

US State of the Mobile Union 1H 2021



Carrier performance at national, state, and metro levels, plus a look at 5G in the US.

From online gaming to binge-watching movies on Netflix and all the Zoom meetings in between, our reliance on connectivity has never been greater. As our connected communities continue to grow in the face of exploding data usage and rising demands for perfect connectivity, the good news is that 5G is expanding and improving, and we're seeing strong performances from all three major carriers.

To show you how the carriers compared in the first half of 2021, we tested the entirety of the United States, each of the 50 states, and the country's 125 most populated metropolitan markets. We've also taken a look at 5G highlights for each carrier.

Read on to see how the carriers performed across all the places in which you use your smartphone in the first half of 2021, and be on the lookout for our 1H 2021 5G report coming soon.



Key takeaways

The mobile landscape is extremely dynamic and prone to rapid change. That could ultimately be great news for consumers because performance is improving and competition is increasing. AT&T, for instance, fared much better in our national testing than it did in 2H 2020, T-Mobile had better speeds at both the national and metro levels, while Verizon showed particularly impressive 5G expansion since 2020.

AT&T shows major improvements across the board:

After taking a slight step back for speed in 2H 2020, AT&T delivered faster speeds, better reliability, and strong Everyday 5G results in 1H 2021. AT&T took home three US RootScore Awards in 1H 2021 compared to one in 2H 2020, while significantly increasing its tally of State and Metro Area RootScore Awards. And as our **5G Scorecard** series has shown, AT&T has also delivered fast Everyday 5G download speeds more consistently than the other carriers in 1H 2021.

T-Mobile improves in major metros:

T-Mobile continued to perform well in our metro area testing, delivering good and improved median download speeds, with stronger reliability since 2H 2020. The carrier also provided the top Everyday 5G availability in our **June 5G Scorecard**, and its 5G speeds have continued to improve since 2H 2020.

Verizon remains the carrier to beat:

Verizon delivered another excellent performance in 1H 2021. The carrier won or shared five out of seven US RootScore Awards and earned more State and Metro Area RootScore Awards than any other carrier. Verizon also continued its trend of offering strong speeds and great reliability in major cities, and as shown in our **last 5G Scorecard**, Verizon has also delivered outstanding Everyday 5G data reliability more often than the other carriers.

To learn about Everyday 5G performance the US, visit our latest **5G Scorecard**.

New 5G report coming soon:
Stay tuned for our upcoming 1H 2021 5G summary report.

Performance across the United States

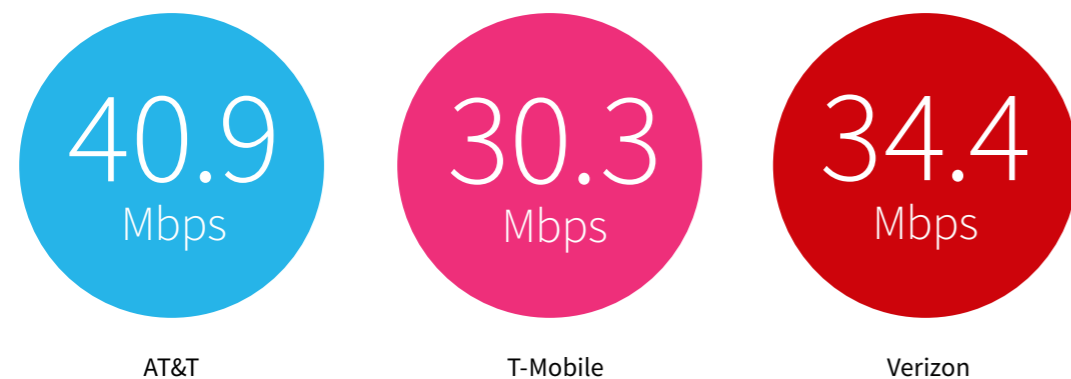
Providing strong service across the entirety of the US is a tall order. To earn our US RootScore Awards, a carrier needs to offer outstanding performance across all the different spaces where consumers use their smartphones, from cities and towns of all sizes, to roadways, rural areas, and all the places in between.

