



THE STATE OF MOBILE NETWORK EXPERIENCE 2020: ONE YEAR INTO THE 5G ERA

MAY 2020

Authors

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Opensignal active userbase:



Total Devices
43,338,654



Total Measurements
87,524,176,592



Data Collection Period
Jan 1 - Mar 30, 2019 & 2020

Opensignal is the independent global standard for analyzing consumer mobile experience. Our industry reports are the definitive guide to understanding the true experience consumers receive on wireless networks.

Key Findings

One year on from the first launch of 5G services for smartphone users back in April 2019, Opensignal looks at what's changed across 100 countries globally on [six different measures of the mobile network experience](#), including upload and download speed, video, voice and games experience, along with the percentage of time that 4G users spent connected to a 4G network (4G Availability).

- How do countries compare on Download Speed or mobile Video Experience?
- Which countries have seen the biggest improvements in mobile experience?
- Have countries that have launched 5G improved significantly more than 4G-only countries?
- Do high data speeds automatically result in a better mobile experience?

Canada and South Korea are now joint top in Download Speed Experience

A year ago South Korean users were the only ones that experienced average download speeds above 50 Mbps. While Korea's operators launched 5G in April 2019, and Canada has only just launched 5G, in early 2020 our Canadian users saw download speeds statistically tied with those of South Korea. Both countries clocked at a blisteringly fast 59 Mbps.

There are improvements in mobile experience across many countries

While Canada and South Korea's performance is exceptional, they're not alone. The average across the 100 countries we've analyzed rose by 3 Mbps between early 2019 and 2020 — an increase of 24.3%.

Canada and Japan have accelerated further ahead of their G7 peers

When we looked at Download Speed Experience for G7 countries, the difference between Canada and Japan and the rest has widened by 10.2-15.9 Mbps. The Download Speed Experience of the other G7 countries — France, Germany, Italy, U.K., U.S. — was more than 50% slower than Canada's and more than 40% slower than Japan's.

The number of countries with Excellent Video Experience has jumped to 15 from none in one year

The Czech Republic, the Netherlands, Austria and Norway statistically tied for first place in Video Experience, in contrast to the first quarter of 2019, when it was just Norway and Hungary. There are now 15 countries where our users have observed an Excellent Video Experience. Japan, Singapore and Australia were the only non-European countries in this category.

Countries with 4G Availability in excess of 95% have doubled from three to six

4G continues to be important in the 5G era for several reasons. The first version of 5G (i.e. non-standalone access) means that 5G phones need to connect to a 4G signal to use 5G. Plus, many countries have yet to launch 5G. Three more countries have joined the exclusive club of nations with 4G Availability scores higher than 95%: the U.S., the Netherlands and Taiwan. Together with Japan, South Korea and Norway, this takes the total number of such countries to six. Users in 21 countries have reported 4G Availability in the 90-95% range up from 12 last year. Our users observed double-digit improvements in 4G Availability in 11 countries with a combined population of around 680 million.

Faster download speeds aren't always associated with a better Video Experience

While there is a relationship between download speeds and the quality of the Video Experience, the strength of this correlation declines as speeds increase. For example, the Czech Republic, where our users saw average download speeds of 32.7 Mbps tied for first place for Video Experience with the Netherlands, where average speeds were 54.8 Mbps.

5G adoption needs to accelerate to move the overall download experience

The Download Speed Experience in 20 countries that have launched 5G ranges from 59 Mbps in South Korea to 16.6 Mbps in Kuwait. 5G countries' Download Speed Experience rose by 24.9%, while that in countries that in the first quarter of 2020 had yet to launch 5G, or have only just done so, rose only slightly less, with an increase of 23.9%. While 5G users can experience much higher speeds they still make up a small proportion of users. However, 5G countries performed better in absolute terms, with their users observing an increase of 6.4 Mbps versus the 1.9 Mbps increase seen on average in non-5G countries.

