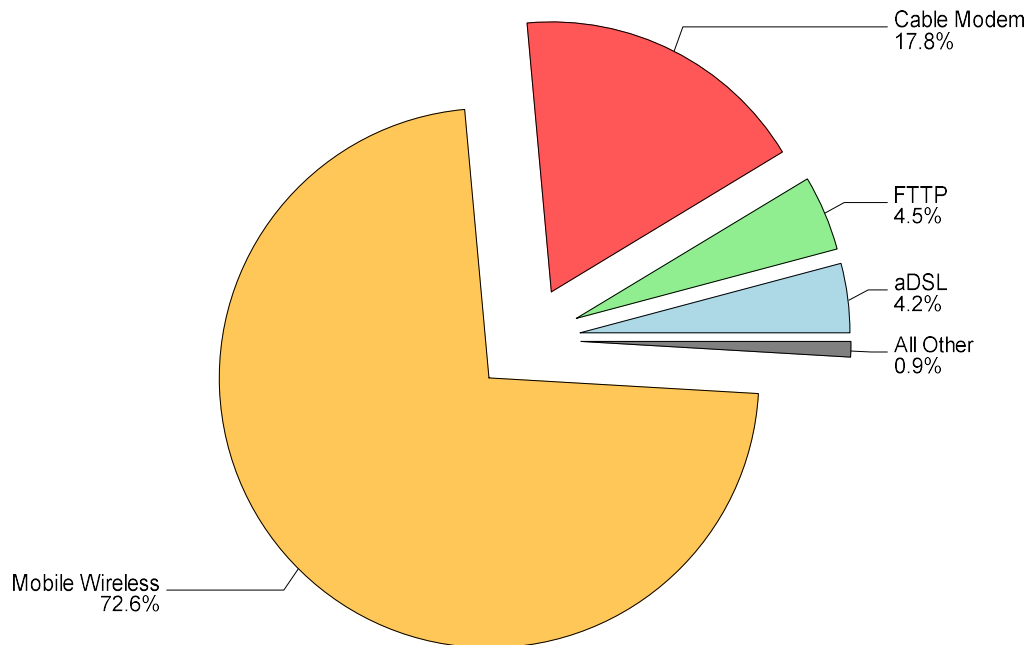
¹ Power Line and Other are summarized with Other Wireline for confidentiality reasons. See Technical Notes at the end of the report for a description of FCC Form 477 technology categories and other reporting requirements.

² Fiber to the premises.

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

Source: FCC Form 477.

Figure 14
Residential Connections by Technology as of December 31, 2020



Source: FCC Form 477.

Figure 15
Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream by Technology 2016-2020
(in thousands)

<i>Technology</i>	2016	2017		2018		2019		2020	
	<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	84,038	86,886	90,609	94,071	97,302	100,464	103,595	109,159	112,445
aDSL	10,810	11,321	11,598	11,822	12,038	11,829	11,704	12,421	11,760
sDSL	10	14	9	11	6	5	5	8	4
Other Wireline ¹	209	246	262	271	292	261	301	307	323
Cable Modem	60,349	61,704	63,978	65,808	67,716	69,704	71,934	75,391	77,513
FTTP ²	10,935	11,811	12,869	13,898	14,815	16,078	16,854	17,993	19,555
Satellite	1,342	1,373	1,402	1,595	1,677	1,726	1,737	1,778	1,727
Fixed Wireless	383	418	491	666	759	861	1,059	1,263	1,564

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

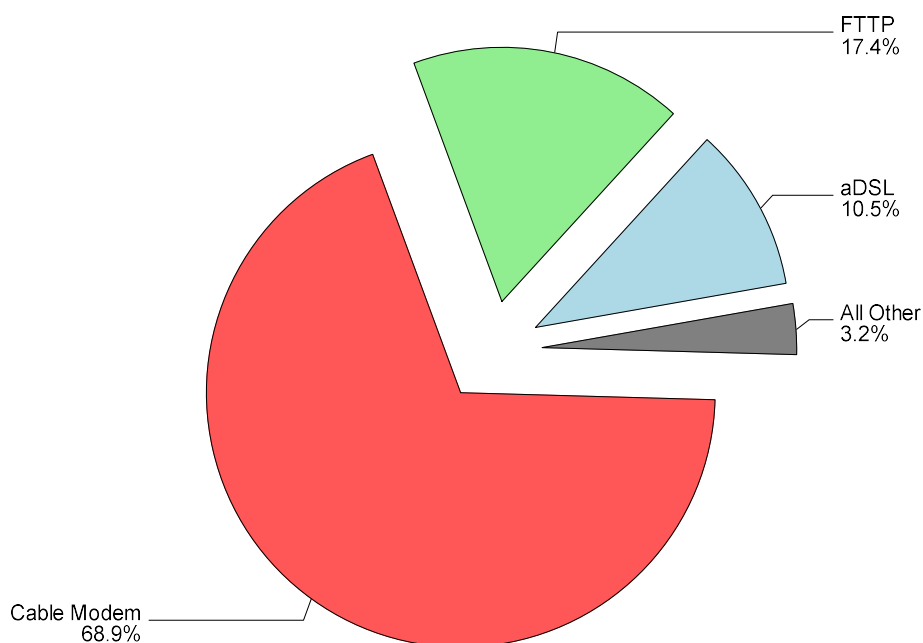
² Fiber to the premises.

= Rounds to zero.

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

Source: FCC Form 477.

Figure 16
Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream
by Technology as of December 31, 2020



Source: FCC Form 477.

Figure 17
Residential Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream by Technology 2016-2020
(in thousands)

Technology	2016	2017		2018		2019		2020	
	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec
Total	78,201	80,671	84,163	86,973	89,873	92,698	95,649	101,201	104,199
aDSL	9,963	10,415	10,657	10,862	11,073	10,812	10,682	11,374	10,761
sDSL	2	6	5	6	2	1	2	4	1
Other Wireline ¹	30	71	64	65	68	58	70	61	56
Cable Modem	56,538	57,617	59,864	61,142	62,810	64,556	66,691	70,299	72,215
FTTP ²	10,004	10,835	11,762	12,741	13,589	14,800	15,536	16,566	18,042
Satellite	1,333	1,362	1,387	1,575	1,655	1,702	1,708	1,745	1,691
Fixed Wireless	332	365	425	582	676	768	960	1,151	1,433

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

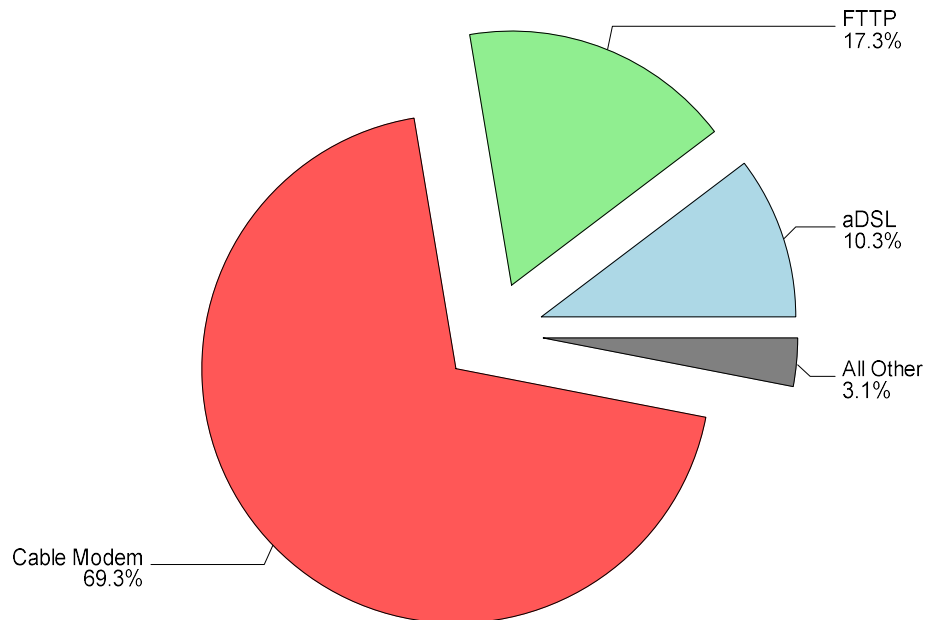
² Fiber to the premises.

= Rounds to zero.

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

Source: FCC Form 477.

Figure 18
Residential Fixed Connections at Least 10 Mbps Downstream and 1 Mbps Upstream
by Technology as of December 31, 2020



Source: FCC Form 477.

Figure 19
Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology 2016-2020
(in thousands)

Technology	2016	2017	2018	2019	2020
	Dec	Jun	Dec	Jun	Dec
Total	62,933	68,280	73,875	78,952	82,965
aDSL	1,476	2,530	3,586	4,298	4,988
sDSL	*	*	*	*	*
Other Wireline ¹	166	203	219	220	263
Cable Modem	51,740	54,829	57,870	60,859	62,880
FTTP ²	9,422	10,344	11,489	12,568	13,605
Satellite	*	*	*	*	*
Fixed Wireless	92	120	143	224	267

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

² Fiber to the premises.

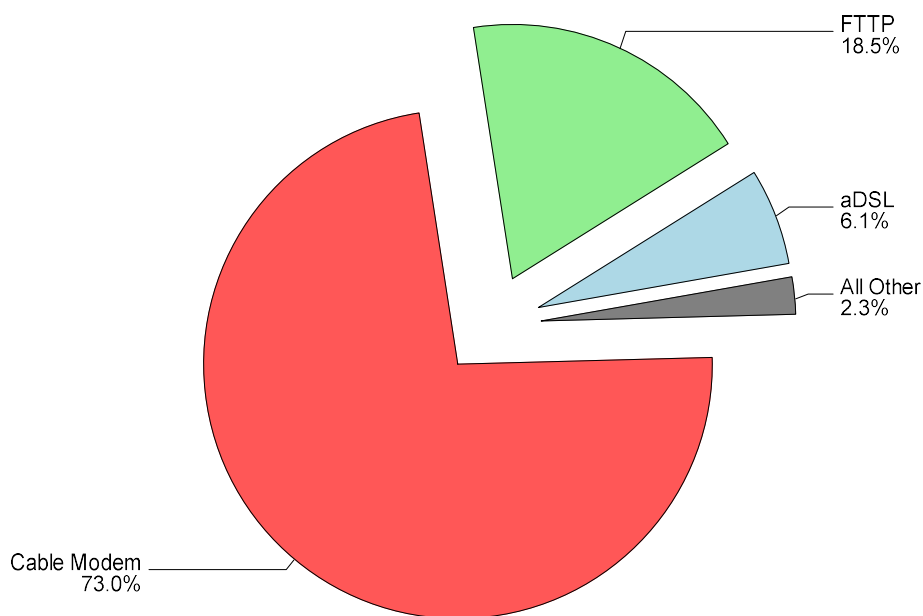
* = Data withheld for confidentiality reasons.

= Rounds to zero.

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

Source: FCC Form 477.

Figure 20
Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream
by Technology as of December 31, 2020



Source: FCC Form 477.

Figure 21
Residential Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream by Technology 2016-2020
(in thousands)

Technology	2016	2017	2018	2019	2020
	Dec	Jun	Dec	Jun	Dec
Total	59,518	64,520	69,447	73,288	76,873
aDSL	1,408	2,418	3,410	4,068	4,712
sDSL	*	*	*	*	*
Other Wireline ¹	27	67	59	54	61
Cable Modem	49,300	52,154	54,748	56,620	58,342
FTTP ²	8,674	9,532	10,553	11,570	12,546
Satellite	*	*	*	*	*
Fixed Wireless	75	101	119	193	234

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

² Fiber to the premises.

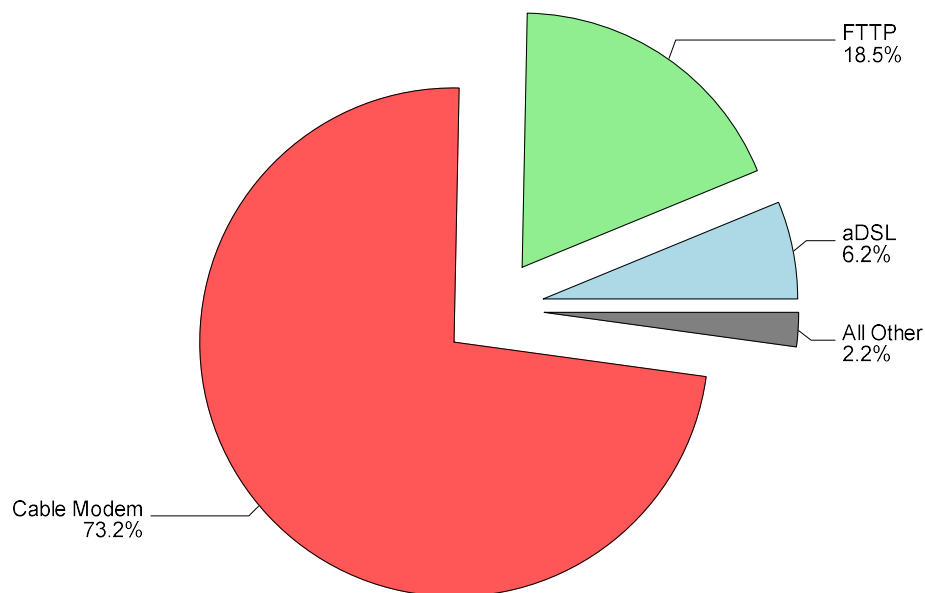
* = Data withheld for confidentiality reasons.