United States RootScores 1H 2021

Rank	Overall	Reliability	Accessibility	Speed	Data	Call	Text
1	96.0	96.5	94.8	97.5	97.6	94.5	96.7
2	95.6	95.9	93.6	95.7	97.1	93.2	96.8
3	90.3	90.9	90.6	91.4	93.6	85.5	92.3

● 2H 2020 ● 1H 2021 ● AT&T ● T-Mobile ● Verizon

United States speeds (ordered alphabetically)



Note: The speeds above show each carrier's aggregate median download speed across the entirety of the US.

Key takeaways (alphabetized by carrier)

AT&T improves significantly at the national level, winning two more US RootScore Awards than it did in 2H 2020:
 In 2H 2020, AT&T earned a share of the US Text RootScore Award and finished second in every other category. This time, on the other hand, AT&T took home its first-ever US Data RootScore Award, won the US Network Speed RootScore Award, and again shared the US Text RootScore Award with Verizon. AT&T also delivered the fastest aggregate median download speed of any carrier at 40.9 Mbps, up from 33.8 Mbps last time.

T-Mobile's US aggregate speed improves, with strong US RootScores: While T-Mobile usually performs better in major cities than it does in our state or national testing, that narrative could quickly change going forward if the carrier adds more towers outside of urban areas while it continues to integrate the highly coveted **mid-band spectrum** it acquired from Sprint. T-Mobile's median download speed across the US increased by over 50% since 2H 2020 (20.1 Mbps to 30.3 Mbps), and six of its seven US RootScores were above 90 (compared two above 90 last time). In short, T-Mobile is showing good progress and could further level the playing field at the national level later in 2021 and beyond.

Verizon leads on the national stage but AT&T gains ground: Verizon continued its record-setting streak of winning US RootScore Awards outright in the categories of overall performance, network reliability, and call performance for the sixteenth straight test period, spanning eight years. That said, Verizon earned two fewer US RootScore Awards than it did in 2H 2020, finishing second behind AT&T in the categories of network speed and data performance. It's worth noting that Verizon performed well in both categories, with its RootScores very close to those of AT&T. The bottom line is that with five national awards and two very close second-place finishes, Verizon delivered another outstanding showing on the national stage.

Keep in mind that if a carrier's ranking(s) declines in a given test period, it doesn't necessarily mean that the operator's performance was worse compared to the previous test period. Rather, a strong performance from another operator(s) can correspond with lower rankings for others.

Mobile performance across the 50 states

Providing strong service across an entire state isn't an easy task. Excelling in metropolitan markets or big cities doesn't necessarily mean that strong service will translate to success in other areas of a state. Our State RootScore Report studies balance performance from dense urban areas, smaller towns, rural spaces, and highways to paint a complete picture of the consumer mobile experience at the state level.



State RootScore Award tally - by category

	Overall	Reliability	Accessibility	Speed	Data	Call	Text	Total
AT&T	25	26	18	41	36	28	43	217
T-Mobile	0	1	2	4	0	1	8	16
Verizon	41	43	38	24	27	45	46	264

Note: Award tallies include both outright wins and ties.

Key takeaways (alphabetized by carrier)

AT&T shows considerable improvement, taking home far more state-level awards:

Similar to what we saw at the national level, AT&T showed excellent improvement in our state testing since the second half of 2020. While AT&T's state-level award tally (217) remained behind that of Verizon (264), AT&T increased its State RootScore Award total by an impressive 56 awards since 2H 2020. While that level of improvement is noteworthy by itself, 22 of those additional awards were earned across the important categories of network speed and data performance. To put AT&T's improvements in context, consider that T-Mobile was the only other carrier that increased its award total in 1H 2021, doing so by 5 awards, whereas Verizon's tally declined by 36.

T-Mobile's improvements starting to take effect: Historically, T-Mobile's state-level award tally has been much lower than that of either AT&T or Verizon, and that was again the case in 1H 2021. That said, with T-Mobile's 5G showing strong progress in major cities in 1H 2021, and its state-level award tally improving by 5 since 2H 2020, we could be witnessing a sign of better performance to come.