Highlights of the mobile experience in 2020 – one year into the 5G era

- The **USA** still lags behind the other G7 countries in Video Experience with a score of **56.0 points** out of 100
- **Canada** challenges South Korea in Download Speed Experience with **59.6 Mbps** despite later 5G launches
- **Japan** has the highest 4G Availability as Japanese spend **98.5%** of the time connected to 4G networks



Key Facts:

- **8:** Countries with Download Speed Experience in excess of 40 Mbps
- **15:** Countries with an Excellent Video Experience (75 and above)
- **16.9 points:** The largest improvement in Video Experience was in Thailand
- **17 Mbps:** The largest increase in Download Speed Experience was in Canada
- **27:** Countries with 4G Availability in excess of 90%

- **Uruguay, Costa Rica, Argentina and Colombia** all show improvements in excess of **33%** in Download Speed Experience
- **Czech Republic, Netherlands, Austria and Norway** lead in our Video Experience table with scores in excess of **78.6 points**
- **Indonesia and the Philippines** show some of the largest percentage improvements in Download Speed Experience and Video Experience, respectively

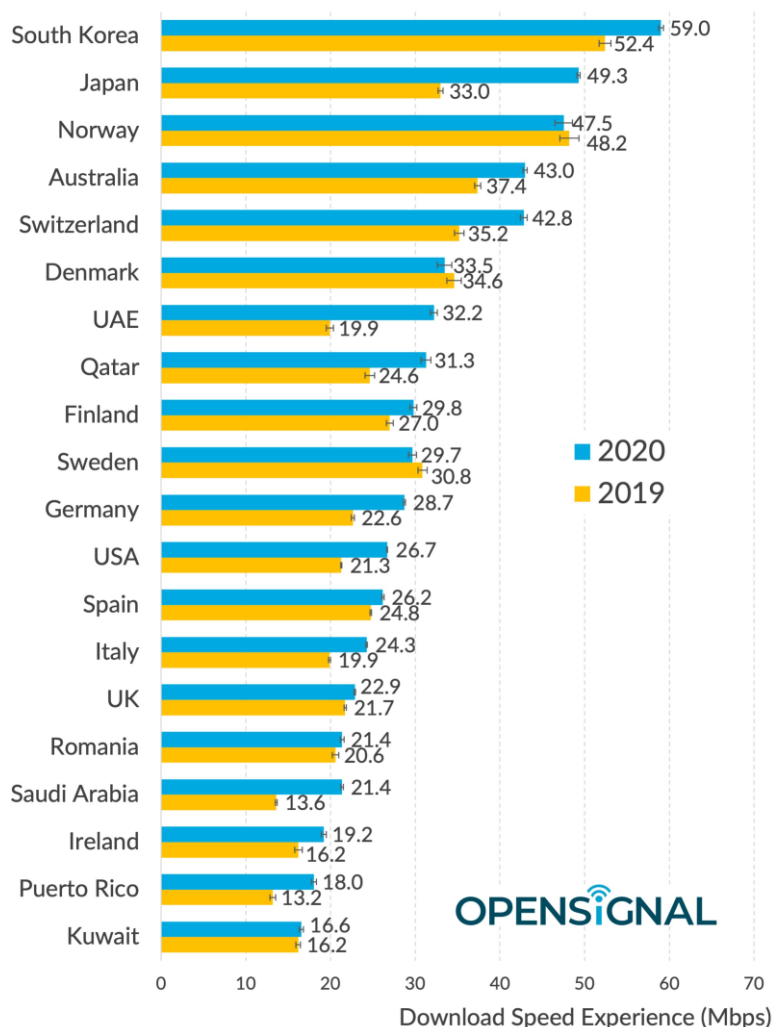
Faster 5G adoption will help more users to benefit from the improved 5G experience

The Download Speed Experience in the 20 leading 5G countries that we have focused on in this chart ranges from 59 Mbps in the case of South Korea to 16.6 Mbps in Kuwait. Our users in five 5G countries observed speeds in excess of 40 Mbps (South Korea, Japan, Norway, Australia and Switzerland). Moving away from the front-runners, speeds were far more moderate with three countries' users reporting speeds in the low 30s.