= Rounds to zero.

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

Source: FCC Form 477.

Figure 22
Residential Fixed Connections at Least 25 Mbps Downstream and 3 Mbps Upstream
by Technology as of December 31, 2020



Source: FCC Form 477.

Figure 23
Fixed Connections at Least 100 Mbps Downstream and 20 Mbps Upstream by Technology 2016-2020
(in thousands)

Technology	2016	2017	2018	2019	2020
	Dec	Jun	Dec	Jun	Dec
Total	7,968	9,676	12,148	14,619	18,750
aDSL	2	16	47	59	207
sDSL	1	1	1	1	1
Other Wireline ¹	140	174	192	174	196
Cable Modem	5,356	6,055	7,149	8,352	9,466
FTTP ²	2,438	3,403	4,729	5,976	8,815
Satellite	0	0	0	0	0
Fixed Wireless	31	28	30	56	65

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

² Fiber to the premises.

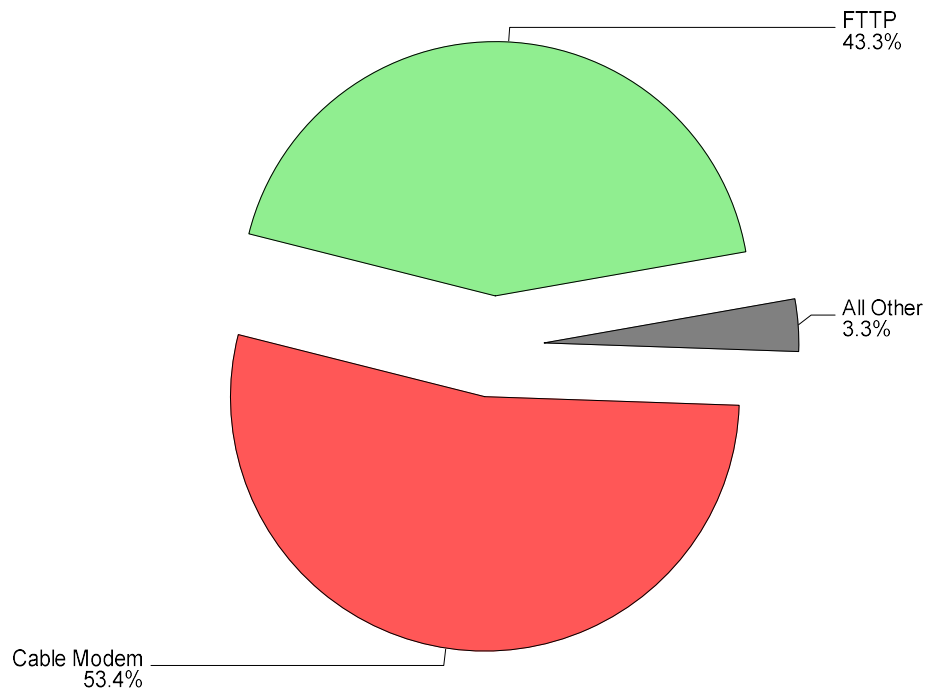
* = Data withheld for confidentiality reasons.

= Rounds to zero.

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

Source: FCC Form 477.

Figure 24
Fixed Connections at Least 100 Mbps Downstream and 20 Mbps Upstream
by Technology as of December 31, 2020



Source: FCC Form 477.

Figure 25
Residential Fixed Connections at Least 100 Mbps Downstream and 20 Mbps Upstream by Technology 2016-2020
(in thousands)

	2016	2017	2018	2019	2020
Technology	Dec	Jun	Dec	Jun	Dec
Total	7,291	8,879	11,030	13,171	17,101
aDSL	2	15	42	53	194
sDSL	#	#	#	#	#
Other Wireline ¹	24	61	53	46	47
Cable Modem	5,071	5,695	6,591	7,491	8,512
FTTP ²	2,170	3,089	4,324	5,534	8,292
Satellite	0	0	0	0	0
Fixed Wireless	24	20	20	47	56

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

² Fiber to the premises.

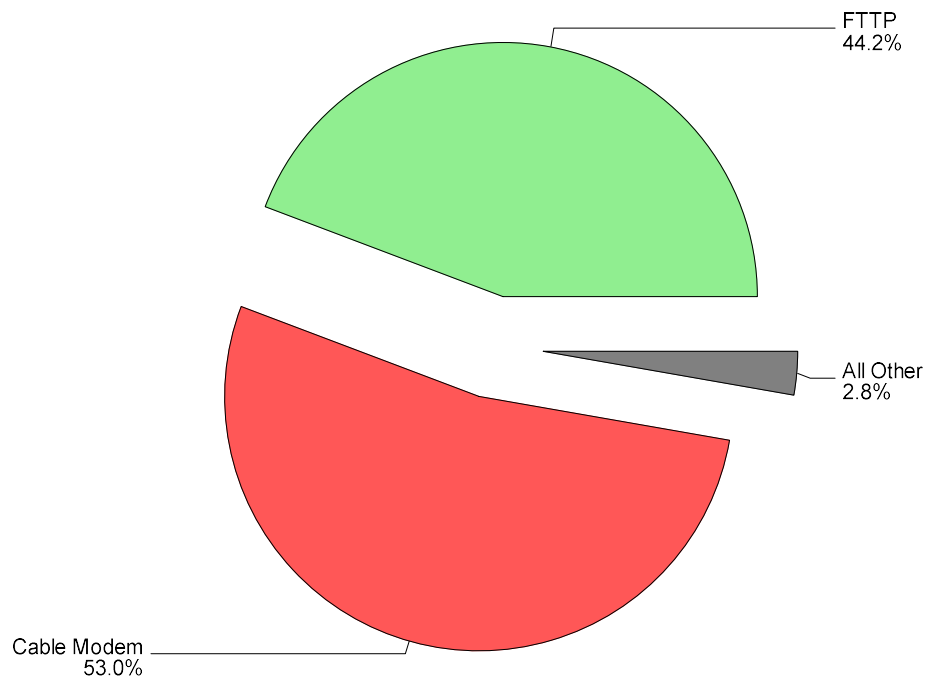
* = Data withheld for confidentiality reasons.

= Rounds to zero.

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

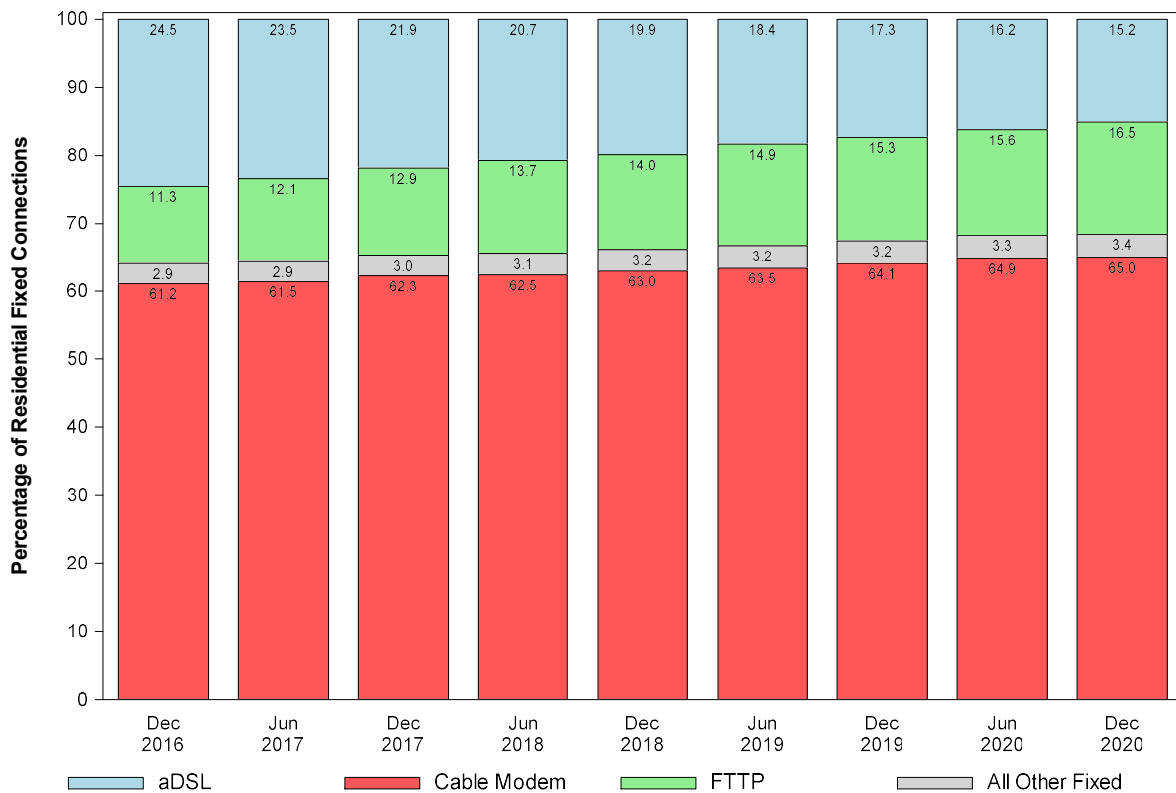
Source: FCC Form 477.

Figure 26
Residential Fixed Connections at Least 100 Mbps Downstream and 20 Mbps Upstream
by Technology as of December 31, 2020



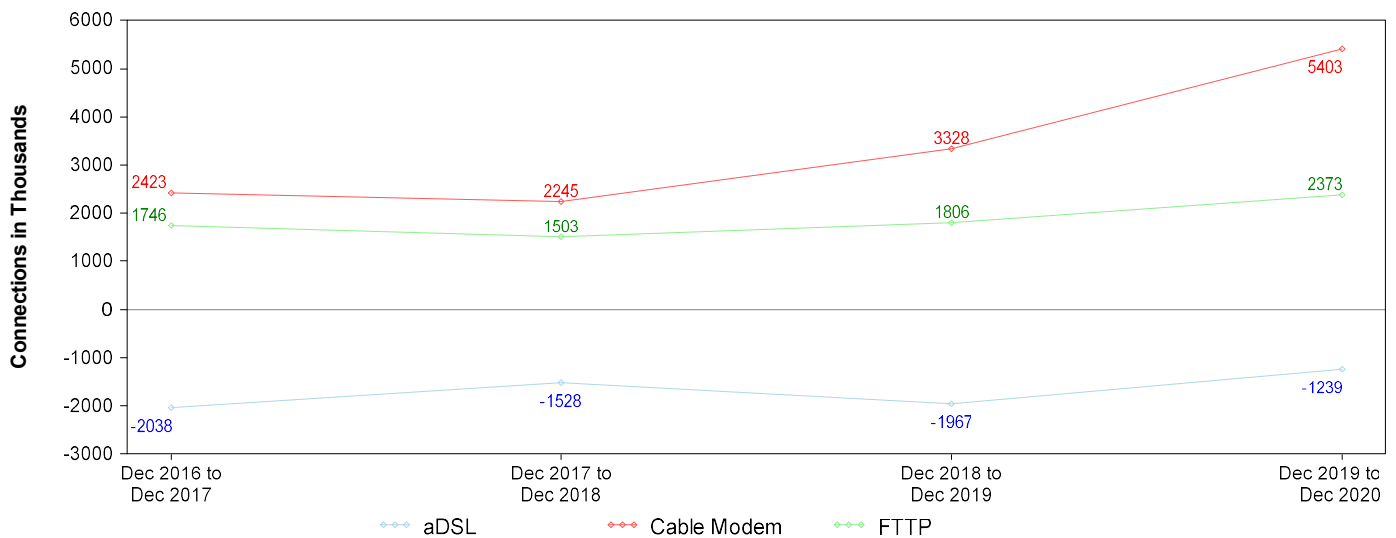
Source: FCC Form 477.