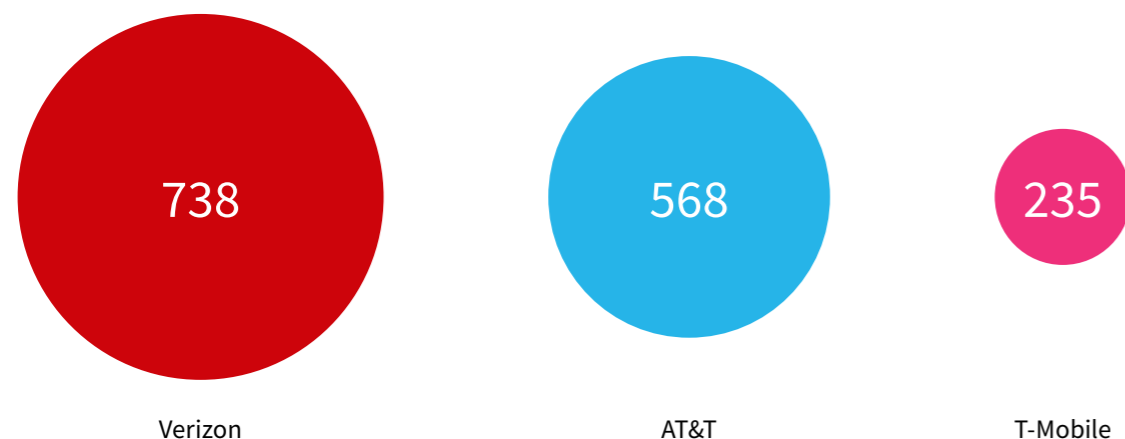
Verizon once again takes home the most State RootScore Awards: Verizon again won the most State RootScore Awards of any carrier in 1H 2021, taking home 264 total state-level awards out of 350 total opportunities. That total includes an impressive 41 State Overall RootScore Awards and 43 State Network Reliability RootScore Awards, easily the most among the competition in both of those crucial categories. Verizon also won or shared 45 state-level call awards and 46 state-level text awards. In short, even though Verizon's award total declined by 36 since 2H 2020, the carrier still posted outstanding results and was the clear overall leader at the state level.

Metro area performance

Major metropolitan markets are much more than just city centers. They also include the suburbs, business districts, tourist areas, and the roadways that connect them. With 5G expanding and improving in the US, end users expect fast and reliable mobile performance across all of these spaces, whether they live and work in a metropolitan market or are visiting on vacation.

This section of our report provides a carrier-by-carrier overview of performance across the 125 most populated metro areas in the US, as well as a high-level look at Everyday 5G availability and speed results for each carrier.

Metro Area RootScore Award tally



Note: Award tallies include both outright wins and ties.

Metro performance in a nutshell:

AT&T continued its trend of improvement we saw in our national and state testing to the metro level in 1H 2021. AT&T won far more awards than in 2H 2020, registered faster speeds, good reliability, and delivered fast Everyday 5G download speeds.

T-Mobile increased its tally of RootScore Awards since 2H 2020, delivered much better speed results, and showed improved reliability. T-Mobile has also continued to deliver impressive Everyday 5G availability.

Verizon remained the top-performing carrier at the metro level. Verizon delivered good speed and reliability results and earned by far the most Metro Area RootScore Awards. Verizon's 5G has also continued to expand, with the carrier recording particularly strong Everyday 5G data reliability results.



AT&T shows major improvements in 1H 2021, with faster speeds, better reliability, and a huge jump in its award total.

Fast speeds got even faster: AT&T's speeds were already fast in most cities in 2H 2020, and those speeds got even faster in 1H 2021. AT&T registered median download speeds of 50 Mbps or better in 31 cities in 1H 2021, a tally over twice as high as that of any other carrier and an improvement from 14 last time. AT&T also improved at the lower end of our intervals, delivering speeds below 20 Mbps in only 3 markets, the fewest of any carrier. Moreover, AT&T clocked the single-fastest median download speed of any carrier for the third straight test period, delivering an impressive 87.9 Mbps in Kansas City, MO. Although AT&T's speed results showed minor declines in our previous report, the carrier rebounded and made impressive progress in 1H 2021, providing its users with strong and improved speeds across all levels of testing.

Far more awards in this test period: Just as we saw at the state and national levels, AT&T showed significant improvement at the metro level in 1H 2021 and gained ground on Verizon in terms of awards. AT&T took home 186 more Metro Area RootScore Awards than it did in 2H 2020, including 43 additional Overall RootScore Awards, 33 more Network Speed RootScore Awards, and 29 incremental Network Reliability RootScore Awards. AT&T won or shared 568 Metro Area RootScore Awards, a tally trailing that of Verizon (738) but well over twice as many as that of T-Mobile (235).

