State of Mobile Networks: USA *(February 2017)*

This report covers clearly when exception to T-Mobile's recent changes to the network signal. Verizon's fighting back with 4G upgrades of its own, and as our latest results in the U.S. show, it's now a close race between the top three. T-Mobile's improving its speed, but Verizon's still ahead by nearly 4mbps. Sprint's continuing to chip away at Verizon's coverage lead in 4G availability. Growing on 4G & Voltan measurements, OpenSignal compared both the national and regional performance of the U.S. big 4.

T-Mobile and Verizon are neck and neck in speed

Six months ago T-Mobile had just edged ahead of Verizon in our 4G speed rankings, but in such quarter tests Verizon regained ground. The two were tied for first place in our 4G and overall speed metrics.

Verizon holds onto top spot for 4G availability

Our metric covers data in the U.S. Verizon's 4G signal 88.3% of the time, centering Big Red's place at the top of our 4G availability rankings. But T-Mobile's been systematically closing the gap. In the fourth quarter its 4G availability was less than two percentage points behind Verizon's, the closest we've seen that difference.

All four operators extend their 4G coverage

In the last six months, all four operators saw significant improvement. In fact 4G availability increased across the board, with Sprint's coverage boost of nearly 7 percentage points. Sprint's still in last place in our availability rankings, but it's definitely improving quickly.

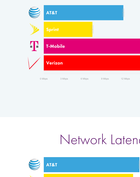
3G connections fade into 4G coverage

As operators provide more consistent LTE coverage, 3G connections are becoming largely irrelevant. Our 3G availability measurements have been in decline for several months, were less than 3 days slower than operators' 4G speed measurements. Smartphone users are spending as little time on CDMA and HSPA networks that those connections are barely factoring into our results.

REPORT FACTS

Report Location	USA
Data Sample Size	4,399,225,167
User Sample Size	589,882
Sample Period	Oct 1st–Dec 31st 2016

Overall Network Comparison



THE CROWDSIGNAL APP: TESTING NETWORK PERFORMANCE ON MILLIONS OF PHONES GLOBALLY

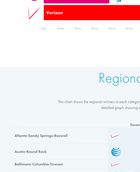
Our app continually runs tests to measure the real world experience users receive. Instead of relying on user-initiated or drive-test simulations, we are able to paint a holistic picture of network performance through our background tests and crowdsourcing techniques – all the while protecting the privacy of our millions of active OpenSignal users. The app has been downloaded over 1.7 billion times, collecting billions of measurements.

Network Availability Comparison

AVAILABILITY: 4G

This metric shows the proportion of time LTE signal is available to users in areas with LTE connection available to them. It's a measure of the proportion of time users have a 4G signal on a network rather than a measure of geographic or population coverage.

Network Speed Comparison



DOWNLOAD SPEED: 4G

This metric shows the average download speed on each network on 4G LTE connections.

DOWNLOAD SPEED: 3G

This metric shows the average download speed on each network on 3G connections.

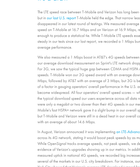
DOWNLOAD SPEED: OVERALL

This metric shows the average download speed experienced by a user across all of an operator's networks. Overall speed doesn't just factor in 3G and LTE speeds, but also the availability of each network technology. Operators with lower 3G coverage tend to have lower overall speeds because their customers connect more time connected to slower 3G networks.

Network Latency Comparison

LATENCY: 4G

This metric shows the average latency on each network on 4G LTE connections. Latency, measured in milliseconds, is the delay data experiences as it travels between points in the network. A lower score in this metric is a sign of a more responsive network.



LATENCY: 3G

This metric shows the average latency on each network on 3G connections. Latency, measured in milliseconds, is the delay data experiences as it travels between points in the network. A lower score in this metric is a sign of a more responsive network.

Regional results

This chart shows the regional winners in each category OpenSignal measures. Click on the icons to see a more detailed graph showing each operator's performance.