Figure 27
Residential Fixed Connections over 200 kbps in at Least One Direction 2016-2020
 (Shares of selected technologies)



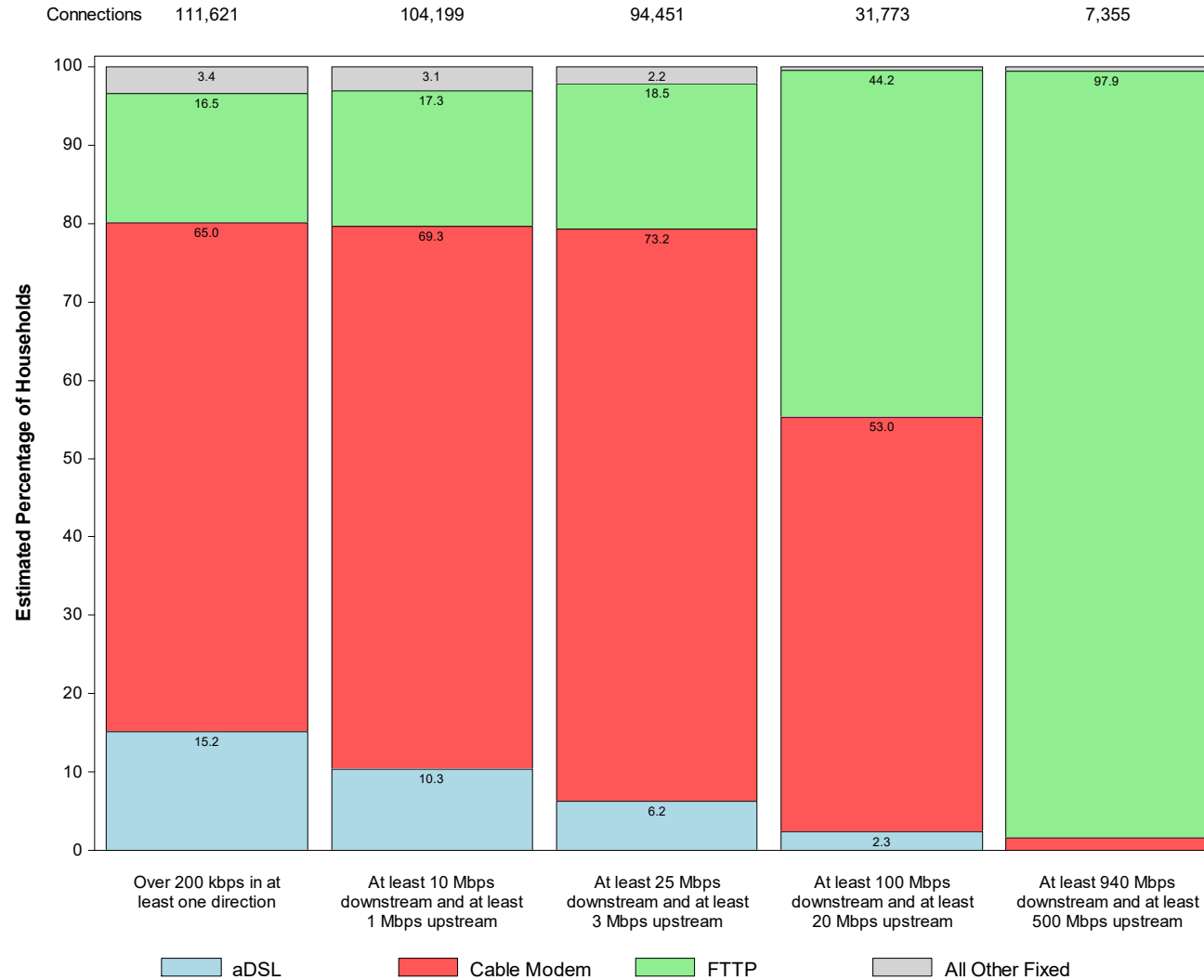
Note: Some previously-published data may have been revised. Numbers may not sum to totals due to rounding.
 Source: FCC Form 477.

Figure 28
Residential Fixed Connections over 200 kbps in at Least One Direction 2016-2020
 (Net adds for selected technologies)



Source: FCC Form 477.

Figure 29
Residential Fixed Connections by Technology as of December 31, 2020
(Shares of selected technologies for selected speeds, connections in thousands)



Note: Numbers may not sum to totals due to rounding.
Source: FCC Form 477.

Figure 30
Fixed Connections by Downstream Speed Tier and Technology as of December 31, 2020
(in thousands)

Technology	Downstream Speed						Total
	Less than 4 Mbps	At least 4 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 and less than 940 Mbps	At least 940 Mbps	
aDSL	2,432	3,248	6,277	5,873	955	#	18,786
sDSL	*	1	*	*	*	*	13
Other Wireline ¹	172	32	33	46	221	23	527
Cable Modem	204	183	2,136	11,099	59,956	4,329	77,909
FTTP	119	234	703	3,611	7,719	7,559	19,945
Satellite	*	42	*	*	*	0	1,931
Fixed Wireless	202	373	748	660	115	41	2,140
Total	3,299	4,114	10,334	22,563	68,986	11,953	121,250

Percentages							
aDSL	2.0	2.7	5.2	4.8	0.8	0.0	15.5
sDSL	*	0.0	*	*	*	*	0.0
Other Wireline ¹	0.1	0.0	0.0	0.0	0.2	0.0	0.4
Cable Modem	0.2	0.2	1.8	9.2	49.4	3.6	64.3
FTTP	0.1	0.2	0.6	3.0	6.4	6.2	16.4
Satellite	*	0.0	*	*	*	0.0	1.6
Fixed Wireless	0.2	0.3	0.6	0.5	0.1	0.0	1.8
Total	2.7	3.4	8.5	18.6	56.9	9.9	100.0

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

= Rounds to Zero.

* = Data withheld for confidentiality reasons.

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

Source: FCC Form 477.

Figure 31
Residential Fixed Connections by Downstream Speed Tier and Technology as of December 31, 2020
(in thousands)

Technology	Downstream Speed						Total
	Less than 4 Mbps	At least 4 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 and less than 940 Mbps	At least 940 Mbps	
aDSL	2,045	2,850	5,608	5,514	*	*	16,920
sDSL	*	#	*	*	*	*	3
Other Wireline ¹	2	1	5	5	27	19	59
Cable Modem	183	138	1,919	9,284	56,849	4,171	72,543
FTTP	96	212	588	3,139	7,036	7,314	18,384
Satellite	*	*	*	*	*	0	1,752
Fixed Wireless	178	347	696	608	93	37	1,958
Total	2,527	3,589	9,249	19,790	64,927	11,540	111,621

Percentages							
aDSL	1.8	2.6	5.0	4.9	*	*	15.2
sDSL	*	0.0	*	*	*	*	0.0
Other Wireline ¹	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Cable Modem	0.2	0.1	1.7	8.3	50.9	3.7	65.0
FTTP	0.1	0.2	0.5	2.8	6.3	6.6	16.5
Satellite	*	*	*	*	*	0.0	1.6
Fixed Wireless	0.2	0.3	0.6	0.5	0.1	0.0	1.8
Total	2.3	3.2	8.3	17.7	58.2	10.3	100.0

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

= Rounds to Zero.

* = Data withheld for confidentiality reasons.

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

Source: FCC Form 477.

Figure 32
Nationwide Number of Providers of Connections over 200 kbps in at Least One Direction
by Technology 2016-2020

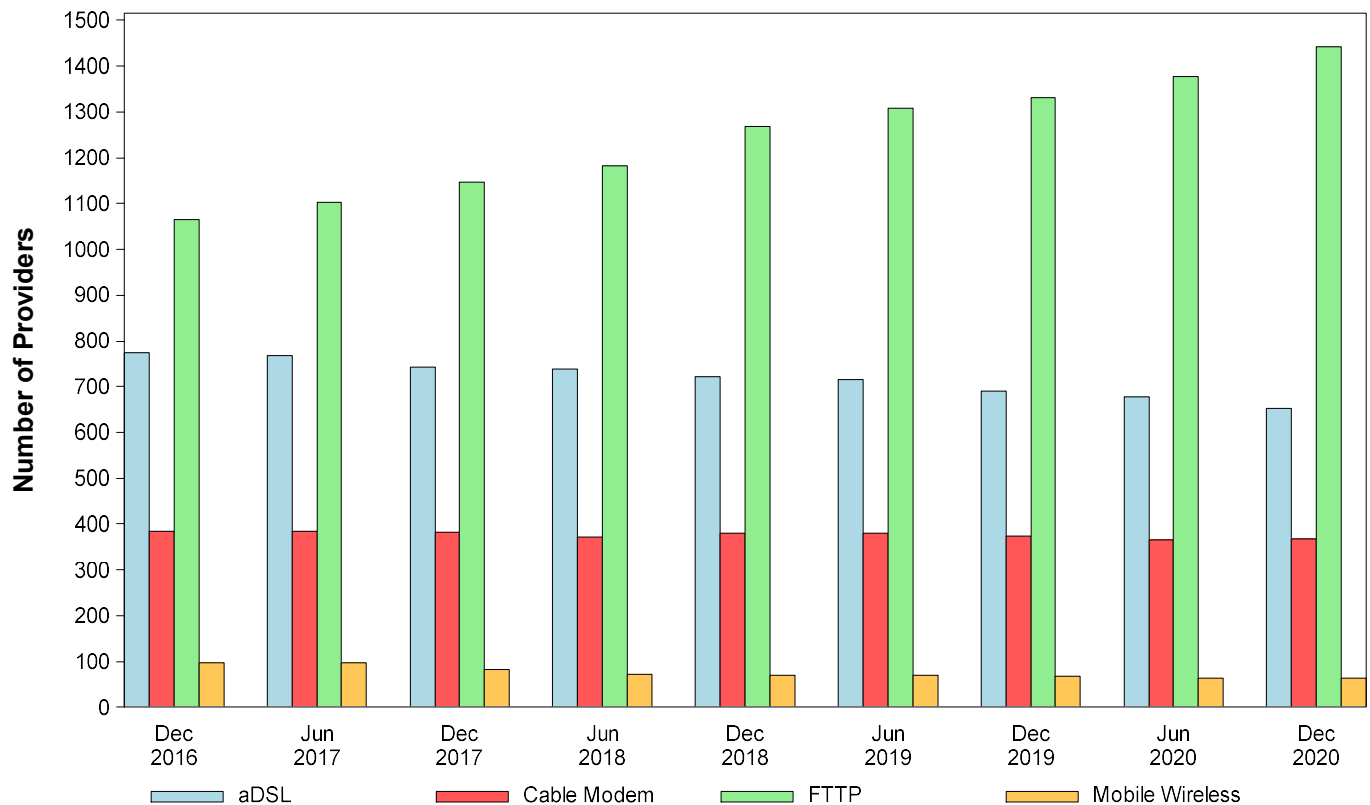
Technology	2016	2017	2018	2019	2020
	Dec	Jun	Dec	Jun	Dec
aDSL	774	768	743	738	721
sDSL	160	161	150	136	127
Other Wireline ¹	236	243	235	249	243
Cable Modem	385	384	383	372	381
FTTP	1,066	1,103	1,147	1,183	1,269
Satellite	6	5	6	6	6
Fixed Wireless	1,071	1,095	1,160	1,188	1,239
Mobile Wireless	98	98	83	73	71
Total	2,000	2,030	2,090	2,129	2,215

¹ Power Line and Other are summarized with Other Wireline for confidentiality reasons.

Note: Multiple FCC Form 477 filers within a holding company structure count as one provider. Some previously-published data may have been revised.

Source: FCC Form 477.

Figure 33
Nationwide Number of Providers of Connections over 200 kbps in at Least One Direction
Selected Technologies 2016-2020



Source: FCC Form 477.

SECTION 3
SUMMARY STATISTICS: THE STATES

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Figure 34
Residential Fixed Connections and Households by State as of December 31, 2020
(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 20 Mbps Up		At least 940 Mbps Down and 500 Mbps Up	
		Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio
Alabama	1,889	1,552	0.82	1,383	0.73	1,181	0.63	377	0.20	105	0.06
Alaska	255	222	0.87	202	0.79	152	0.59	*	*	*	*
American Samoa	10	*	*	*	*	*	*	0	0.00	0	0.00
Arizona	2,643	2,444	0.92	2,205	0.83	2,013	0.76	502	0.19	*	*
Arkansas	1,170	906	0.77	776	0.66	630	0.54	218	0.19	45	0.04
California	13,103	12,330	0.94	11,766	0.90	10,873	0.83	2,871	0.22	500	0.04
Colorado	2,137	2,106	0.99	1,918	0.90	1,810	0.85	338	0.16	100	0.05
Connecticut	1,385	1,305	0.94	1,247	0.90	1,095	0.79	347	0.25	12	0.01
Delaware	371	381	1.03	372	1.00	367	0.99	115	0.31	*	*
District of Columbia	288	273	0.95	266	0.92	261	0.91	107	0.37	*	*
Florida	7,931	8,078	1.02	7,719	0.97	6,948	0.88	2,448	0.31	364	0.05
Georgia	3,830	3,470	0.91	3,231	0.84	2,804	0.73	1,172	0.31	341	0.09
Guam	42	*	*	*	*	*	*	0	0.00	0	0.00
Hawaii	468	487	1.04	472	1.01	*	*	*	*	*	*
Idaho	649	572	0.88	471	0.72	381	0.59	141	0.22	18	0.03
Illinois	4,884	4,201	0.86	3,951	0.81	3,350	0.69	1,181	0.24	115	0.02
Indiana	2,603	2,204	0.85	2,004	0.77	1,681	0.65	621	0.24	105	0.04
Iowa	1,274	1,050	0.82	899	0.71	794	0.62	271	0.21	25	0.02
Kansas	1,142	979	0.86	894	0.78	766	0.67	285	0.25	104	0.09
Kentucky	1,748	1,479	0.85	1,336	0.76	1,171	0.67	382	0.22	65	0.04
Louisiana	1,752	1,427	0.81	1,303	0.74	1,117	0.64	371	0.21	72	0.04
Maine	570	565	0.99	507	0.89	423	0.74	42	0.07	1	0.00
Maryland	2,231	2,135	0.96	2,078	0.93	2,025	0.91	803	0.36	*	*
Massachusetts	2,647	2,522	0.95	2,451	0.93	2,417	0.91	659	0.25	*	*
Michigan	3,980	3,435	0.86	3,201	0.80	2,761	0.69	707	0.18	65	0.02
Minnesota	2,208	1,952	0.88	1,741	0.79	1,596	0.72	308	0.14	45	0.02
Mississippi	1,117	824	0.74	712	0.64	534	0.48	180	0.16	59	0.05
Missouri	2,440	2,039	0.84	1,799	0.74	1,559	0.64	592	0.24	168	0.07
Montana	436	386	0.89	331	0.76	284	0.65	44	0.10	7	0.02
Nebraska	767	656	0.86	601	0.78	529	0.69	170	0.22	28	0.04