AT&T's 5G providing a strong combination of availability plus speed: As shown in our [June 5G Scorecard](#), AT&T has delivered fast Everyday 5G download speeds in 1H 2021, while also providing good 5G data reliability results. While AT&T's Everyday 5G availability wasn't as widespread as that of T-Mobile, it was generally high, allowing AT&T to deliver on the key combination of fast speeds plus generally widespread access to 5G. AT&T also invested \$23B at the [C-Band auction](#) earlier this year to acquire mid-band spectrum for its 5G network, which should lead to faster speeds in the future.

AT&T's median download speed intervals (all network technologies)

Median download speed intervals	0-10 Mbps	10-20 Mbps	20-30 Mbps	30-40 Mbps	40-50 Mbps	50+ Mbps
2H 2020	0	22	36	31	22	14
1H 2021	0	3	26	34	31	31

- Number of markets out of 125 in which AT&T delivered median download speeds at various intervals.
 - Median download speeds on the table above represent speeds recorded on all network technologies, including 5G, where available.



AT&T's fastest and slowest median download speeds

(and how long it takes to download a 600MB video)



Speeds above show the markets in which AT&T recorded its fastest and slowest median download speeds (Mbps), and the times indicate how long it typically takes to download a 600MB video at each speed (times in minutes).

AT&T Metro Area RootScore Award tally

	AT&T	Outright	Ties	1H 2021 total
Overall RootScore Award		15	60	75
Reliability RootScore Award		8	73	81
Accessibility RootScore Award		32	18	50
Speed RootScore Award		30	48	78
Data RootScore Award		26	38	64
Call RootScore Award		5	92	97
Text RootScore Award		1	122	123
Total awards		117	451	568

T-Mobile delivers fast(er) speeds in many markets, a higher award tally, with impressive Everyday 5G availability.

Faster speeds: T-Mobile users should be pleased to know that the carrier's speeds took a nice step forward in the first half of 2021. T-Mobile recorded median download speeds of at least 40 Mbps in 29 markets in 1H 2021, up from only 3 in 2H 2020. And in 11 of those cities, T-Mobile clocked speeds of 50 Mbps or faster. T-Mobile also improved at the lower end of our intervals, registering speeds below 20 Mbps in 23 cities in 1H 2021, a major improvement from 62 last time. In short, T-Mobile's speeds were strong in most cities, and as the carrier's 5G continues to provide better speeds, its overall median download speeds across all network technologies should get even faster going forward.

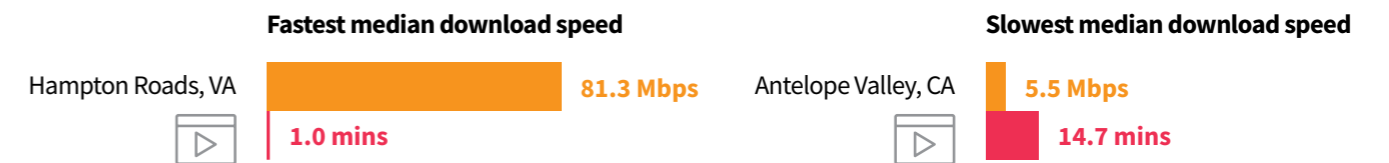
Improved award tally, with great text results: T-Mobile's RootScore Award tally increased by 89 since 2H 2020, jumping from 146 last time to 235 in 1H 2021. While T-Mobile again performed especially well in the text category, taking home 113 Text RootScore Awards, the carrier also showed strong gains for network speed and call performance, where T-Mobile took home an additional 17 and 29 RootScore Awards, respectively, since 2H 2020.

Broad Everyday 5G availability and faster 5G speeds: Using more mid-band spectrum than it did in 2H 2020, T-Mobile has shown improved Everyday 5G median download speeds in 1H 2021 to go along with its already widespread 5G availability. In fact, T-Mobile's Everyday 5G median download speed of 195.8 Mbps in Hampton Roads, VA, was the fastest of any carrier in 1H 2021. As T-Mobile continues to integrate more of the speedy mid-band spectrum it acquired from Sprint (along with the mid-band assets it acquired at the **C-Band auction**), we should see faster 5G speeds ahead.