	Download Speed: 4G	Availability: 4G
Atlanta-Sandy Springs-Roswell		
Austin-Round Rock		
Baltimore-Columbia-Towson		
Boston-Cambridge-Newton		
Chicago-Naperville-Elgin		
Cincinnati		
Cleveland-Elyria		
Columbus		
Dallas-Fort Worth-Arlington		
Denver-Aurora-Lakewood		
Detroit-Warren-Dearborn		
Houston-The Woodlands-Sugar Land		
Indianapolis-Carmel-Anderson		
Kansas City		
Las Vegas-Henderson-Paradise		
Los Angeles-Long Beach-Anaheim		
Miami-Fort Lauderdale-West Palm Beach		
Milwaukee-Waukesha-West Allis		
Minneapolis-St. Paul-Bloomington		
New York-Newark-Jersey City		
Oklahoma City		
Orlando-Kissimmee-Sanford		
Philadelphia-Camden-Wilmington		
Phoenix-Mesa-Scottsdale		
Pittsburgh		
Portland-Vancouver-Hillsboro		
Riverside-San Bernardino-Ontario		
Sacramento-Roseville-Arden-Arcade		
San Antonio-New Braunfels		
San Diego-Carlsbad		
San Francisco-Oakland-Hayward		
San Jose-Sunnyvale-Santa Clara		
Seattle-Tacoma-Bellevue		
St. Louis		
Tampa-St. Petersburg-Clearwater		
Washington-Arlington-Alexandria		

Analysis

The war between T-Mobile and Verizon over network performance has taken a new twist in our latest round of tests. Verizon has regained our ground in 4G speed, bringing it even with T-Mobile. Meanwhile T-Mobile's continued to narrow the gap with Verizon in our 4G availability rankings, putting the Un-carrier within a stone's throw of matching Verizon's top signal. In our report two this look between the two operators (were is header) Other Verizon is T-Mobile and or dropped every single national spread is our report.

In our third State of Mobile Networks report for the U.S., OpenSignal proved 4 G speed improvements across the board. Verizon's network speed was the quicker of 2016 to gauge the 3G and 4G performance of national operators AT&T, Sprint, T-Mobile and Verizon. We also examined 4G speed and availability in 20 of the biggest cities in the U.S. First, let's look at the right-now user network speed.

It's a draw

The LTE speed race between T-Mobile and Verizon has long been a close one, but as our last U.S. report T-Mobile held the edge. That series result, however, disappeared in our latest round of testing. We measured average LTE download speeds of 21.7 Mbps for Verizon and 21.3 Mbps for T-Mobile. The difference is enough to produce a statistical tie. While T-Mobile LTE speeds essentially held steady in our tests since our last report, we recorded a 1.1 Mbps bump in Verizon's average performance.

We also measured a 1.1 Mbps boost in AT&T's 4G speeds between reports, but our average download measurement on Sprint's 4G network dropped 0.4Mbps for 3G, was the typical through page between CDMA and HSPA connection speeds. T-Mobile was our 3G speed second with an average, download of 4 Mbps, followed by AT&T with an average of 3 Mbps, but 3G is becoming less and less important to smartphone users and Verizon's 3G speed, 1.7 Mbps, becomes colloquially the slowest operator's overall speed, since it's which measures the typical download speed our users experience across all data networks – ones only a megabit or two slower than their 4G speeds, on average. T-Mobile's had HSPA+ network gave it a slight bump in our overall speed metric, but T-Mobile and Verizon were still in a dead heat in our overall category, tying with an average of about 14.6 Mbps.

In August, Verizon announced it was implementing an LTE-Advanced upgrade across its 4G network, stating it would boost peak speeds by as much as 50%. While OpenSignal tracks average speeds, not peak speeds, we definitely see evidence of Verizon's upgrades showing up in our metrics. In addition to our overall speed metric, we also track the speed users experience across different speeds of 2014 to gauge the 3G and 4G performance of national operators AT&T, Sprint, T-Mobile and Verizon. We also examined 4G speed and availability in 20 of the biggest cities in the U.S. First, let's look at the right-now user network speed.

Verizon ranked highest in speed in 14 of the 20 cities we analyzed, compared to four cities for T-Mobile and one for AT&T. Sprint's seven other metro areas the speed contest between Verizon and T-Mobile resulted in a statistical tie. In those other cities we recorded a dead heat between AT&T and either Verizon or T-Mobile, while in the remaining markets, we saw three-way between the three operators.