Figure 34 - Continued
Residential Fixed Connections and Households by State as of December 31, 2020
(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 20 Mbps Up		At least 940 Mbps Down and 500 Mbps Up	
		Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio	Connections	Subscribership Ratio
Nevada	1,130	1,071	0.95	1,016	0.90	925	0.82	249	0.22	31	0.03
New Hampshire	539	550	1.02	522	0.97	489	0.91	108	0.20	2	0.00
New Jersey	3,272	3,144	0.96	3,075	0.94	3,021	0.92	1,714	0.52	*	*
New Mexico	793	677	0.85	548	0.69	488	0.62	69	0.09	5	0.01
New York	7,417	6,630	0.89	6,500	0.88	6,200	0.84	3,467	0.47	*	*
North Carolina	4,032	3,784	0.94	3,446	0.85	3,214	0.80	1,064	0.26	270	0.07
North Dakota	321	276	0.86	266	0.83	249	0.78	103	0.32	3	0.01
Northern Mariana Isl	16	*	*	*	*	*	*	0	0.00	0	0.00
Ohio	4,717	4,125	0.87	3,826	0.81	3,388	0.72	781	0.17	*	*
Oklahoma	1,494	1,193	0.80	1,068	0.71	904	0.61	314	0.21	79	0.05
Oregon	1,643	1,488	0.91	1,354	0.82	1,263	0.77	229	0.14	47	0.03
Pennsylvania	5,107	4,537	0.89	4,238	0.83	4,080	0.80	1,222	0.24	*	*
Puerto Rico	1,206	673	0.56	586	0.49	355	0.29	108	0.09	4	0.00
Rhode Island	415	393	0.95	390	0.94	381	0.92	204	0.49	*	*
South Carolina	1,961	1,790	0.91	1,678	0.86	1,489	0.76	493	0.25	73	0.04
South Dakota	348	297	0.85	285	0.82	271	0.78	84	0.24	1	0.00
Tennessee	2,640	2,274	0.86	2,129	0.81	1,867	0.71	777	0.29	204	0.08
Texas	9,906	8,996	0.91	8,547	0.86	7,725	0.78	3,154	0.32	935	0.09
Utah	1,003	948	0.95	870	0.87	803	0.80	218	0.22	68	0.07
Vermont	263	262	1.00	226	0.86	187	0.71	33	0.12	*	*
Virgin Islands	43	*	*	*	*	*	*	*	*	0	0.00
Virginia	3,184	2,864	0.90	2,689	0.84	2,572	0.81	1,025	0.32	*	*
Washington	2,906	2,715	0.93	2,488	0.86	2,345	0.81	414	0.14	104	0.04
West Virginia	734	572	0.78	468	0.64	401	0.55	119	0.16	2	0.00
Wisconsin	2,378	2,090	0.88	1,899	0.80	1,652	0.69	301	0.13	46	0.02
Wyoming	233	206	0.89	183	0.79	164	0.70	18	0.08	1	0.00
Total	123,671	111,621	0.90	104,199	0.84	94,451	0.76	31,773	0.26	7,355	0.06

= Rounds to Zero; * = Data withheld for confidentiality reasons.

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

Sources: FCC Form 477 (Connections); 2016-2020 ACS 5-year estimates; Census 2010.

Figure 35
Connections by Type of End User by State as of December 31, 2020
 (Connections over 200 kbps in at least one direction, in thousands)

State	Connections		Percentages		Total
	Residential	Business	Residential	Business	
Alabama	5,692	1,416	80.1	19.9	7,108
Alaska	862	137	86.3	13.7	0
American Samoa	*	*	*	*	*
Arizona	8,697	1,508	85.2	14.8	10,205
Arkansas	3,311	861	79.4	20.6	4,172
California	50,789	9,896	83.7	16.3	60,686
Colorado	7,085	1,464	82.9	17.1	8,549
Connecticut	4,631	925	83.4	16.6	5,556
Delaware	1,257	248	83.5	16.5	1,505
District of Columbia	1,056	597	63.9	36.1	1,653
Florida	28,001	4,841	85.3	14.7	32,842
Georgia	12,885	2,965	81.3	18.7	15,850
Guam	*	*	*	*	*
Hawaii	1,829	353	83.8	16.2	2,182
Idaho	2,032	400	83.6	16.4	2,432
Illinois	15,810	3,315	82.7	17.3	19,125
Indiana	7,687	1,568	83.1	16.9	9,256
Iowa	3,572	792	81.8	18.2	4,365
Kansas	3,429	704	83.0	17.0	4,133
Kentucky	5,246	918	85.1	14.9	6,164
Louisiana	5,701	1,020	84.8	15.2	6,721
Maine	1,512	461	76.6	23.4	1,973
Maryland	7,883	1,369	85.2	14.8	9,252
Massachusetts	8,718	1,748	83.3	16.7	10,466
Michigan	12,095	2,407	83.4	16.6	14,502
Minnesota	6,691	1,429	82.4	17.6	8,121
Mississippi	3,412	664	83.7	16.3	4,076
Missouri	7,240	1,445	83.4	16.6	8,685
Montana	1,172	333	77.9	22.1	1,505
Nebraska	2,182	592	78.6	21.4	2,774
Nevada	3,953	576	87.3	12.7	4,529
New Hampshire	1,626	407	80.0	20.0	2,033
New Jersey	11,931	2,162	84.7	15.3	14,093
New Mexico	2,514	460	84.5	15.5	2,974
New York	25,332	5,510	82.1	17.9	30,841
North Carolina	12,178	2,841	81.1	18.9	15,020
North Dakota	871	232	79.0	21.0	1,102
Northern Mariana Isl	*	*	*	*	*
Ohio	14,178	3,039	82.3	17.7	17,217
Oklahoma	4,662	849	84.6	15.4	5,512
Oregon	5,094	1,060	82.8	17.2	6,155
Pennsylvania	15,377	3,312	82.3	17.7	18,689
Puerto Rico	2,864	1,158	71.2	28.8	4,022
Rhode Island	1,367	287	82.6	17.4	1,654
South Carolina	5,871	1,325	81.6	18.4	7,196
South Dakota	952	259	78.6	21.4	1,211
Tennessee	8,009	1,855	81.2	18.8	9,864
Texas	36,878	6,305	85.4	14.6	43,182
Utah	3,527	728	82.9	17.1	4,255
Vermont	705	231	75.3	24.7	937
Virgin Islands	121	10	92.4	7.6	131
Virginia	10,230	2,363	81.2	18.8	12,594
Washington	9,397	1,888	83.3	16.7	11,286
West Virginia	1,948	345	84.9	15.1	2,294
Wisconsin	6,648	1,398	82.6	17.4	8,047
Wyoming	669	178	78.9	21.1	847
Total	407,652	83,237	83.0	17.0	490,888

= Rounds to Zero.

* = Data withheld for confidentiality reasons.

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

Source: FCC Form 477.

Figure 36
Connections by Technology by State as of December 31, 2020
(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	397	*	5	949	257	*	16	5,422	7,108
Alaska	66	#	7	*	13	*	13	743	0
American Samoa	0	0	0	*	*	0	*	*	*
Arizona	568	*	12	1,754	181	*	63	7,588	10,205
Arkansas	323	*	2	460	133	*	15	3,187	4,172
California	2,229	2	*	9,293	1,527	*	202	47,224	60,686
Colorado	*	#	18	1,534	203	*	96	6,270	8,549
Connecticut	*	*	2	1,141	43	*	*	*	5,556
Delaware	*	*	2	272	*	*	1	*	1,505
District of Columbia	*	*	6	*	*	*	4	*	1,653
Florida	1,176	*	20	6,131	1,306	*	32	24,093	32,842
Georgia	792	*	10	2,197	696	*	16	12,067	15,850
Guam	*	0	0	*	*	0	*	*	*
Hawaii	*	*	1	*	73	*	2	1,644	2,182
Idaho	200	*	3	279	55	*	66	1,811	2,432
Illinois	898	#	*	3,153	317	*	114	14,586	19,125
Indiana	494	*	3	1,377	394	*	62	*	9,256
Iowa	269	1	*	511	269	*	58	3,225	4,365
Kansas	196	#	*	540	256	*	51	3,070	4,133
Kentucky	341	*	2	898	298	*	27	4,560	6,164
Louisiana	353	*	4	923	200	*	17	5,166	6,721
Maine	107	1	*	471	20	*	10	1,352	1,973
Maryland	*	*	16	1,313	*	*	8	6,950	9,252
Massachusetts	*	*	17	2,078	*	*	17	*	10,466
Michigan	656	*	5	2,699	184	*	65	10,805	14,502
Minnesota	440	1	*	1,308	276	*	49	6,013	8,121
Mississippi	320	*	9	397	105	*	16	3,164	4,076
Missouri	547	#	*	1,113	406	*	59	6,482	8,685
Montana	92	*	2	244	45	*	34	1,073	1,505
Nebraska	125	#	*	403	136	*	41	2,058	2,774

Figure 36 - Continued
Connections by Technology by State as of December 31, 2020
(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	161	#	6	*	99	*	45	3,371	4,529
New Hampshire	59	#	*	499	37	*	3	1,426	2,033
New Jersey	89	*	24	2,194	*	*	3	*	14,093
New Mexico	223	*	4	406	50	*	32	2,241	2,974
New York	219	*	36	5,074	1,884	*	16	23,566	30,841
North Carolina	635	*	8	2,735	606	*	24	10,935	15,020
North Dakota	29	*	1	170	105	*	4	792	1,102
Northern Mariana Isl	*	*	*	*	*	0	*	*	*
Ohio	805	*	10	3,075	424	*	71	*	17,217
Oklahoma	305	#	*	655	222	*	68	4,208	5,512
Oregon	203	#	14	1,123	211	30	41	4,534	6,155
Pennsylvania	412	#	*	3,347	1,074	*	19	13,773	18,689
Puerto Rico	*	0	*	*	56	*	51	3,295	4,022
Rhode Island	*	*	*	*	*	*	#	*	1,654
South Carolina	354	*	3	1,233	308	*	9	5,250	7,196
South Dakota	36	*	1	194	78	*	12	884	1,211
Tennessee	400	#	*	1,405	579	*	23	7,395	9,864
Texas	1,648	#	*	5,473	2,083	*	321	33,420	43,182
Utah	158	*	7	603	201	*	53	3,227	4,255
Vermont	78	*	3	171	34	*	3	641	937
Virgin Islands	*	0	0	*	*	*	*	*	131
Virginia	219	#	*	1,727	1,034	*	31	9,479	12,594
Washington	371	#	45	2,146	256	46	53	8,369	11,286
West Virginia	*	*	1	407	16	*	7	1,670	2,294
Wisconsin	507	*	3	*	219	*	53	5,788	8,047
Wyoming	44	*	1	128	15	*	36	616	847
Total	18,786	13	527	77,909	19,945	1,931	2,140	369,638	490,888

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

= Rounds to Zero.

* = Data withheld for confidentiality reasons.

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

Source: FCC Form 477.

