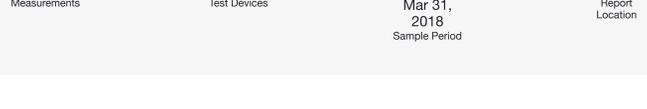


State of Mobile Networks: Germany (May 2018)

In our first ever in-depth analysis of Germany, we found that one of the country's three main operators stood out from the pack. **Telekom scooped the majority of OpenSignal's mobile awards, putting in a particularly impressive performance in our 4G speed category.** Drawing on more than 855 million data samples collected by nearly 69,000 OpenSignal users in the 1st quarter of 2018, we analyzed the mobile experience offered by O2, Telekom and Vodafone in Germany.

Report Facts



Highlights

Telekom users ahead in 4G speeds

Telekom's users experienced the fastest 4G download speeds by far in our measurements, with its speed of 33.6 Mbps being over 12 Mbps faster than Vodafone, and over double that of O2. This trend was repeated in our overall download speed metric, where Telekom was over 13 Mbps faster than either of its rivals.

Telekom leads by 12 percentage points in 4G availability

Telekom was also way ahead of the pack in our 4G availability metric, where its score of 81% easily beat Vodafone and O2 by nearly 12 percentage points. However, Vodafone is challenging in urban 4G availability, managing to draw with the incumbent in four of Germany's largest cities.

Vodafone beats its rivals for latency

Vodafone easily won both our 3G and 4G latency awards. It's 4G latency score of 37 milliseconds was 5ms slower than either of its rivals, while in 3G latency its score of 56ms beat its rivals by a clear 10ms.

Despite Telekom's strong 4G scores, Germany lags behind its European peers

Germany remains amongst the lowest scoring countries in Western Europe in both our 4G download speed and LTE availability metrics. But there's a huge contrast between the operators, with Telekom way ahead in our analysis, as its competitors are holding down the country's 4G scores.

Awards Table

Operator	Download Speed: 4G	Download Speed: 3G	Download Speed: Overall	Upload Speed: 4G	Latency: 4G	Latency: 3G	Availability: 4G
O2							
Telekom	🏆	🏆	🏆	🏆			
Vodafone					🏆	🏆	

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Performance by Metric



Regional Performance

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 metrics in a particular region.

Legend: O2 (O), Telekom (T), Vodafone (V)

Region	Download Speed: 4G	Latency: 4G	Availability: 4G
Berlin	T	V	T
Cologne	T	T, V	T
Dusseldorf	T, V	V	T, V
Frankfurt	T	T, V	T
Hamburg	T	V, O	T
Hannover	T	T, V	T, V
Leipzig	T	V	T
Munich	T	T, V	T, V
Nuremberg	T	V	T
Stuttgart	T, V	T, V	T, V

Analysis

In our first look at the German mobile market, we examined the 3G and 4G user experience offered by the three nationwide operators, and discovered that one service provider stood head and shoulders above its peers. Telekom claimed five of our seven awards, winning the coveted 4G speed and 4G availability categories, as well as dominating our regional analysis of 10 of the largest cities in Germany. Meanwhile, Vodafone scooped both our 3G and 4G latency awards, as the UK-based operator is upping the competition with Telekom.

Despite an impressive showing from Telekom, Germany remains amongst the lowest rated countries in Western Europe for 4G experience, with an average LTE speed of just 22.7 Mbps in our most recent analysis, while it fared little better in terms of 4G availability with a score of 65.7%. On a national level, Telekom is way ahead in these two metrics, as its competitors are holding down Germany's scores. But in reality, the German mobile market is far more complex.

For this report, OpenSignal parsed more than 855 million measurements taken from nearly 69,000 smart devices between Jan. 1 and March 31, 2018. We also performed a detailed regional analysis in this report, breaking down our 4G download speed, latency and availability metrics for 10 of Germany's largest cities. Let's start by looking at 4G download speed, the metric in which we saw the largest disparity between the operators.

Telekom sweeps the board in network speed and availability

Telekom offered the fastest 4G experience by far, registering average download speeds of 33.6 Mbps in our measurements. This score was over 12 Mbps faster than Vodafone's average tested speed of 20.9 Mbps, and more than double O2's speed of 11.5 Mbps. This trend was repeated in our 4G upload metric, where Telekom's 16.6 Mbps was close to 5 Mbps faster than either of its rivals in our measurements. Telekom also led fairly comfortably in our 3G download speed metric. Its score of 10.5 Mbps was over 2 Mbps faster than the other two.

