State of Mobile Networks: UK (October 2016)

452 Mobile connections are live in the U.K. but they're still hard to find. OpenSignal data expert partnered with Whistle to examine 3G and 4G mobile performance in the U.K. Our analysis covers over 100 million measurements from the previous 18 months, and we present the data on both the national and regional level. Our tests revealed that consumers are reaping benefits of new 4G connections throughout the country, particularly as new technologies like LTE-Advanced take hold. Apart from London, however, no users had fast mobile access to those high speeds.

EE takes our 4G speed award

Though EE tied with 3 for fastest LTE performance in our last report, our speed measurements show the mega-operator now has the lead. We clocked average 4G download speeds in EE at 28 Mbps, more than 3 Mbps faster than 3 and well ahead of O2 and Vodafone.

4G availability is still lacking

A fast network doesn't necessarily mean an accessible network, and a 4G signal is still often difficult to come by in the U.K. EE performed best in our tests on our users had access to an EE LTE connection 65% of the time. 3, however, came in at the bottom of our rankings. We were only able to find its 4G network 41% of the time.

3 lives up to its 3G heritage

The operator that started out as a 3G only provider still lags behind HSPA service to keep about 3 even our overall for fastest 3G speeds, averaging downloads of 4.1 Mbps.

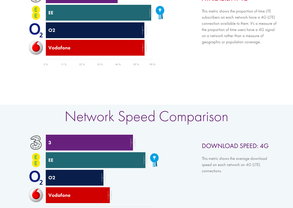
London leads UK in LTE coverage, but falls short in speed

The U.K's LTE signal scarcity was less severe in the capital, where all of the operators improved considerably on their nationwide 4G availability score. But when it came to average LTE speed, London came in dead last in our comparison of 12 U.K. regions.

REPORT FACTS

Report Location	United Kingdom
Data Sample Size	103,997,687
User Sample Size	28,841
Sample Period	Jun 1st - Aug 31st 2016

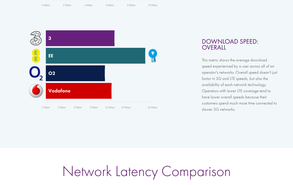
Overall Network Comparison



THE OPENSIGNAL 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 analyze a point's historic picture of network performance through our background tests and crowdsourcing techniques – all free while protecting the privacy of our millions of active OpenSignal users. The app has been installed over 10 million times collecting billions of measurements.

Network Availability Comparison



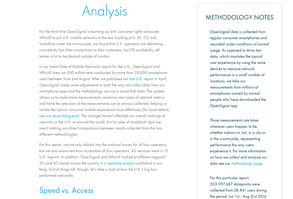
AVAILABILITY: 4G

This metric shows the proportion of time LTE subscribers can access network towers at all (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

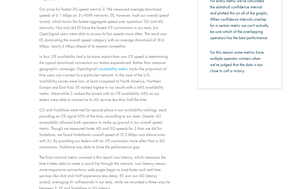
DOWNLOAD SPEED: 4G

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



DOWNLOAD SPEED: 3G

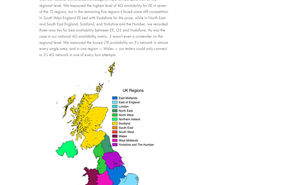
This metric shows the average download speed on each network on 3G connections.



DOWNLOAD SPEED: OVERALL

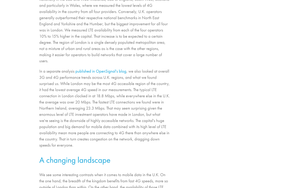
This metric shows the average download speed experienced by a user across all of an operator's networks. Overall speed doesn't just factor in 3G and LTE speeds, but also the availability of each network technology. Operators with lower LTE coverage tend to have lower overall speeds because their customers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

Analysis

For the third time OpenSignal is teaming up with consumer rights advocate Which? to put U.K. mobile networks to the test. Looking at 3, EE, O2 and Vodafone under the microscope, we found that U.K. operators are delivering consistently fast data connections to their customers, but LTE availability still leaves a lot to be desired outside of London.

In our latest State of Mobile Networks: UK report for the U.K., OpenSignal and Which? drew on 500 million tests conducted by more than 28,000 smartphone users between June and August. After last year's report for U.K. report in April, OpenSignal made some adjustments to both the way we collect data from our smartphone apps and the methods we use to parse that data. The update allows us to make more measurements, examine new types of network metrics and better filter out inaccurate results from our crowdsourced dataset. We've also added the typical consumer mobile experience more effectively (for more details see our recent blog post). The changes haven't affected our overall rankings of networks in the U.K. or around the world, but it does mean that this report isn't making any direct comparisons between results collected from the two different methodologies.

For this report, we not only delved into the national scores for all four operators, but we also examined how accessible all four operators' 4G services were in 12 U.K. regions. In addition, OpenSignal and Which? looked at different regional 3G and 4G networks were the country in a separate analysis published in our blog. To kick things off, though, let's take a look at how the U.K.'s big four performed nationally.

Speed vs. Access

BT's LTE-Advanced network is really starting to rear its head. Over the summer, we saw EE pull ahead of its competitors in 4G speed, averaging 28 Mbps in our download tests, 3 which was tied with EE for fastest speed in our last report, averaged 4.1 Mbps on our average LTE speeds of 24.5 Mbps, but the mega-operator was beaten out by O2 and Vodafone both below the 20 Mbps line.