Figure 37
Percentage of Fixed Connections by Downstream Speed by State as of December 31, 2020

State	% over 200 kbps Downstream	% at least 10 Mbps Downstream	Over 200 kbps Upstream and		
			% at least 25 Mbps Downstream	% at least 100 Mbps Downstream	% at least 940 Mbps Downstream
Alabama	99.8	90.3	78.9	59.4	7.9
Alaska	99.7	89.3	68.4	*	*
American Samoa	*	*	*	*	*
Arizona	99.8	94.5	83.1	58.5	9.5
Arkansas	99.9	88.1	71.0	41.1	7.6
California	99.8	94.6	87.0	68.2	8.3
Colorado	99.9	95.2	86.2	63.3	12.1
Connecticut	99.7	94.7	84.3	72.9	5.5
Delaware	100.0	96.9	95.5	80.2	18.6
District of Columbia	100.0	95.2	93.3	79.0	20.0
Florida	99.8	96.3	90.2	70.3	6.7
Georgia	99.6	92.9	84.3	63.6	12.4
Guam	*	*	*	*	*
Hawaii	100.0	95.6	*	*	*
Idaho	99.9	90.2	68.4	47.9	5.0
Illinois	99.8	93.6	84.4	62.8	6.6
Indiana	99.6	91.5	80.5	58.3	7.0
Iowa	99.5	90.0	76.7	52.5	8.0
Kansas	99.8	92.0	77.6	53.0	13.0
Kentucky	99.7	90.4	79.9	60.2	5.3
Louisiana	99.8	91.7	79.2	55.0	8.6
Maine	99.2	88.3	75.3	63.8	1.4
Maryland	99.9	96.5	93.9	77.8	20.9
Massachusetts	100.0	96.5	95.0	83.6	15.4
Michigan	99.6	92.9	84.3	63.9	4.2
Minnesota	99.9	93.0	82.4	59.5	6.4
Mississippi	99.7	86.6	68.2	41.3	9.1
Missouri	99.7	90.5	77.3	59.7	9.9
Montana	99.9	90.1	74.6	54.6	2.1
Nebraska	99.6	93.3	80.9	59.7	7.3

Figure 37 - Continued
Percentage of Fixed Connections by Downstream Speed by State as of December 31, 2020

State	% over 200 kbps Downstream	% at least 10 Mbps Downstream	Over 200 kbps Upstream and		
			% at least 25 Mbps Downstream	% at least 100 Mbps Downstream	% at least 940 Mbps Downstream
Nevada	99.9	96.0	87.4	64.9	10.3
New Hampshire	99.5	93.1	88.1	78.2	7.7
New Jersey	99.8	97.3	95.2	83.6	20.8
New Mexico	99.9	88.6	73.6	45.0	4.3
New York	99.8	97.2	92.7	82.7	13.0
North Carolina	99.4	92.8	84.9	71.0	7.5
North Dakota	99.9	96.7	89.1	69.8	5.5
Northern Mariana Isl	*	*	*	*	*
Ohio	99.8	93.1	82.0	64.7	3.2
Oklahoma	99.7	89.5	74.8	51.2	10.6
Oregon	99.9	93.8	85.1	64.4	8.8
Pennsylvania	99.9	93.7	89.7	71.8	13.4
Puerto Rico	100.0	85.6	52.9	25.1	0.7
Rhode Island	99.6	98.5	95.7	80.3	23.3
South Carolina	99.8	93.8	84.2	68.6	5.1
South Dakota	99.8	97.1	91.2	63.6	4.1
Tennessee	99.7	93.7	85.3	66.1	11.0
Texas	99.9	95.0	85.5	65.6	13.4
Utah	100.0	95.1	85.1	62.6	13.4
Vermont	98.5	84.3	73.1	59.7	8.1
Virgin Islands	*	*	*	*	*
Virginia	99.6	93.9	89.0	72.4	19.1
Washington	99.8	94.4	86.7	67.8	11.5
West Virginia	97.9	81.1	69.3	53.4	5.5
Wisconsin	99.3	92.2	79.4	62.4	2.7
Wyoming	99.9	92.1	79.8	53.1	1.0
Total	99.8	93.9	85.4	66.8	9.9

Source: FCC Form 477.

Figure 38
Providers of Connections by Technology by State as of December 31, 2020
(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	23	*	15	18	45	*	30	6	82
Alaska	17	4	9	*	19	*	15	10	38
American Samoa	0	0	0	*	*	0	*	*	*
Arizona	19	*	18	16	50	*	53	5	101
Arkansas	22	*	13	17	47	*	36	4	90
California	32	12	*	32	94	*	131	4	222
Colorado	*	5	20	16	77	*	75	8	139
Connecticut	*	*	9	9	22	*	*	*	34
Delaware	*	*	6	5	*	*	4	*	27
District of Columbia	*	*	12	*	*	*	8	*	37
Florida	17	*	24	18	78	*	47	6	121
Georgia	25	*	18	26	91	*	31	4	121
Guam	*	0	0	*	*	0	*	*	*
Hawaii	*	*	9	*	10	*	9	4	20
Idaho	23	*	15	16	42	*	46	7	77
Illinois	49	5	*	21	98	*	99	5	185
Indiana	36	*	21	12	81	*	75	*	130
Iowa	71	12	*	40	179	*	93	6	237
Kansas	27	5	*	22	74	*	84	8	139
Kentucky	16	*	10	28	60	*	36	6	109
Louisiana	16	*	16	15	41	*	26	5	75
Maine	12	6	*	7	20	*	19	4	43
Maryland	*	*	19	16	*	*	28	4	76
Massachusetts	*	*	12	11	*	*	21	*	60
Michigan	26	*	25	26	82	*	66	6	140
Minnesota	38	7	*	20	92	*	65	4	139
Mississippi	14	*	10	12	37	*	16	5	67
Missouri	31	4	*	17	76	*	87	6	146
Montana	19	*	12	7	38	*	44	6	70
Nebraska	27	5	*	18	63	*	54	6	105

Figure 38 - Continued
Providers of Connections by Technology by State as of December 31, 2020
(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	17	4	15	*	43	*	34	4	75
New Hampshire	9	4	*	5	22	*	13	4	37
New Jersey	8	*	20	8	*	*	11	*	63
New Mexico	18	*	14	10	39	*	45	5	73
New York	28	*	27	22	80	*	31	4	115
North Carolina	19	*	20	27	64	*	31	5	102
North Dakota	18	*	9	9	34	*	15	5	51
Northern Mariana Isl	*	*	*	*	*	0	*	*	*
Ohio	32	*	25	32	88	*	77	*	165
Oklahoma	33	5	*	14	62	*	60	9	118
Oregon	32	6	21	18	66	4	51	5	109
Pennsylvania	21	4	*	27	71	*	39	6	124
Puerto Rico	*	0	*	*	13	*	30	4	41
Rhode Island	*	*	*	*	*	*	4	*	24
South Carolina	18	*	14	14	40	*	19	5	62
South Dakota	20	*	11	9	42	*	25	7	76
Tennessee	20	4	*	20	84	*	36	5	117
Texas	62	8	*	32	139	*	176	8	273
Utah	20	*	15	11	39	*	39	7	70
Vermont	8	*	8	5	20	*	12	5	36
Virgin Islands	*	0	0	*	*	*	*	*	6
Virginia	19	4	*	20	78	*	48	5	118
Washington	25	5	28	25	75	4	55	5	118
West Virginia	*	*	8	16	29	*	23	5	66
Wisconsin	40	*	20	*	75	*	53	5	116
Wyoming	14	*	9	7	23	*	22	7	46
Total	653	106	209	368	1,441	6	1,396	64	2,381

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

= Rounds to Zero.

* = Data withheld for confidentiality reasons.

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

Source: FCC Form 477.

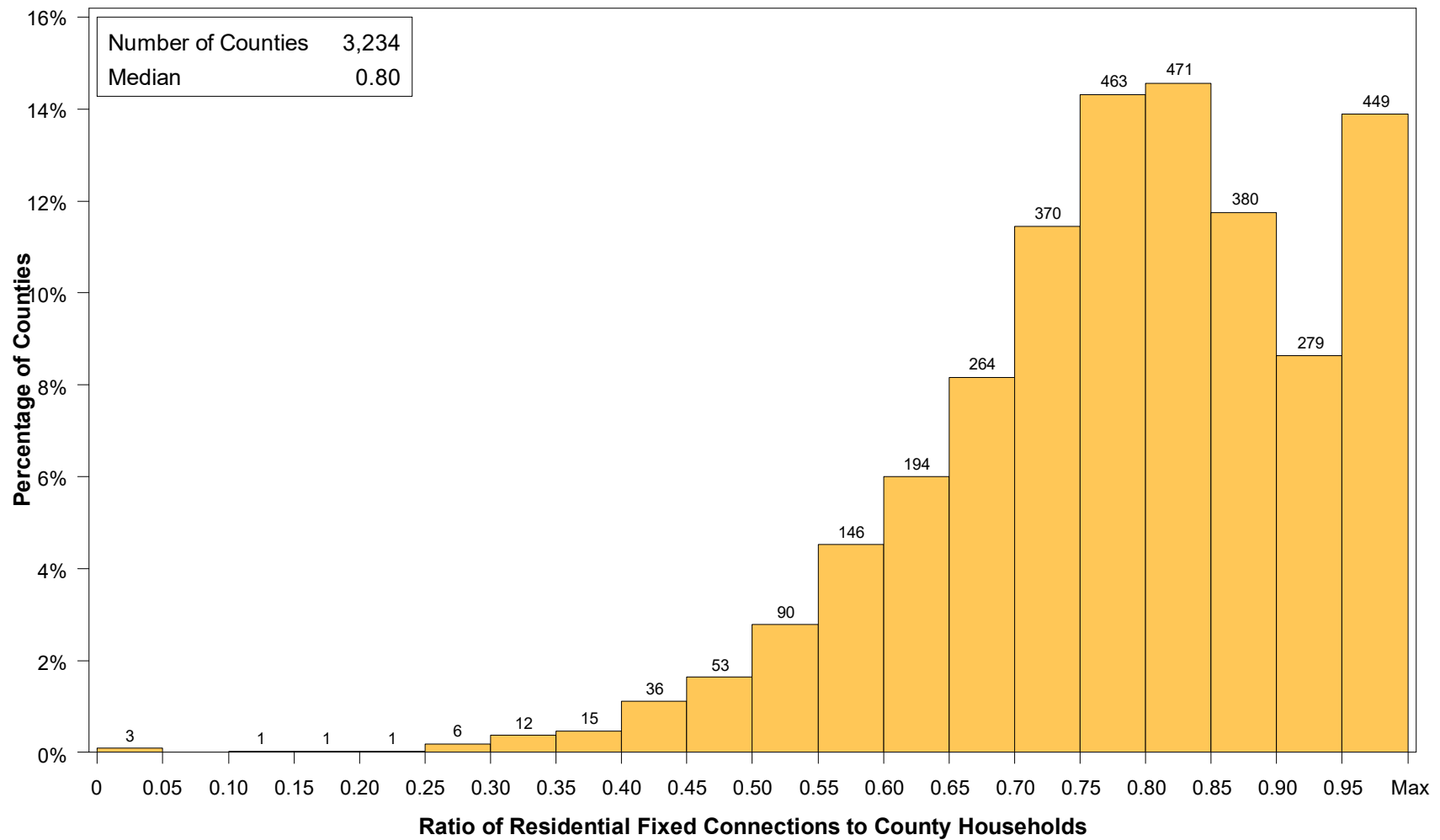
SECTION 4

SUMMARY STATISTICS: COUNTIES AND CENSUS TRACTS

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Figure 39
Distribution of Counties by Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to County Households as of December 31, 2020



Note: Ratios over 1 were set to 1. See Technical Notes at the end of the report.
 Sources: FCC Form 477; 2016-2020 ACS 5-year estimates; and Census 2010.