Former incumbent Deutsche Telekom's mobile unit was also way ahead of the pack in our 4G availability metric. Our testers were able to tap into Telekom's 4G network 81.3% of the time, a score that easily beat its rivals by over 10 percentage points. Vodafone and O2 scored 69.4% and 59.2% respectively. Telekom also won our overall download speed prize, where it was over 13 Mbps faster than either of its rivals, partly as a result of its superior 4G availability results. Our Telekom users not only experienced faster speeds on their LTE connections, but they were able to make those connections more often. There are a number of reasons that Telekom has found itself so far ahead in the 4G race.

Both Telekom and Vodafone are investing heavily in their 4G networks, while the application of LTE-Advanced carrier aggregation technologies, while Telekom is re-farming its 900 MHz spectrum for 4G and rolling out small cell technology to urban areas to increase capacity and reduce the data demand on existing metropolitan base stations. As Germany races towards nationwide 4G coverage, we will be keeping a close eye on the rising competition between Telekom and Vodafone.

The merger of O2 Deutschland with Germany's fourth operator E-Plus has had a marked effect on the operator landscape. O2's owner Telefonica bought E-Plus from KPN in 2014, but only completed the brand and customer migration to the O2 network last year. Telefonica's description of the merger as an enormous effort in terms of the scale and complexity is not much of an overstatement, as the operator has had to cope with migrating millions of customers to its network. O2 did gain some spectrum bandwidth from E-Plus, but not a huge amount, and the distraction of the merger has inevitably played a part in allowing O2's rivals to pull ahead in the push to 4G in Germany.

Telekom's dominance and the operator's position as Germany's fixed-line former incumbent, and is the nature of mobile licensing in the country. Deutsche Telekom owns a significant amount of high-speed fiber backbone in the country, enabling it to construct a backhaul network that can support high data capacity relatively rapidly in comparison to its rivals. As data use increases and average speeds climb ever higher, fiber is becoming crucial to connect cell sites. And Vodafone's recent acquisition of cable operator Unitymedia will offer it greater access to high capacity fixed networks across Germany. However, there are already some signs that Vodafone is closing the gap on the leader Telekom in the 4G race.

Vodafone's recent network upgrades did exert themselves in one category of our metrics. The operator won both our latency categories, which essentially measure a network's response time. Latency is a key factor in real-time communications apps like VoIP and video chat — the lower the score, the better. In our 4G latency category, Vodafone's score of 37.1 milliseconds easily beat Telekom's 42.1ms and O2's 49.7ms, while in 3G latency Vodafone's score of 55.8ms was close to 10ms more responsive than either of its rivals.

Vodafone's challenge apparent in Germany's big cities

As expected, Telekom dominated our 4G download speed and availability metrics in our analysis of 10 of Germany's biggest cities. The former incumbent won the top prize in eight out of 10 of the cities we examined, averaging 4G download speeds of over 40 Mbps in seven of them. O2 was once again a fair way behind its rivals with average speeds of less than 20 Mbps in all of our city measurements.

Vodafone closed the distance on Telekom in our regional 4G availability metric. The operator drew with the incumbent in four cities, but the difference between the two was generally only a couple of percentage points across the board, as both operators registered scores of around 80% 4G availability in almost all the cities we analyzed. Telekom had the highest individual city scores, registering 88.8% 4G reach in Nuremberg and 87.8% in Leipzig, while O2 was once again some way behind its rivals in our results. The Telefonica subsidiary managed to pass the 70% availability milestone in only half the cities we measured.

Despite some impressive reach in its cities, the fact remains that at a national level, Germany has some catching up to do if it wants to match its European peers in 4G speed and 4G availability. Nonetheless, the completion of O2's merger and Vodafone's fresh challenge to Telekom's dominance of the multi-play sector means we expect to see this market mature pretty quickly over the next few years. Germany is certainly one market worth keeping an eye on.

Our Methodology

OpenSignal measures the real-world experience of consumers on mobile networks as they go about their daily lives. We collect 3 billion individual measurements every day from tens of millions of smartphones worldwide.

Our measurements are collected at all hours of the day, every day of the year, under conditions of normal usage, including inside buildings and outdoors, in cities and the countryside, and everywhere in between. By analyzing on-device measurements recorded in the places where subscribers actually live, work and travel, we report on mobile network service the way users truly experience it.

We continually adapt our methodology to best represent the changing experience of consumers on mobile networks and, therefore, comparisons of the results to past reports should be considered indicative only. For more information on how we collect and analyze our data, see our [methodology page](#).

For this particular report, 855,367,879 datapoints were collected from 68,968 users during the period: Jan 1 - Mar 31, 2018.

For every metric we've calculated statistical confidence intervals and plotted them on all of the graphs. When confidence intervals overlap for a certain metric, our measured results are too close to declare a winner in a particular category. In those cases, we show a statistical draw. For this reason, some metrics have multiple operator winners.

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