We've seen even higher average speeds when looking at 5G speeds in [Opensignal's initial U.S. 5G analysis](#) and at [maximum 5G speeds in a number of other leading 5G countries](#). In those analyses we found 5G average speeds to typically be in the 100 to 250 Mbps range, with some even higher. This indicates that it is the relatively low numbers of 5G users to date that is causing the overall Download Speed Experience of these 5G countries to increase modestly. However, once 5G smartphones become more widely adopted and their supporting networks become more widespread, the speeds enjoyed by their users will have a greater impact on average speeds. The mobile industry should look to accelerate 5G deployments to help boost users' overall mobile experience.

In a number of 5G countries, overall download speeds are yet to increase by more than a little. U.K. users saw speeds rise by 1.1 Mbps, while U.S. users saw speeds increase by 5.4 Mbps, and Australians by 5.6 Mbps. We saw a larger increase in South Korea – its more than five million 5G users helped boost speeds from 52.4 to 59.0 Mbps, an increase of 6.6 Mbps (12.6%) in the year since South Korea's April 2019 5G launches. South Korea is unique in the extent of its 5G adoption – it recently came first in the world in this regard [with a penetration rate of 9.7% as of April 2 2020](#). To put this into perspective, China, the U.S. and the U.K all have less than 1% of their mobile subscribers on 5G contracts.

5G Countries – Download Speed Experience



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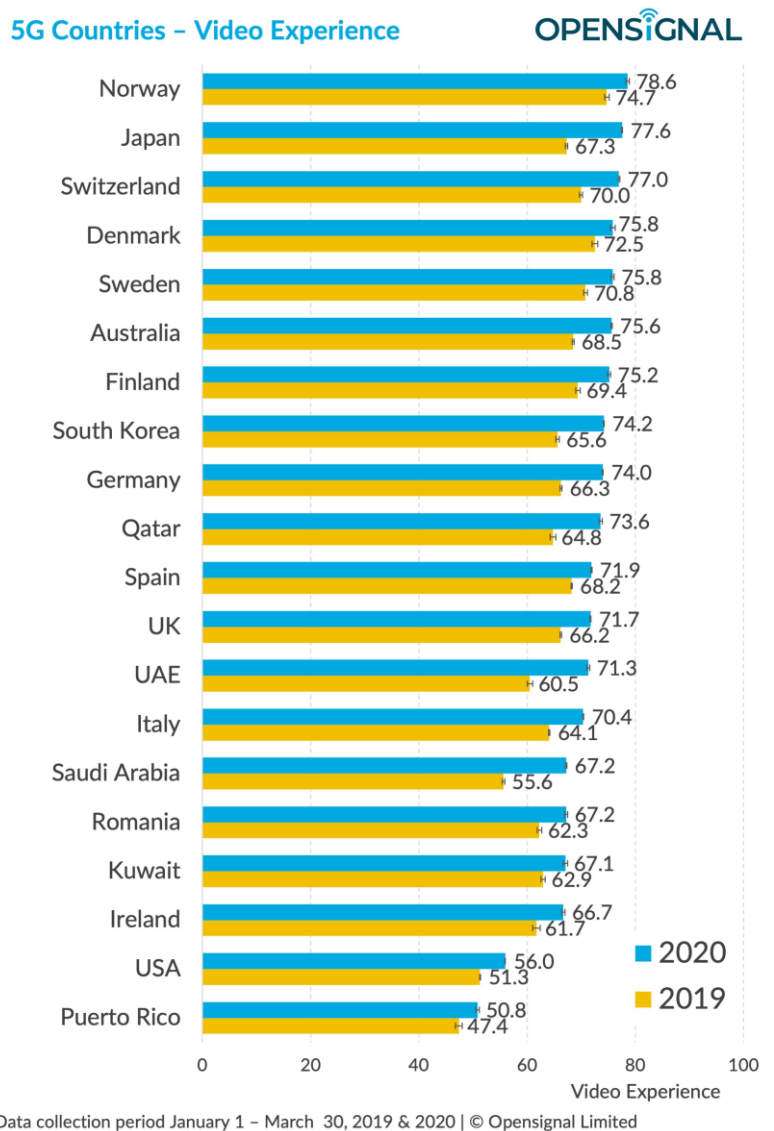
The scale of South Korea's improvement since the first quarter of 2019 is all the more impressive given that the country came first for Download Speed Experience last year. As 5G adoption increases, it is likely that we'll see large increases in download speeds even in countries where our users are already experiencing impressive speeds and [we recently observed that 5G is faster than Wifi in seven out of eight leading 5G countries](#).