Figure 40
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, 2020

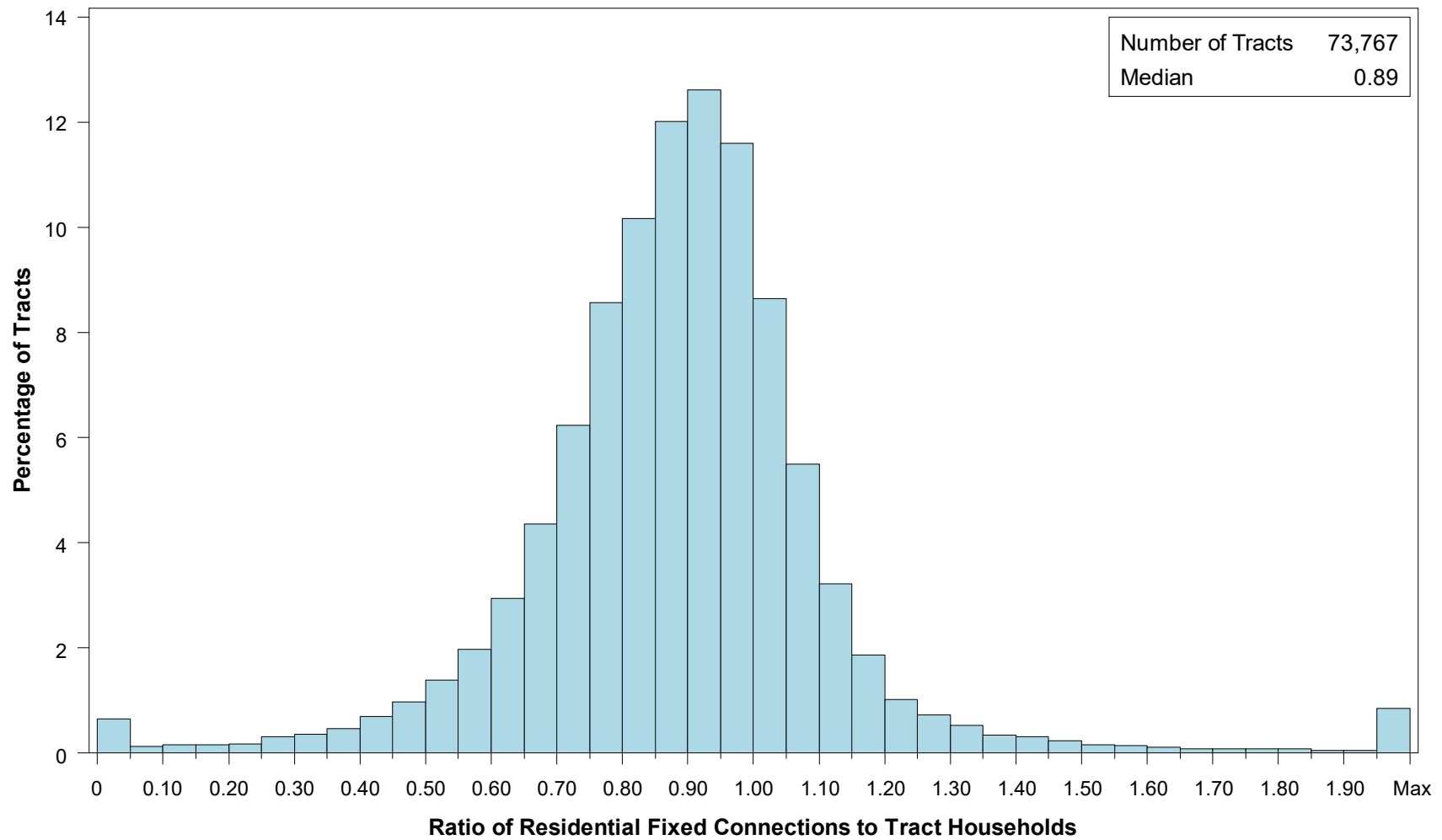
<i>Technology</i>	<i>Ratio of Residential Fixed Connections to County Households</i>										<i>100% or more</i>
	<i>Zero</i>	<i>Greater than 0 and no more than 5%</i>	<i>Greater than 5 and no more than 10%</i>	<i>Greater than 10 and no more than 20%</i>	<i>Greater than 20 and no more than 30%</i>	<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	1.9	9.6	12.9	30.7	22.6	12.5	5.4	2.3	1.7	0.3	0.1
sDSL	95.8	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Wireline ¹	82.3	17.6	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cable Modem	11.3	5.9	5.2	11.1	12.7	11.3	11.5	11.0	16.2	2.9	0.8
FTTP	10.3	39.7	13.5	13.5	7.8	4.6	3.3	2.4	4.1	0.6	0.1
Satellite	0.4	65.5	21.4	11.2	1.1	0.3	0.0	0.0	0.0	0.0	0.0
Fixed Wireless	3.5	65.4	15.1	10.0	3.8	1.2	0.6	0.2	0.1	0.0	0.1
Total	0.1	0.0	0.0	0.1	0.2	0.8	2.8	7.3	39.9	41.4	7.4

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

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

Sources: FCC Form 477; 2016-2020 ACS 5-year estimates; and Census 2010.

Figure 41
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, 2020



Note: Ratios over 2 were set to 2. See Technical Notes at the end of the report.
 Sources: FCC Form 477; 2016-2020 ACS 5-year estimates; and Census 2010.

Figure 42
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, 2020

<i>Technology</i>	<i>Ratio of Residential Fixed Connections to Tract 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	5.2	28.0	16.2	24.6	15.0	5.8	2.6	1.2	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 ¹	96.9	2.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cable Modem	4.3	2.6	1.5	3.2	4.3	6.8	11.8	16.5	32.2	13.2	3.6
FTTP	28.0	24.1	8.5	11.7	8.5	6.5	4.9	3.3	3.3	0.8	0.3
Satellite	28.7	61.3	5.3	3.6	0.8	0.2	0.1	0.0	0.0	0.0	0.0
Fixed Wireless	31.3	60.1	3.5	2.9	1.1	0.5	0.3	0.1	0.1	0.0	0.1
Total	0.6	0.1	0.1	0.3	0.5	0.8	1.7	3.4	22.1	46.5	24.0

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of FCC Form 477 technology categories and other reporting requirements.
Note: Numbers may not sum to totals due to rounding.
Sources: FCC Form 477; 2016-2020 ACS 5-year estimates; and Census 2010.

Figure 43
Percentage of Developed Census Blocks with Residential Fixed Service by Technology as of December 31, 2020
 (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	23.9	74.2	1.8	0.1	0.0	0.0	0.0	0.0
sDSL	99.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Other Wireline ¹	99.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Cable Modem	30.9	65.0	4.0	0.0	0.0	0.0	0.0	0.0
FTTP	69.9	28.6	1.4	0.1	0.0	0.0	0.0	0.0
Satellite	0.0	0.1	1.0	98.8	0.1	0.0	0.0	0.0
Fixed Wireless	28.3	32.9	20.8	11.1	4.8	1.6	0.4	0.2
aDSL and/or Cable Modem and/or FTTP	9.9	24.3	56.1	9.1	0.6	0.0	0.0	0.0
Any Technology	0.0	0.1	0.0	2.7	9.7	26.6	28.9	32.0

¹ Power Line and Other are summarized with Other Wireline. See Technical Notes at the end of the report for a description of FCC Form 477 technology categories and other reporting requirements.
 Note: Numbers 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 FCC 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 44
Distribution of Counties by Ratio of Residential Fixed Connections to County Households by State as of December 31, 2020
(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	3	11	34	18	1
Alaska	29	0	0	0	0	1	0	1	4	6	12	5
American Samoa	5	2	0	0	0	0	0	0	2	1	0	0
Arizona	15	0	0	0	0	0	0	0	1	4	10	0
Arkansas	75	0	0	0	0	0	0	5	20	39	11	0
California	58	0	0	0	0	0	0	0	1	5	46	6
Colorado	64	0	0	0	0	0	1	2	3	14	25	19
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	2	16	25	24
Georgia	159	0	0	0	0	1	3	7	21	60	53	14
Guam	1	0	0	0	0	0	0	0	0	0	1	0
Hawaii	5	0	0	0	1	0	0	0	0	0	1	3
Idaho	44	0	0	0	0	0	1	3	1	17	16	6
Illinois	102	0	0	0	0	0	1	2	11	54	33	1
Indiana	92	0	0	0	0	0	0	0	6	55	30	1
Iowa	99	0	0	0	0	0	0	0	0	62	36	1
Kansas	105	0	0	0	0	0	0	0	4	65	36	0
Kentucky	120	0	0	0	0	0	0	1	13	58	48	0
Louisiana	64	0	0	0	0	0	1	4	15	26	18	0
Maine	16	0	0	0	0	0	0	0	0	0	9	7
Maryland	24	0	0	0	0	0	0	0	0	3	19	2
Massachusetts	14	0	0	0	0	0	0	0	0	0	10	4
Michigan	83	0	0	0	0	0	0	0	3	31	43	6
Minnesota	87	0	0	0	0	0	0	1	0	26	57	3
Mississippi	82	0	0	0	0	0	1	13	23	35	9	1
Missouri	115	0	0	0	0	0	2	5	12	63	30	3
Montana	56	0	0	0	0	0	0	0	1	21	30	4
Nebraska	93	0	0	0	0	0	0	1	5	56	31	0

Figure 44 - Continued
Distribution of Counties by Ratio of Residential Fixed Connections to County Households by State as of December 31, 2020
(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	0	2	1	5	8	1
New Hampshire	10	0	0	0	0	0	0	0	0	0	5	5
New Jersey	21	0	0	0	0	0	0	1	0	0	17	3
New Mexico	33	0	0	0	0	0	0	0	2	12	13	6
New York	62	0	0	0	0	0	0	1	0	8	43	10
North Carolina	100	0	0	0	0	0	0	0	1	29	52	18
North Dakota	53	0	0	0	0	0	0	0	0	23	27	3
Northern Mariana Isl	4	1	0	0	0	0	1	1	1	0	0	0
Ohio	88	0	0	0	0	0	0	0	2	33	51	2
Oklahoma	77	0	0	0	0	0	0	5	12	46	13	1
Oregon	36	0	0	0	0	0	0	1	2	8	21	4
Pennsylvania	67	0	0	0	0	0	0	1	0	18	45	3
Puerto Rico	78	0	0	0	0	4	12	17	24	19	2	0
Rhode Island	5	0	0	0	0	0	0	0	0	0	3	2
South Carolina	46	0	0	0	1	1	0	0	2	20	18	4
South Dakota	66	0	0	0	0	0	1	0	1	36	26	2
Tennessee	95	0	0	0	0	0	0	0	4	50	37	4
Texas	254	0	0	0	0	0	1	4	14	121	97	17
Utah	29	0	0	0	0	0	0	0	0	2	19	8
Vermont	14	0	0	0	0	0	0	0	0	0	8	6
Virgin Islands	3	0	0	0	0	0	0	0	0	2	1	0
Virginia	134	0	0	0	0	0	2	6	8	45	62	11
Washington	39	0	0	0	0	0	0	1	0	10	22	6
West Virginia	55	0	0	0	0	0	0	1	2	34	18	0
Wisconsin	72	0	0	0	0	0	0	0	0	14	48	10
Wyoming	23	0	0	0	0	0	0	0	1	5	15	2
Total	3,234	3	0	0	2	7	27	89	236	1291	1339	240

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

Sources: FCC Form 477; 2016-2020 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 45
Distribution of Census Tracts by Ratio of Residential Fixed Connections to Tract Households by State as of December 31, 2020
(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	0	0	1	0	3	28	64	106	392	428	157	
Alaska	167	1	0	0	2	2	4	5	6	38	72	37	
American Samoa	18	2	0	0	0	0	1	3	5	5	0	2	
Arizona	1,526	9	2	3	7	15	18	23	46	286	619	498	
Arkansas	686	0	0	0	1	5	13	56	91	268	192	60	
California	8,036	46	10	3	10	16	32	45	88	997	4,519	2,270	
Colorado	1,249	8	0	0	2	1	3	10	20	130	626	449	
Connecticut	829	3	0	0	0	1	0	3	1	91	478	252	
Delaware	215	1	0	0	0	0	1	0	2	28	98	85	
District of Columbia	179	0	0	1	1	0	0	0	2	28	85	62	
Florida	4,199	29	4	3	2	5	9	19	73	531	1,577	1,947	
Georgia	1,964	6	0	2	2	2	23	43	103	467	782	534	
Guam	56	8	1	1	3	5	1	2	4	7	8	16	
Hawaii	326	10	1	1	1	1	1	2	3	33	122	151	
Idaho	298	0	0	0	0	3	4	9	12	89	135	46	
Illinois	3,121	5	0	0	5	7	22	52	132	853	1,592	453	
Indiana	1,508	5	1	0	4	1	11	22	94	503	644	223	
Iowa	825	2	0	0	0	1	0	9	20	380	354	59	
Kansas	770	6	0	1	2	4	6	5	37	274	313	122	
Kentucky	1,115	7	0	2	0	3	10	32	58	348	499	156	
Louisiana	1,136	10	1	0	3	12	23	66	93	345	388	195	
Maine	351	0	0	0	0	0	0	0	0	46	174	131	
Maryland	1,394	6	1	1	1	2	2	17	16	197	660	491	
Massachusetts	1,471	12	1	1	1	2	4	6	11	168	854	411	
Michigan	2,767	25	2	4	4	18	29	46	123	687	1,329	500	
Minnesota	1,335	4	0	0	0	1	5	6	18	330	782	189	
Mississippi	661	4	0	0	0	6	17	64	106	241	162	61	
Missouri	1,393	2	1	0	2	7	16	54	87	431	579	214	
Montana	271	1	0	0	0	0	1	4	7	79	131	48	
Nebraska	532	3	1	0	0	1	0	2	16	180	259	70	

Figure 45 - Continued
Distribution of Census Tracts by Ratio of Residential Fixed Connections to Tract Households by State as of December 31, 2020
(Connections over 200 kbps in at least one direction)

State	Tracts	Ratio of Residential Fixed Connections over 200 kbps in at Least One Direction to Tract Households										
		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	4	0	0	1	0	2	8	17	103	334	214
New Hampshire	294	2	0	0	0	0	0	0	1	10	152	129
New Jersey	2,004	9	1	0	8	8	19	12	10	229	962	746
New Mexico	499	1	1	2	2	7	4	13	24	156	204	85
New York	4,900	68	3	6	15	19	20	33	62	1,124	2,445	1,105
North Carolina	2,183	12	1	0	0	0	3	11	53	505	931	667
North Dakota	205	0	0	0	0	0	1	0	6	80	85	33
Northern Mariana Isl	22	2	0	0	0	1	5	6	1	3	4	0
Ohio	2,946	5	0	0	4	6	15	41	102	800	1,532	441
Oklahoma	1,046	0	2	2	3	9	25	51	121	359	330	144
Oregon	827	2	1	0	1	0	1	3	18	135	513	153
Pennsylvania	3,217	18	2	3	5	4	16	32	73	717	1,702	645
Puerto Rico	903	13	8	46	127	126	127	126	77	84	46	123
Rhode Island	241	0	0	1	0	0	0	1	1	20	141	77
South Carolina	1,097	9	2	8	2	10	9	28	65	274	401	289
South Dakota	222	0	0	1	1	0	0	4	7	101	86	22
Tennessee	1,497	12	1	0	2	6	14	28	71	501	629	233
Texas	5,253	28	2	1	5	14	26	88	233	1,445	2,125	1,286
Utah	588	2	2	0	1	3	2	1	3	76	309	189
Vermont	184	1	0	0	0	0	0	1	1	13	106	62
Virgin Islands	29	0	0	0	1	0	2	3	0	16	6	1
Virginia	1,895	18	2	1	2	7	24	37	74	373	825	532
Washington	1,446	2	0	1	1	2	4	6	11	150	899	370
West Virginia	484	0	0	0	2	4	8	24	39	189	171	47
Wisconsin	1,393	2	2	0	0	1	3	6	22	362	796	199
Wyoming	132	1	0	1	0	0	0	2	1	32	72	23
Total	73,767	426	56	97	236	351	614	1,234	2,473	16,309	34,267	17,704