A tightening race over 4G reach

Verizon has long been proud of its network reach, and its dominance in 4G availability continued in our latest tests. Rather than tout geographic coverage, our availability metric measures the proportion of time our users can access a particular network. In Verizon's case, our tests were able to find an LTE signal 88.3% of the time, earning it once again our award for best 4G availability. For the last year, however, T-Mobile has been shaking up our rankings. In our last report, T-Mobile surpassed AT&T, and in our most recent tests T-Mobile has closed the gap with Verizon. Our 4G availability measurement for Verizon's users dropped to a comeback for T-Mobile network 86.6% of the time, while our measured AT&T's 4G availability at 82.2%.

Just a few months ago, Sprint's 4G LTE network was in last place. However, it's now in last place by a wide margin. Sprint's 4G availability jumped 6.9% in August to 76.8%. Sprint however, still lags behind the top three in 4G availability, but the improvement we measured was an encouraging sign. Sprint's 4G availability jumped 6.9% in August to 76.8%. Sprint however, still lags behind the top three in 4G availability, but the improvement we measured was an encouraging sign. Sprint's 4G availability jumped 6.9% in August to 76.8%. Sprint however, still lags behind the top three in 4G availability, but it's now nearly a percentage point ahead of Verizon's 4G availability, and for the other three operators it's one or two percentage points behind Verizon's.

In our 4G availability breakdown of U.S. cities, Verizon emerged as the dominant operator in our tests. It was our top network in 14 of the 20 availability in 20 of the 56 markets we analyzed, and it was the only operator to win any of those awards outright. In the remaining 36 cities, Verizon was also extremely competitive, showing statistically with one or more operators for the top ranking.

The final metric we looked at was latency, which measures the response time of a data connection. Networks with lower latency generally start loading web pages and video faster. A low latency also means lag time in real-time communication apps like voice over LTE, which is beginning to displace 2G voice services on U.S. operators' networks. In our last report, Verizon was our 4G latency award and T-Mobile was in 3G comparison. In our latest tests, T-Mobile pushed the limits of that technology, by a margin. Our 4G milliseconds, but Verizon rebuked sassy with our 4G group, averaging 59 Mbps.

Improving by increments

While we didn't record any major shifts in our metrics from one report to the last, we've clearly seeing steady increases in speed and availability across the board. The U.S. has long been one of the world's leaders in providing consumers LTE access, and it's adding its elevated status each year with gradual gains in speed and availability. Our latest tests, for instance, recorded average 4G speeds that are 12% quicker than those 4G speeds we measured in our last round of tests. As a whole, the U.S. mobile operator community had an overall 4G availability score of 81.3%, as measured in our recent State of LTE report, up 2 with still some work before the entire country has access to 4G connections 90% of the time. But that's a very high bar to achieve indeed. Only two countries have managed to surpass 92% 4G availability: Japan and South Korea.

In terms of LTE speed, though, the U.S. still lags the global mobile community, despite incremental improvements in performance. We saw speeds on the increase at operators the AT&T and Verizon Rather, to a new average speed of 40% quicker, and in individual cities operators are pushing well beyond 20 Mbps. Our latest tests, for instance, recorded average LTE download speeds in Dallas of the global LTE download average of 7.8 Mbps. While U.S. operators are starting to take advantage of new LTE-Advanced techniques, they haven't pushed the limits of that technology to the level we've seen in Europe, East Asia and even neighboring Canada. We're seeing average LTE-Advanced speed in many of those countries of 30 Mbps, with some cities in excess of 40Mbps. Some LTE-Advanced networks are clearly more advanced than others.

METHODOLOGY NOTES

OpenSignal data is collected from regular consumer smartphones and recorded under conditions of normal usage. As opposed to drive-test data, our results reflect real-world user experiences by using the same devices to measure network performance in a small number of locations, we take our measurements from millions of smartphones owned by normal people who have downloaded the OpenSignal app.

These measurements are taken whenever users happen to be, whether indoors or outdoors, or in a city or the countryside, representing performance the way users experience it. For more information on how we collect our data and our data we use methodology page.

For this particular report: 4,399,225,167 datapoints were collected from 589,882 users during the period: Oct 1st - Dec 31st 2016

All data has been collected from users of the OpenSignal mobile app for Android or iOS.

For every metric we've calculated the statistical confidence interval and plotted this on all of the graphs. When confidence intervals overlap for a certain metric we can't actually tell for sure which mobile network operator has the best performance.

For this reason some metrics have multiple operator winners when we've judged that the data is too close to call a victory.