When we compare the change in average download speeds (weighted by population) for these twenty leading 5G countries and those countries that in the first quarter of 2020 had yet to launch 5G or have only just done so, 5G countries' Download Speed Experience rose by 24.9%, while that in those in the latter category rose only slightly less, with an increase of 23.9%. However, 5G countries performed better in absolute terms, with their users observing an increase of 6.4 Mbps versus the 1.9 Mbps increase seen on average in non-5G countries.

Even in 5G countries, there's still room to improve mobile Video Experience

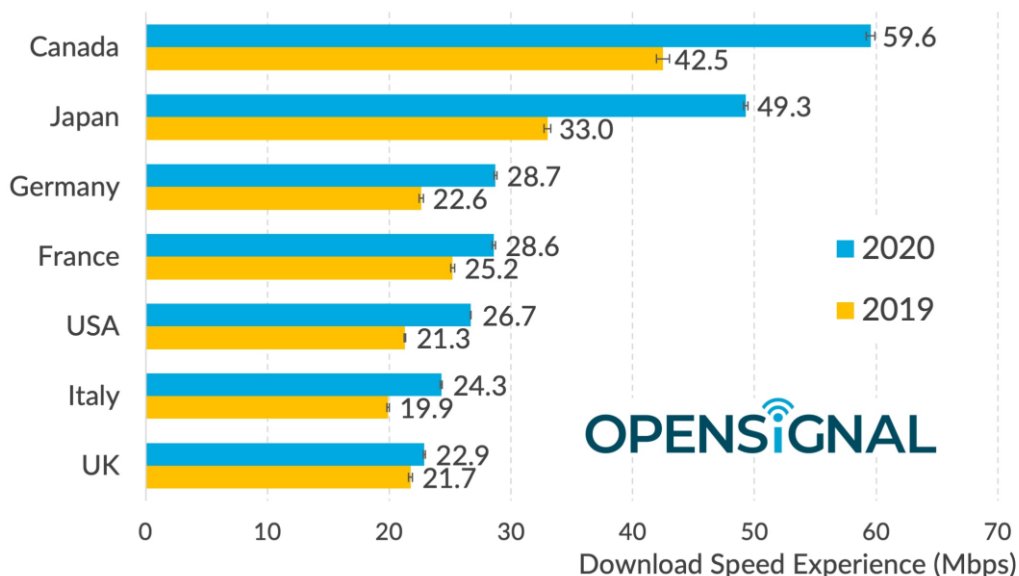
A 5G launch is not sufficient for the average user to enjoy a great mobile video experience. Our users had an Excellent Video Experience (scores of 75 or more) in seven out of our list of 20 countries where 5G has launched including Norway, Japan, Switzerland, Denmark, Sweden, Australia and Finland. South Korea narrowly missed this category by just 0.8 points. All told, users in 11 countries observed a Very Good (65-75) experience, while the U.S. placed in the Good (55-65) category. [A guide to our metrics and the different categories can be found here.](#)

When we compare the average change in Video Experience (weighted by population) over the past year between the 5G countries we have selected and those countries that in the first quarter of 2020 had yet to launch 5G, non-5G countries saw more improvement in both absolute and percentage terms. The average score of these 5G countries rose by 6.5 points to 67 points, an increase of 10.7%. In comparison, non-5G countries' average Video Experience score rose by 8 points to 46.9 points, an increase of 20.5%.