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

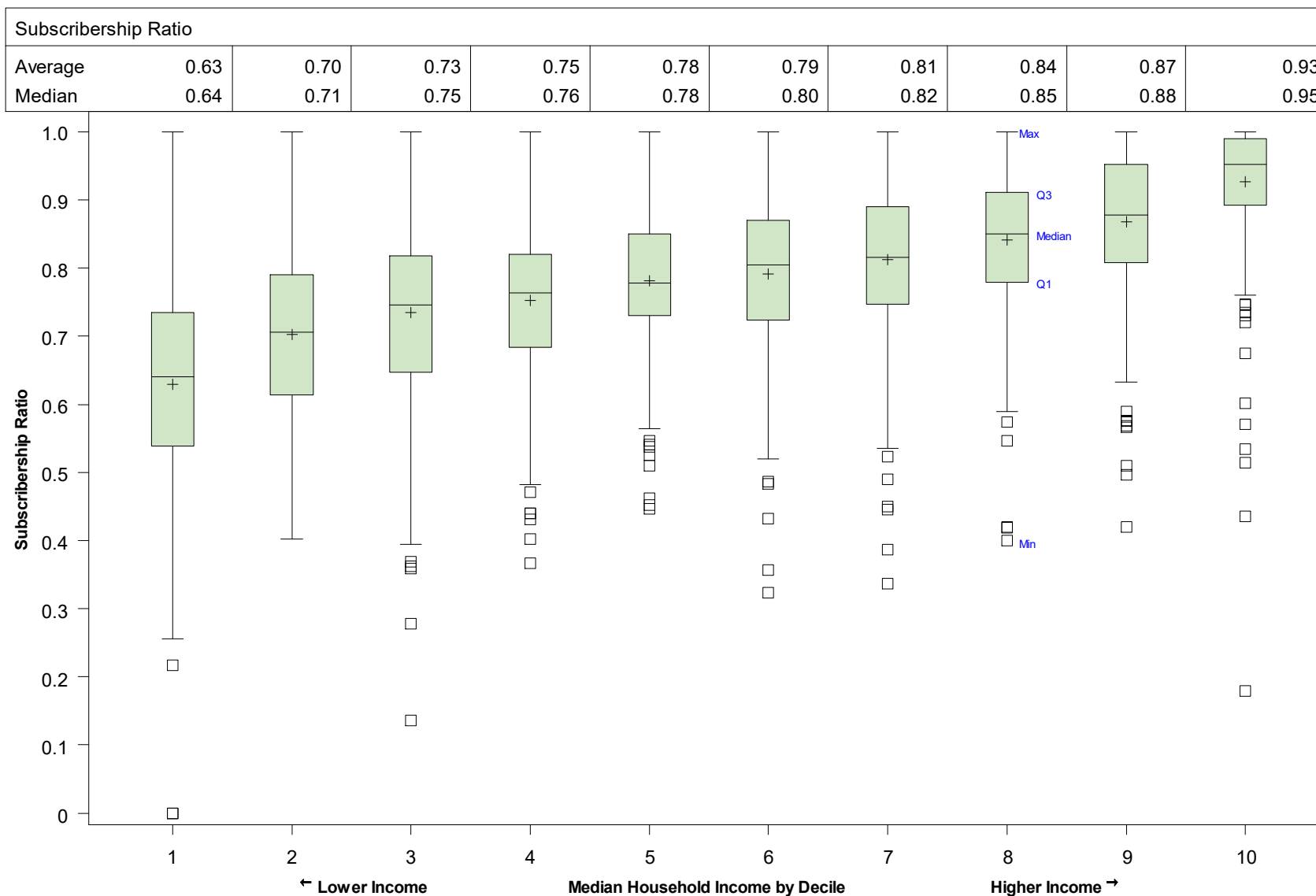
Sources: FCC Form 477; 2016-2020 ACS 5-year estimates (Households for U.S. and District of Columbia); Census 2010 (Households for Puerto Rico, American Samoa, Guam, Northern Mariana Islands and U.S. Virgin Islands).

SECTION 5
CORRELATED RESULTS: DEMOGRAPHIC MEASURES

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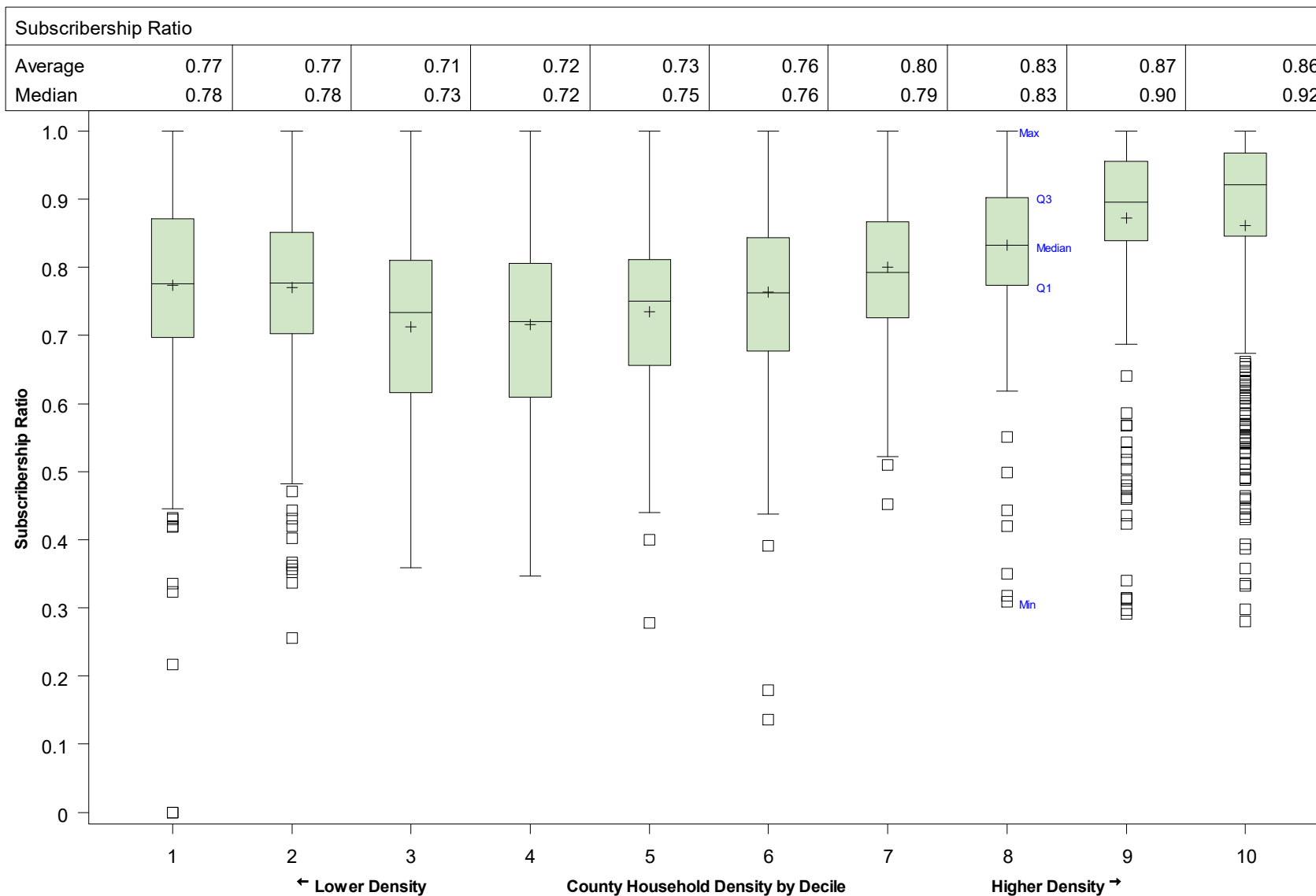
Figure 46
Subscribership Ratio Distributions by Income Deciles as of December 31, 2020



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; 2016-2020 ACS 5-year Estimates; Census 2010.

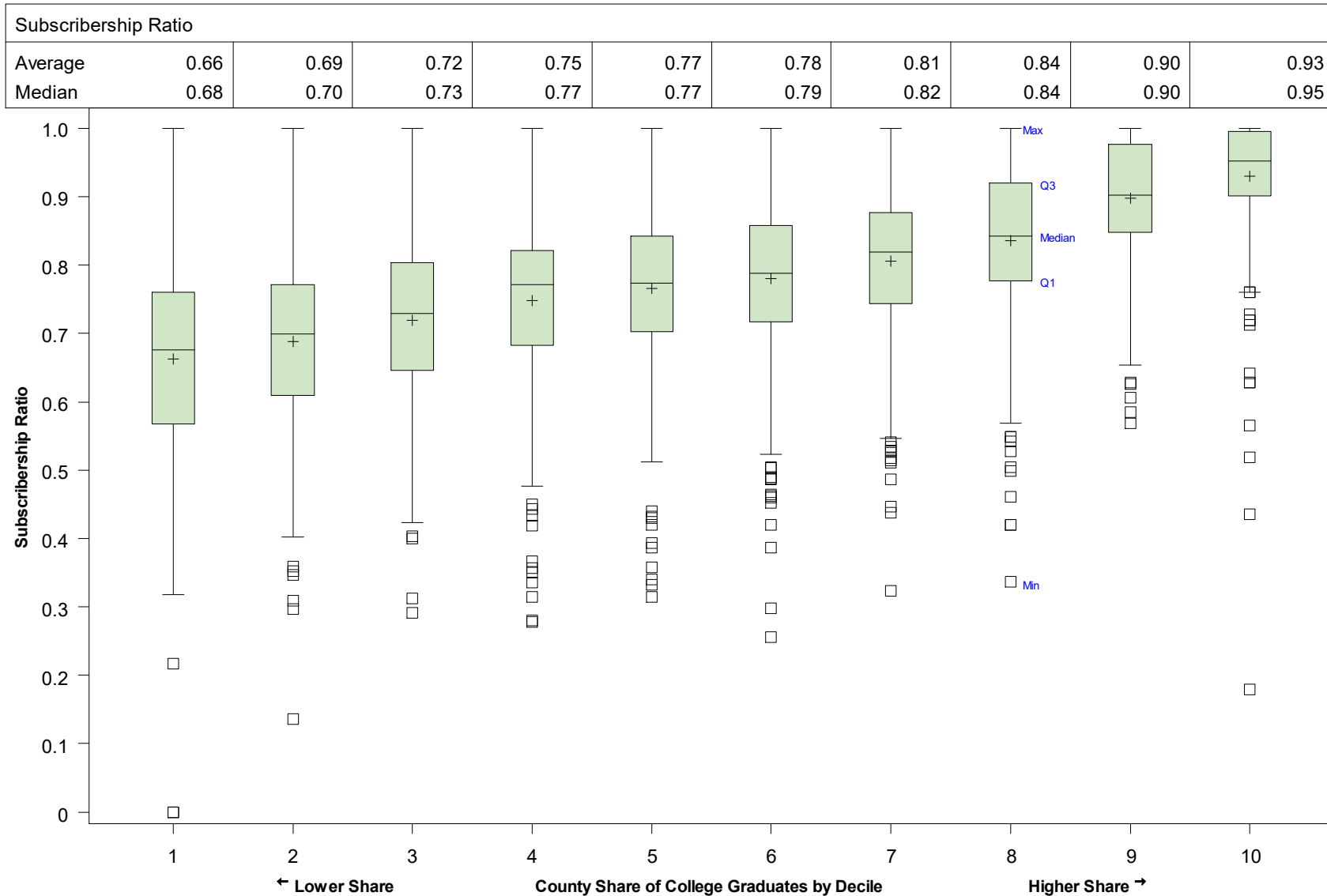
Figure 47
Subscribership Ratio Distributions by Density Deciles as of December 31, 2020



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; \perp is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and \square 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; 2016-2020 ACS 5-year Estimates; Census 2010.