T-Mobile's median download speed intervals (all network technologies)						
Median download speed intervals	0-10 Mbps	10-20 Mbps	20-30 Mbps	30-40 Mbps	40-50 Mbps	50+ Mbps
2H 2020	4	58	46	14	3	0
1H 2021	4	19	40	33	18	11

- Number of markets out of 125 in which T-Mobile delivered median download speeds at various intervals.
 - Median download speeds on the table above represent speeds recorded on all network technologies, including 5G, where available.

T-Mobile's fastest and slowest median download speeds (and how long it takes to download a 600MB video)



Speeds above show the markets in which T-Mobile recorded its fastest and slowest median download speeds (Mbps), and the times indicate how long it typically takes to download a 600MB video at each speed (times in minutes).

T-Mobile Metro Area RootScore Award tally

T-Mobile	Outright	Ties	1H 2021 total
Overall RootScore Award	0	7	7
Reliability RootScore Award	0	19	19
Accessibility RootScore Award	3	4	7
Speed RootScore Award	4	24	28
Data RootScore Award	1	14	15
Call RootScore Award	0	46	46
Text RootScore Award	0	113	113
Total awards	8	227	235

Verizon wins by far the most RootScore Awards, with great reliability, strong speeds, and rapid 5G expansion.

Easily the most awards with incredible reliability: Verizon once again took home far more awards than any other carrier in 1H 2021. Verizon won or shared an exceptional 738 Metro Area RootScore Awards (out of 875 total chances). Verizon's results were especially outstanding in the critical categories of network reliability and overall performance (which factors in speed and reliability results across data, call, and text testing), with Verizon earning 117 Reliability RootScore Awards and 109 Overall RootScore Awards.

Fast speeds: Verizon registered strong speeds in most cities, though its speeds did show some declines since 2H 2020. While Verizon recorded median download speeds above 30 Mbps in a robust 90 markets, compared to 96 for AT&T and 62 for T-Mobile, the carrier's speeds at the higher end of our intervals weren't quite as impressive as they were last time. Verizon delivered median download speeds of at least 40 Mbps in 43 cities, a decrease from 67 last time, while its number of cities with speeds above 50 Mbps fell from 20 to 13 since 2H 2020. That said, Verizon clocked solid speeds in general and took home the most Network Speed RootScore Awards of any carrier at 85.

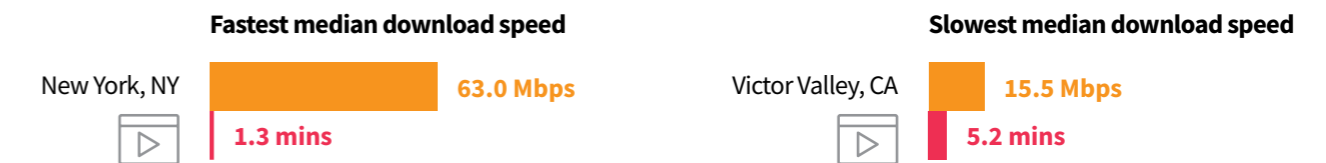
Quick 5G expansion, with improving 5G performance: Launching its **nationwide 5G** service in October of 2020, Verizon recorded Everyday 5G results in 120 cities in 1H 2021, a huge increase from 51 in 2H 2020. Verizon has shown consistently strong Everyday 5G data reliability in 1H 2021, and its Everyday 5G download speeds showed good progress in our recent **5G Scorecard**. Even better news for consumers is that stronger 5G performance could be on the horizon: Verizon invested a staggering \$45B at the **C-Band auction** to boost its mid-band spectrum holdings, so we will likely see the carrier's Everyday 5G speed and reliability results continue to improve going forward.

Verizon's median download speed intervals (all network technologies)

Median download speed intervals	0-10 Mbps	10-20 Mbps	20-30 Mbps	30-40 Mbps	40-50 Mbps	50+ Mbps
2H 2020	0	0	14	44	47	20
1H 2021	0	7	28	47	30	13

- Number of markets out of 125 in which Verizon delivered median download speeds at various intervals.
 - Median download speeds on the table above represent speeds recorded on all network technologies, including 5G, where available.