Five G7 countries see little change, but two shoot ahead

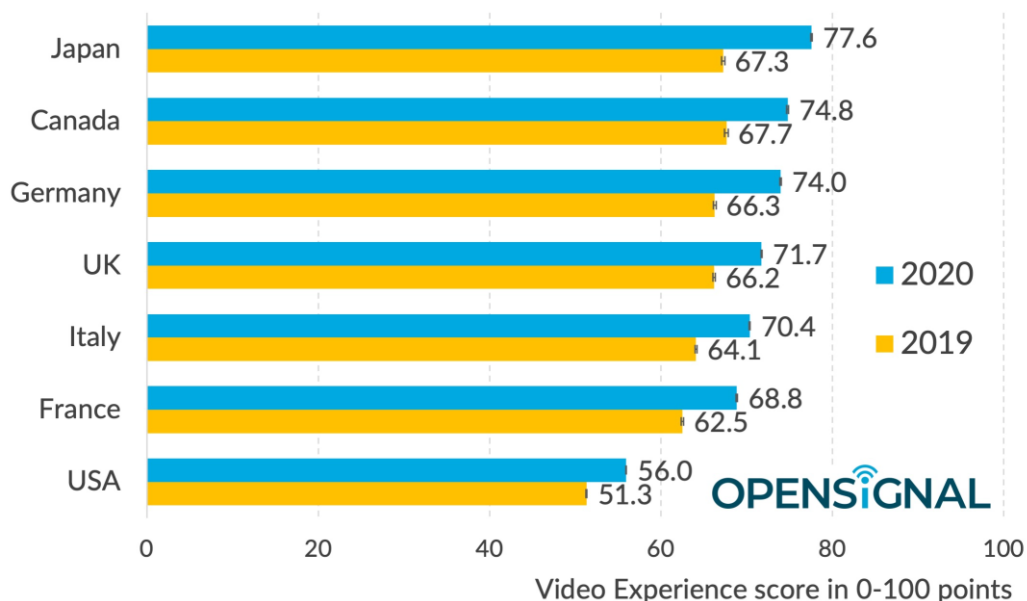
Download speeds have risen sharply in Canada and Japan



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Looking at the average download speeds seen by our users in G7 countries, it really is a tale of two countries – Canada and Japan. The difference between their speeds and those of their G7 peers has widened by 10.2-15.9 Mbps since our last report. As a result, the Download Speed Experience observed by our users in the other G7 countries are 51.8-61.6% slower than those seen in Canada and 41.7-53.6% slower than those in Japan.

Among G7 countries the US still ranks last for Video Experience



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[In our last report](#), our U.S. users saw the lowest Video Experience out of all of those in the G7. This remains the case and the gap has widened further, with that between the U.S. and France (the G7 country with the next lowest score) increasing slightly and the U.S.'s score growing by the least in absolute terms – though the U.K. saw the weakest growth in percentage terms.

The U.S. is the only country in the G7 to place in the Good category. Its peers are predominantly in the Very Good category with the sole exception of Japan where our users reported an Excellent Video Experience. Japan had the highest score for Video Experience out of the G7.

While Japan and Canada had the highest two scores for Download Speed in the G7 as well as Video Experience, their lead for Video Experience was far more modest. Third-placed Germany was hot on their heels with a score just 0.8 points shy of Canada's.

South Korea and Canada tie for first on download speed

This time last year on the eve of the first 5G launches, South Korea was the only country where our users experienced average download speeds of more than 50 Mbps and it was the fastest country overall. However, despite South Korea's advanced 5G rollout and 5G smartphone uptake and the fact that Canada has only just started a commercial 5G launch, the speeds observed by our Canadian users statistically tied with those of South Korea, with both countries clocking at around a blisteringly fast 59 Mbps.

The speeds observed by our users in the Netherlands were also well in excess of 50 Mbps, averaging 54.8 Mbps, while those seen in Japan, Norway – last year's runner-up – and Singapore were below this mark but still eye-wateringly fast with scores of 49.3 Mbps, 47.5 Mbps and 47.5 Mbps, respectively.