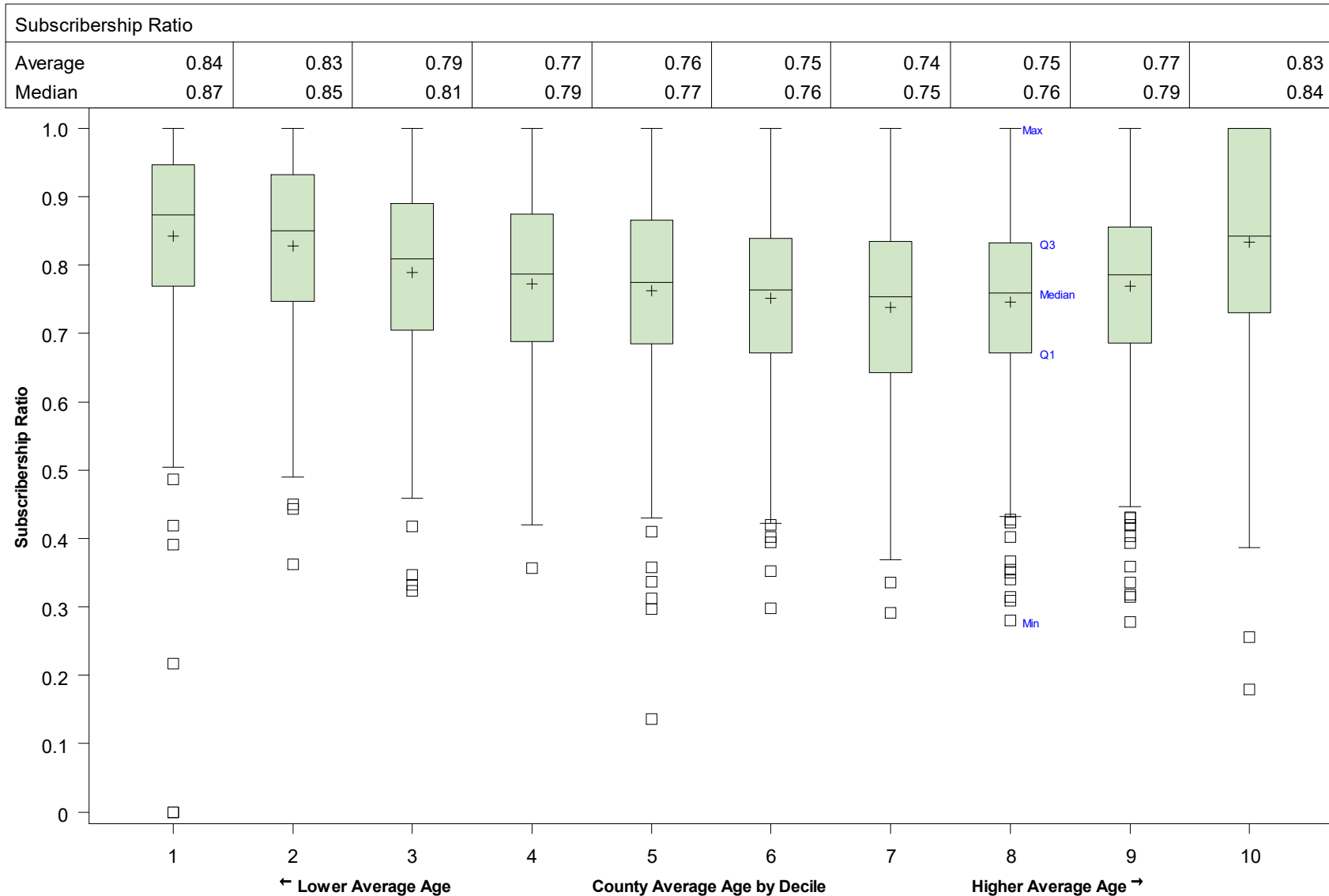
Figure 48



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; \perp is the minimum observation above $Q1-1.5(Q3-Q1)$; T is the maximum observation below $Q3+1.5(Q3-Q1)$; and \square 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; 2016-2020 ACS 5-year Estimates; Census 2010.

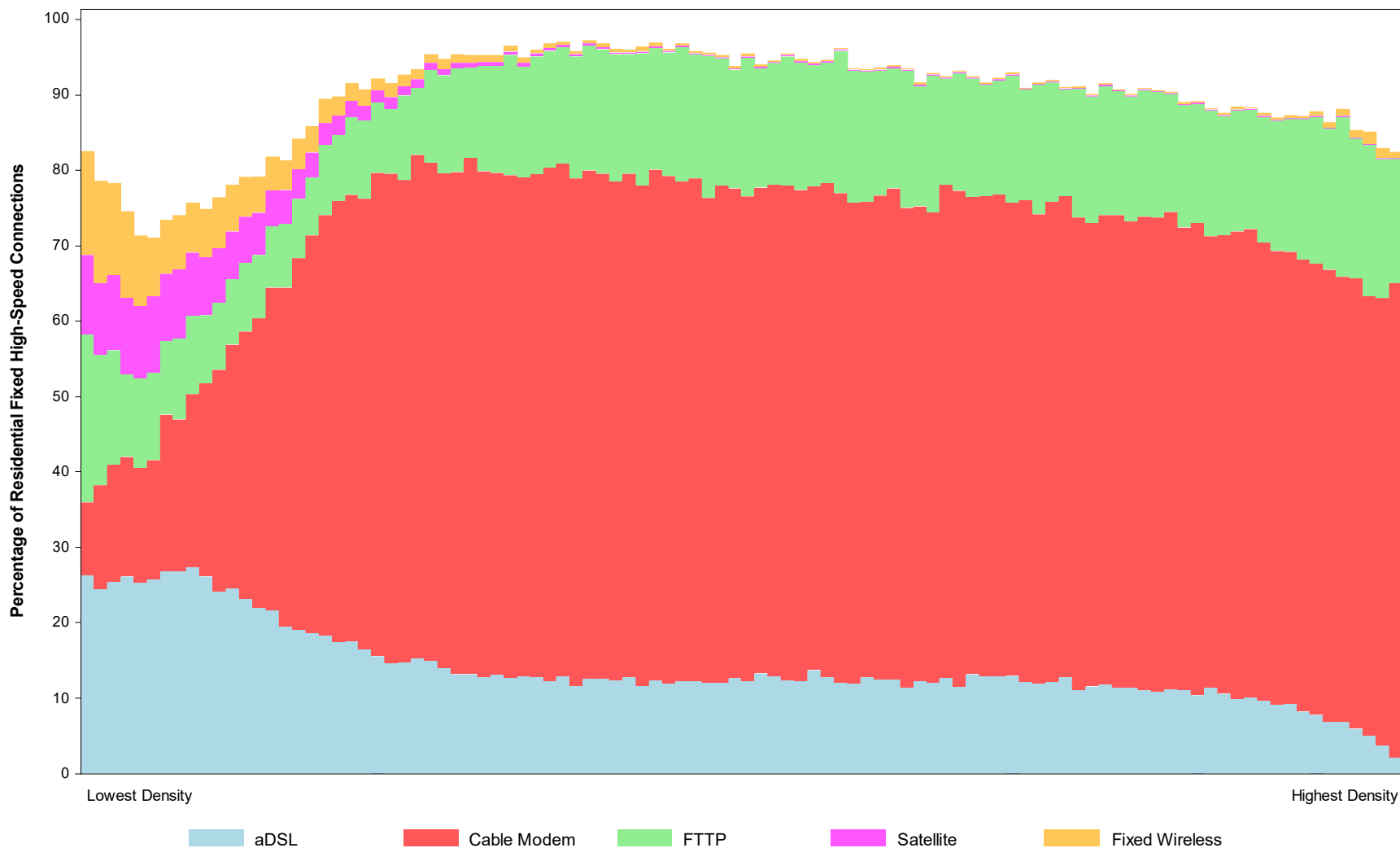
Figure 49
Subscribership Ratio Distributions by Average Age of County Population (in Deciles) as of December 31, 2020



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; 2016-2020 ACS 5-year Estimates; Census 2010.

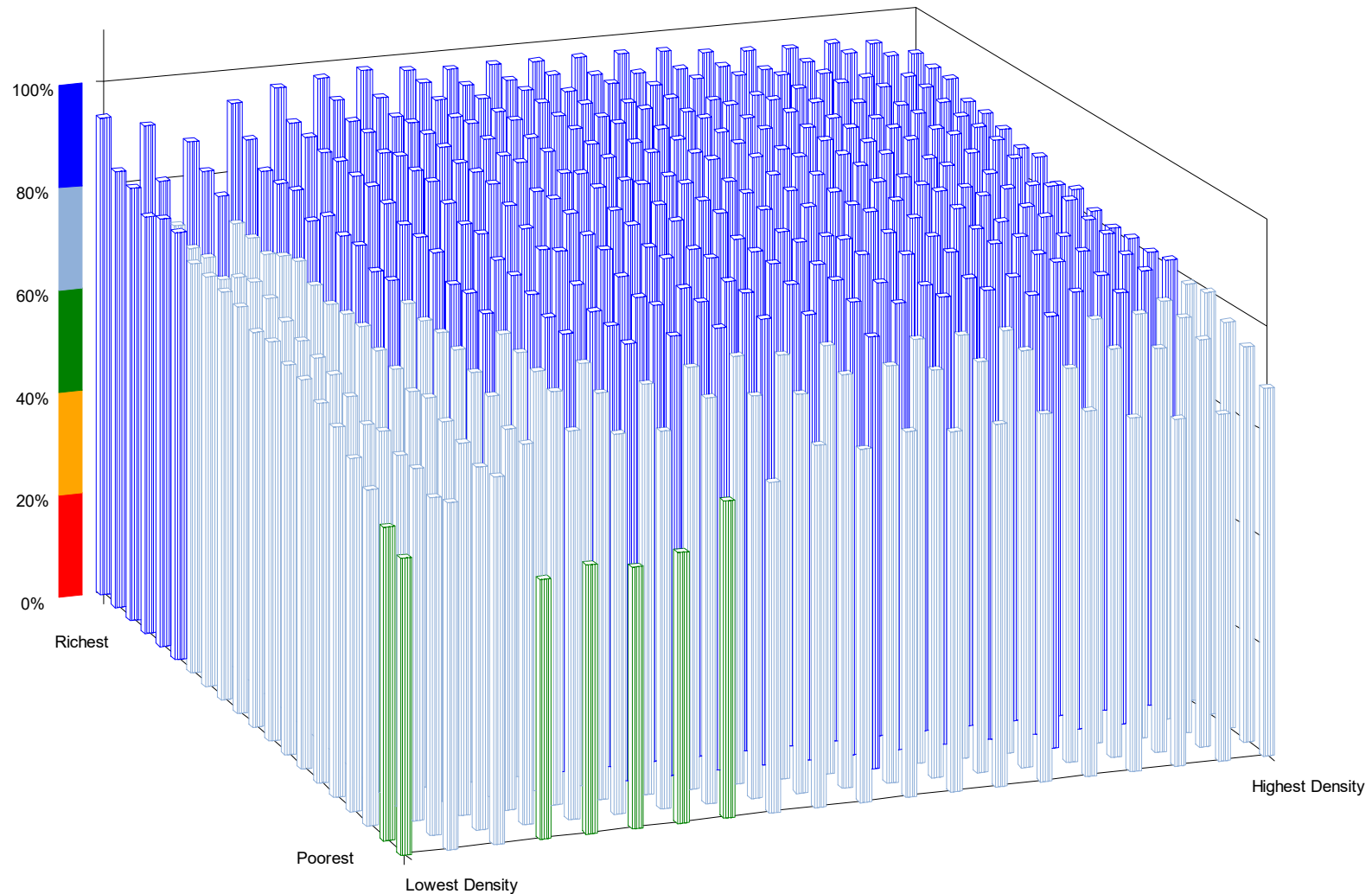
Figure 50
Subscribership Ratios by Technology and Tract Household Density as of December 31, 2020
(Residential fixed connections over 200 kbps in at least one direction)



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; 2016-2020 ACS 5-year estimates; and Census 2010.

Figure 51
Average Subscribership Ratios by Income and Household Density as of December 31, 2020
(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; 2016-2020 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 FCC 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 FCC Form 477.⁹ Detailed information about those changes and about the FCC Form 477 reporting requirements in general is available at www.fcc.gov/form477.

In March 2020, Congress passed the Broadband Data Act which required the Commission to collect broadband availability data at a more granular level than what was historically reported through FCC Form 477.¹⁰ As a result, starting in June 2022, broadband availability data have been collected through the Broadband Data Collection (BDC) while subscription data continues to be reported through FCC Form 477. To ensure consistency across the two data collections, several minor changes were made to the FCC Form 477 reporting requirements beginning with filings as of June 30, 2022. Complete reporting requirements for both, the BDC and FCC Form 477, can be found here: www.fcc.gov/BroadbandData/filers. The inaugural BDC filing window for data as of June 30, 2022 was closed on September 1, 2022. Subscription data collected as part of the BDC will be incorporated into this report beginning with the June 30, 2022 edition.

FCC 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 FCC 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 FCC 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

⁹ *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>.

¹⁰ Broadband Deployment Accuracy and Technological Availability Act, Pub. L. No. 116-130, 134 Stat. 228 (2020) (codified at 47 U.S.C. §§ 641-646) (Broadband DATA Act or Act).

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 FCC 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 FCC 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 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 FCC 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 2016-2020 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.