Verizon's fastest and slowest median download speeds (and how long it takes to download a 600MB video)



Speeds above show the markets in which Verizon recorded its fastest and slowest median download speeds (Mbps), and the times indicate how long it typically takes to download a 600MB video at each speed (times in minutes).

Verizon Metro Area RootScore Award tally

	Verizon	Outright	Ties	1H 2021 total
Overall RootScore Award		49	60	109
Reliability RootScore Award		39	78	117
Accessibility RootScore Award		72	17	89
Speed RootScore Award		38	47	85
Data RootScore Award		54	41	95
Call RootScore Award		23	97	120
Text RootScore Award		0	123	123
Total awards		275	463	738

5G highlights

Availability plus performance: the key to the end-user 5G experience

The ideal Everyday 5G experience is marked by those times when a carrier delivers a combination of both widespread availability plus strong performances for speed and reliability.

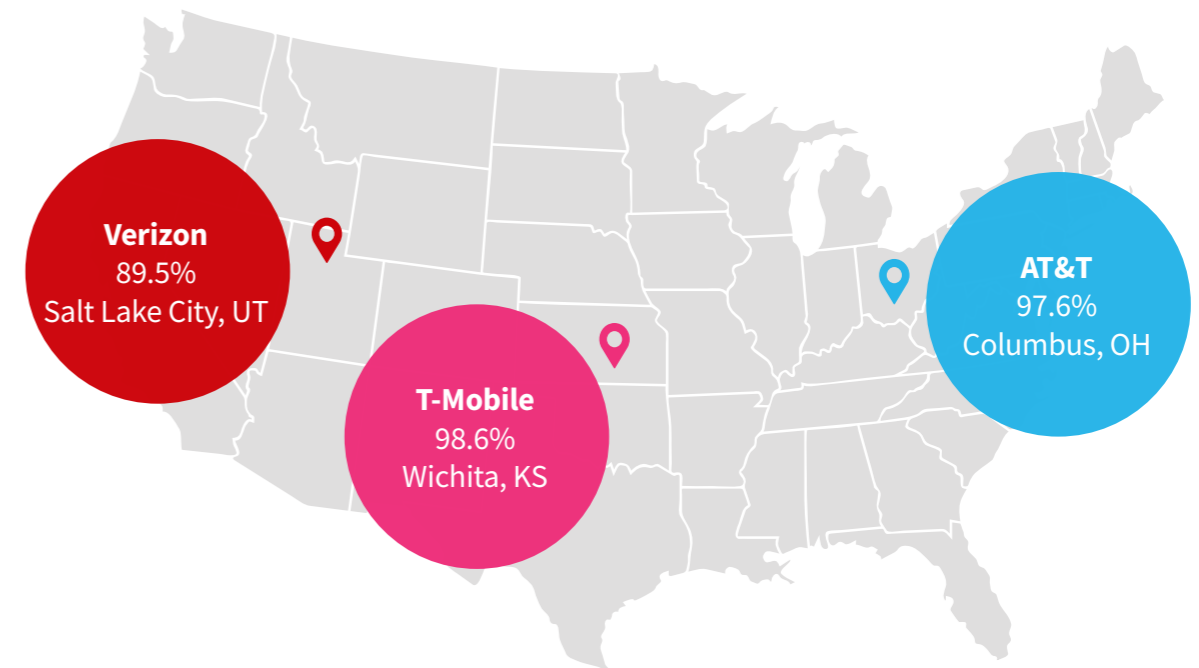
Our upcoming 1H 2021 5G report will provide detailed availability, speed, and data reliability metrics and insights to show how each carrier is performing on that key combination of Everyday 5G availability and performance. We'll also take a look at the types of spectrum the carriers are using for 5G, discuss performance trends, and more.

In the meantime, check the maps on the right to see each carrier's top Everyday 5G availability and speed results, and for more 5G results, visit our [June 5G Scorecard](#). To learn about the Everyday 5G experience, see the appendix or check out our [blog](#).