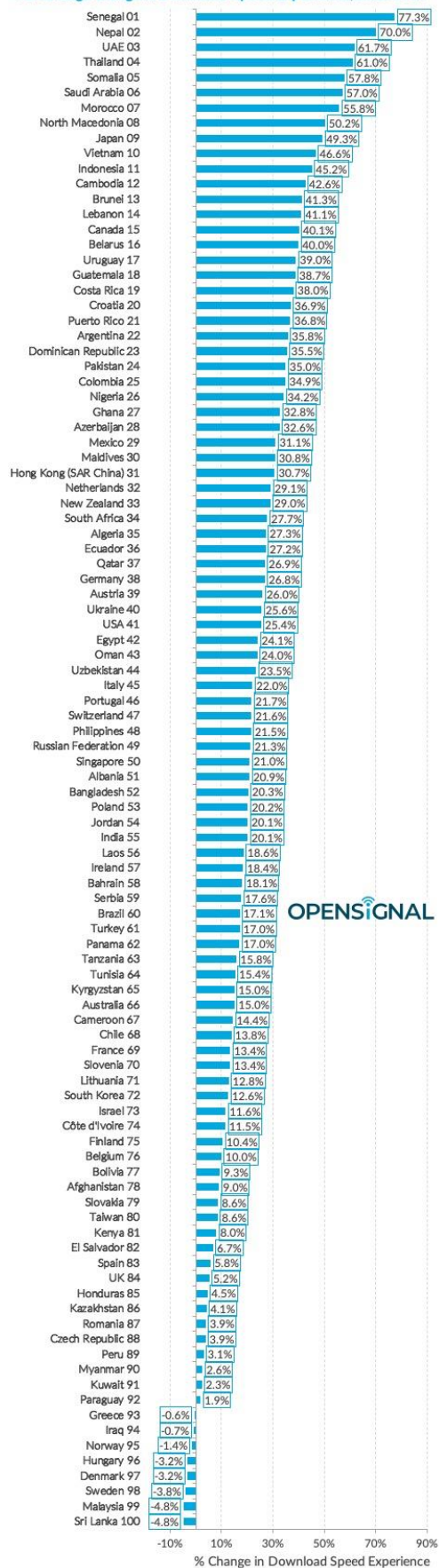
Download Speed Experience (Mbps)



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Percentage change in Download Speed Experience, since 2019



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In Senegal we saw the greatest improvement in percentage terms where our users saw an incredible 77.3% increase in their observed download speeds, followed by Nepal with an increase of 70% and Thailand came fourth with an increase of 61%. Several other Asian countries have also seen impressive gains, including Vietnam (46.6%), Indonesia (45.2%) and Cambodia (42.6%).

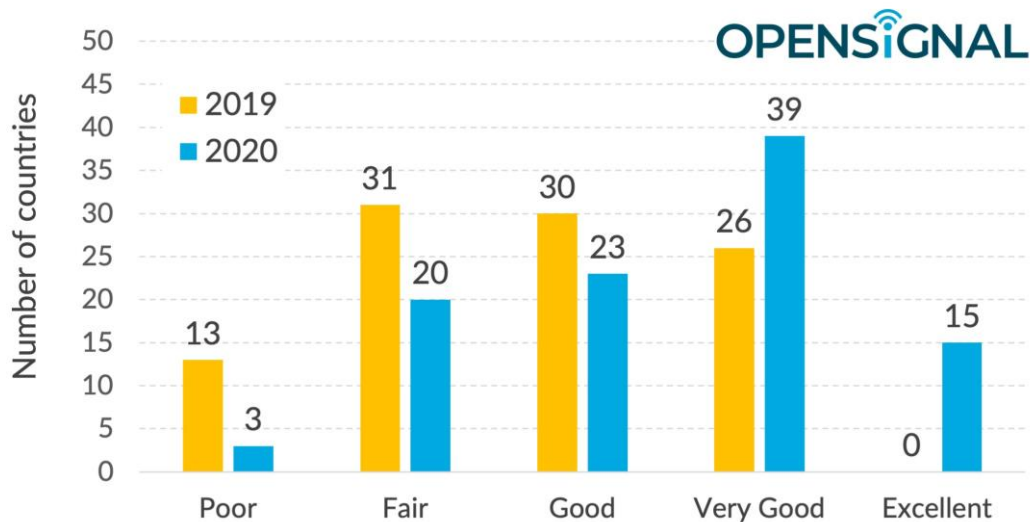
Much of the top of this table was dominated by countries hailing from the Middle East (U.A.E., 61.7%; Saudi Arabia, 57%; and Lebanon, 41.1%), and those from Central and South America including Uruguay, Guatemala, Costa Rica, Argentina and the Dominican Republic.