The price for fastest 3G speed went to 3. We measured average download speeds of 5.1 Mbps on 21.6GPA networks. EE, however, took our overall speed crown for its 3G and 4G networks, averaging downloads of 4.6 Mbps across its networks. Not only did EE move the fastest 3G connections to its side, OpenSignal users were able to access its fast speeds more often. The result was EE dominating the overall speed category with an average download of 18.6 Mbps, nearly 6 Mbps ahead of its closest competitor.

In fact, O2 undoubtedly had a bit worse impact than new LTE speed in determining the overall speed winner. The operator's connections were the slowest in most geographic coverage. OpenSignal's availability metric tracks the proportion of time users can connect to a particular network. In the case of the U.K., availability scores were low, at least compared to North America, Northern Europe and East Asia. EE ranked highest in our work with a 64% availability meaning the U.K. ranked the lowest with an LTE availability of 41%. Our testers were able to connect to 4G service less than half the time.

O2 and Vodafone were tied for second place in our availability rankings, each providing an LTE signal 60% of the time, according to our data. Greater 4G availability allowed both operators to make up ground in our overall speed rank. Though we measured faster 4G and 3G speeds for 3 than we did for Vodafone, we found Vodafone's overall speed of 12.5 Mbps was almost even with 3's. By providing our testers with an LTE connection more often than a 3G connection, Vodafone was able to close the performance gap.

The final national metric covered in this report was latency, which measures the time it takes data to make a round trip through the network. Low latency means more responsive connections: web pages begin to load faster and real-time services like chat and VoIP experience less delay. EE won our 4G latency award, averaging 41 milliseconds in our tests, while we recorded a three way tie between 3, EE and Vodafone in 3G latency.

Capital vs. Country

Which? and OpenSignal didn't just examine 4G availability on a national level for this report. We looked at operator performance in each of England's nine regions, Scotland, Wales and Northern Ireland. Instead of relying on the data we ran our national LTE availability category, I performed quite well on the regional level. We measured the highest level of 4G availability for EE in seven of the 12 regions, but in the remaining five regions, we found three with competitors: in South West England EE tied with Vodafone for the prize, while in North East and South East England, Scotland, and Yorkshire and the Humber, we recorded three way ties for best availability between EE, O2 and Vodafone. As was the case with our national results, 3 was the only operator not a contender on the regional level. We measured the lowest 4G availability on 3's network in almost every single area, and in six regions – Wales – our testers could only connect to 3's 4G network in one of every four attempts.

In general the four operators performed worse in our tests from they did nationally in the East and West Midlands, East of England, South West, Scotland and particularly in Wales, where we measured the lowest levels of 4G availability in the country from all four providers. Conversely, U.K. operators generally outperformed their respective national benchmarks in North East England and Yorkshire and the Humber, but the biggest improvement for all four was in London. We measured EE availability in the capital at four operators 10% to 15% higher in the capital. That increase is to be expected in a certain sense, as the capital's population and its transportation infrastructure demand more rural or suburban and rural areas as is the case for the other regions, making it easier for operators to build networks that cover a large number of users.

In a separate analysis published in OpenSignal's blog, we also looked at overall 3G and 4G performance trends across U.K. regions, and what we found surprised us. While London may be the region with 4G accessible region of the country, it had the lowest average 4G speed in our measurements. The average 4G connection in London clocked in at 18.8 Mbps, while everywhere else in the U.K. the average was over 20 Mbps. The fastest LTE connections we found were in Northern Ireland, averaging 23.3 Mbps. That may seem surprising given the enormous level of LTE investment expected to be made in London, but what we're seeing is the downside of highly accessible networks. The capital's huge population and its dense, mobile-heavy population put a strain on the U.K.'s 4G availability as more people are connecting to 4G than anywhere else in the country. That in turn creates congestion on the network, dragging down speeds for everyone.

A changing landscape

We see some interesting contrasts when it comes to mobile data in the U.K. On the one hand, the breadth of the Kingdom benefits from fast 4G speeds, more so outside of London than within. On the other hand, the availability of those LTE connections is poor compared to many other developed countries, a limitation only accelerated when you venture outside of London.

But U.K. operators aren't only occupying the status quo either. Spectrum rich EE has just begun a capacity upgrade to its LTE-Advanced network that should boost speeds by 50%. Acts is typically the case, the first city to see the benefits of that enhancement will be London, starting with Waterloo Station. Meanwhile Vodafone and 3 are repurposing old 2G and 3G spectrum for LTE use, with the aim of giving more capacity into and boosting coverage on their 4G networks. We're highly likely to see the U.K.'s speeds increase even further in the coming years. Whether, or not, that's needs, though, is a large issue in 4G availability as consumers can take advantage of those speedy connections.

METHODOLOGY NOTES

OpenSignal data is collected from regular consumer smartphones and recorded under conditions of normal usage. As opposed to drive-test data, which simulates the typical experience of a user using the same device in the same way, network performance is 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, in contrast to drive-test data, which is the controllable, repeatable performance the way users experience it. For more information on how we collect and analyze our data see our methodology page.

For this particular report, 103,997,687 datapoints were collected from 28,841 users during the period Jun 1st - Aug 31st 2016.

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

For every metric we've calculated a confidence interval between and plotted the on all of the graphs. When confidence intervals overlap for a certain metric we can't actually be sure which of the overlapping operators has the best performance.

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