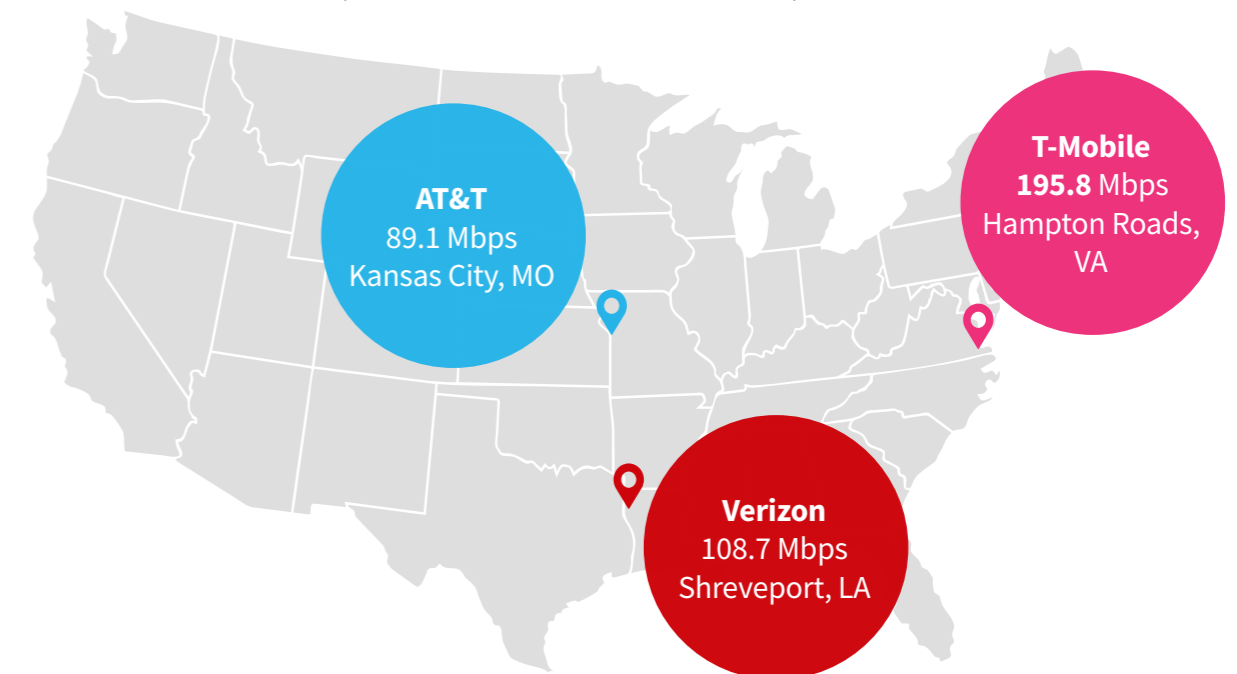
Each carrier's highest Everyday 5G availability (%)

(out of 125 cities tested in 1H 2021)



Each carrier's fastest Everyday 5G median download speed (Mbps)

(out of 125 cities tested in 1H 2021)



New 5G report coming soon:

Stay tuned for our upcoming 1H 2021 5G summary report.

Appendix

How we test

We believe that real-world results come from real-world testing. All RootMetrics testing is conducted from the consumer's point of view. In 1H 2021, we used the Samsung Galaxy S20+ 5G to measure 4G LTE and 5G performance for AT&T and Verizon, and we used the Samsung Galaxy Note 20 Ultra 5G to test T-Mobile's 4G LTE and 5G performance. Tests were conducted during the day and night while walking and driving.

We utilize random sampling techniques to ensure our results offer a robust characterization of performance in the places consumers most often use their smartphones, and all testing is focused on the activities for which consumers typically use their smartphones, including data, call, and text usage.

To learn more about our testing, visit the [methodology page](#) of our website.

Testing facts & figures



The entire US



The 50 states



The US's 125
biggest metros



2,981,028
Tests performed



294,740
Miles driven



125
Metro areas tested



Over 3,000
Total places visited

A note about Everyday 5G results

The Everyday 5G results in this report include a combination of results recorded on both 5G-only and "5G mixed mode." 5G mixed mode is the user experience of switching between 5G and 4G LTE during the same data activity, an increasingly common user experience.

With 5G growing fast and users switching between 5G-only and 5G mixed mode more and more often, Everyday 5G results offer the most accurate picture of the daily 5G experience when connected to 5G at least a portion of the time.

To learn more about Everyday 5G results, check out our new [blog](#).



For more information, visit