The average download speeds we have observed across the 100 countries we've been tracking (weighted for population) have risen by 3 Mbps to 15.4 Mbps, an increase of 24.3%.

Users in 15 countries are now enjoying an Excellent Video Experience

With people around the world forced to spend more of their leisure time consuming screen-based content during the lockdowns that many countries are experiencing due to the COVID-19 pandemic, the importance of a good mobile video streaming experience has never been higher.

Number of countries by Video Experience category



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At the top of the table, the Czech Republic, the Netherlands, Austria and Norway statistically tied for first place, in contrast to the first quarter of 2019, when Norway and Hungary were the only countries that were tied for the top spot.

An impressive amount of progress has been made by operators around the world since the first quarter of 2019. Back then, no country's users reported an Excellent Video Experience, but in the first quarter of 2020, users in 15 countries did so. Just three of these countries hail from outside of Europe – Japan, Singapore and Australia – with all of the others being European: Czech Republic, Netherlands, Austria, Norway, Belgium, Switzerland, Hungary, North Macedonia, Denmark, Sweden, Lithuania and Finland. There were no countries with an Excellent Video Experience in North or South America, the Middle East or in Africa.

In addition, the number of countries where Opensignal users have reported a Very Good Video Experience has increased by 13, while the number of countries in the Poor category for this measure of the mobile experience declined from 13 to three.

Out of the 100 countries we have studied in this report, 70 moved up one category, and two countries moved up by two categories – North Macedonia jumped from Good to Excellent, while Azerbaijan moved to Very Good from Fair.

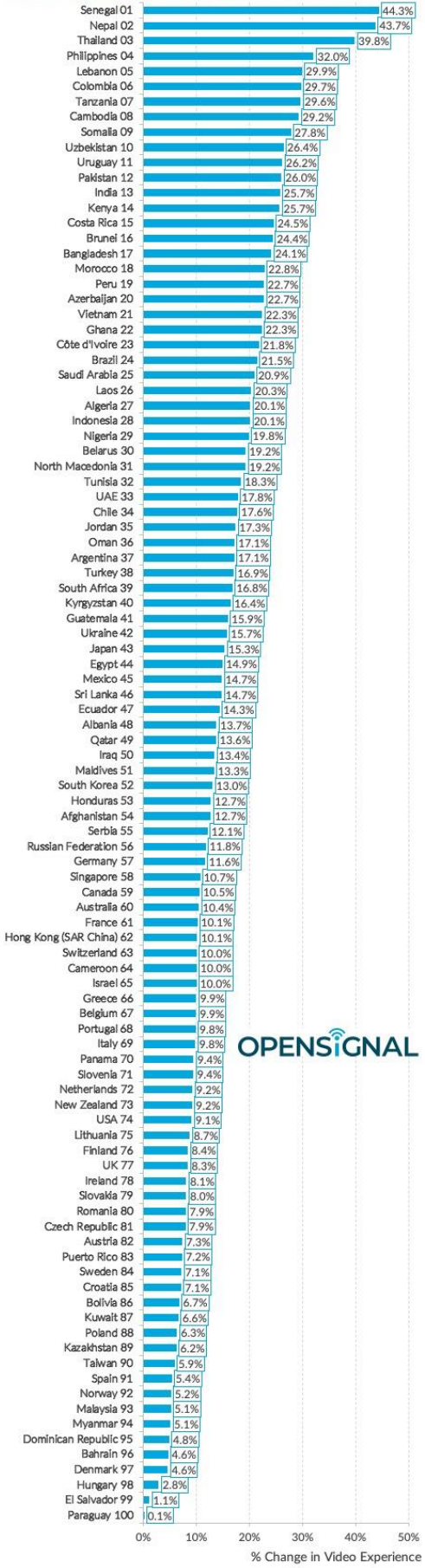
While there is a relationship between download speeds and the quality of the Video Experience, the strength of the correlation between the two declines as speeds increase. This is most clearly demonstrated by the fact that the Czech Republic, where our users saw average download speeds of 32.7 Mbps tied for first place for Video Experience with the Netherlands, where average speeds were 54.8 Mbps.

The quality of the Mobile Video Experience varies dramatically globally



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Percentage change in Video Experience, since 2019



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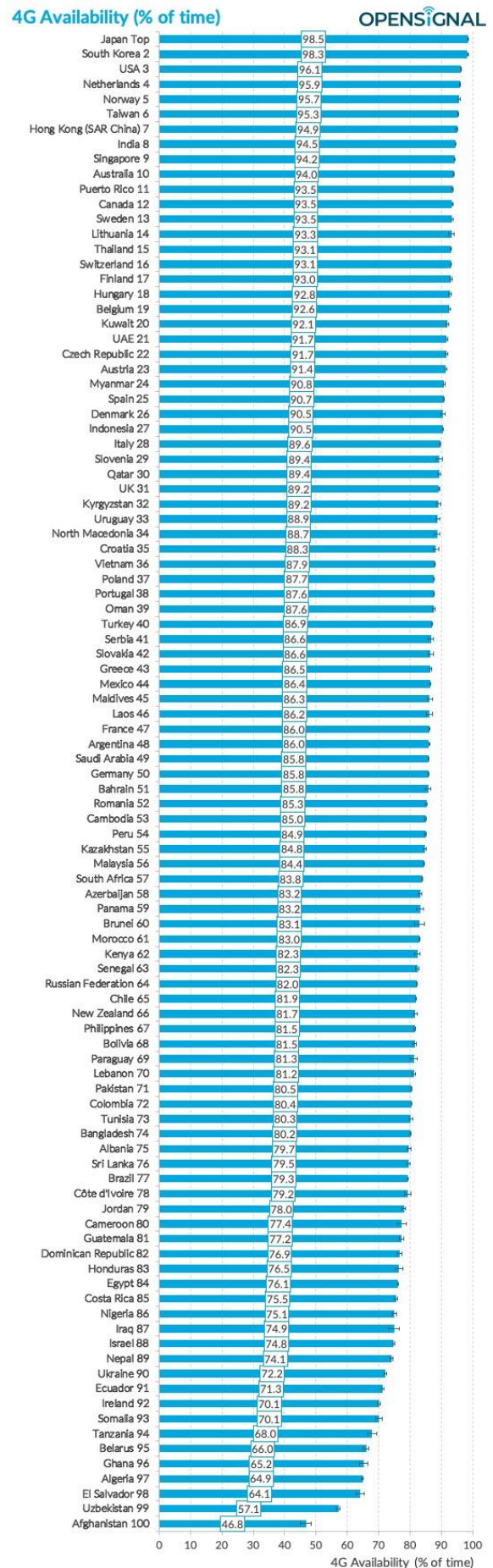
Opensignal users also observed impressive increases in Video Experience scores. Fourteen countries increased their video score by more than 25%, with our users in Senegal and Nepal reporting improvements in excess of 40%. Thailand followed not far behind with its score increasing by an impressive 39.8% and the Philippines took the fourth spot with an increase of 32%. Pakistan and India's scores both increased by around 26%.

The average Video Experience score (weighted by population) across all 100 countries has increased by 9.1 points or 18.5% to 58.2, which places the average score into the Good category (55-65). This means that users will see noticeably slower video loading times and more frequent stalling than they would in higher categories.

Japan's smartphone users spend the most time on 4G

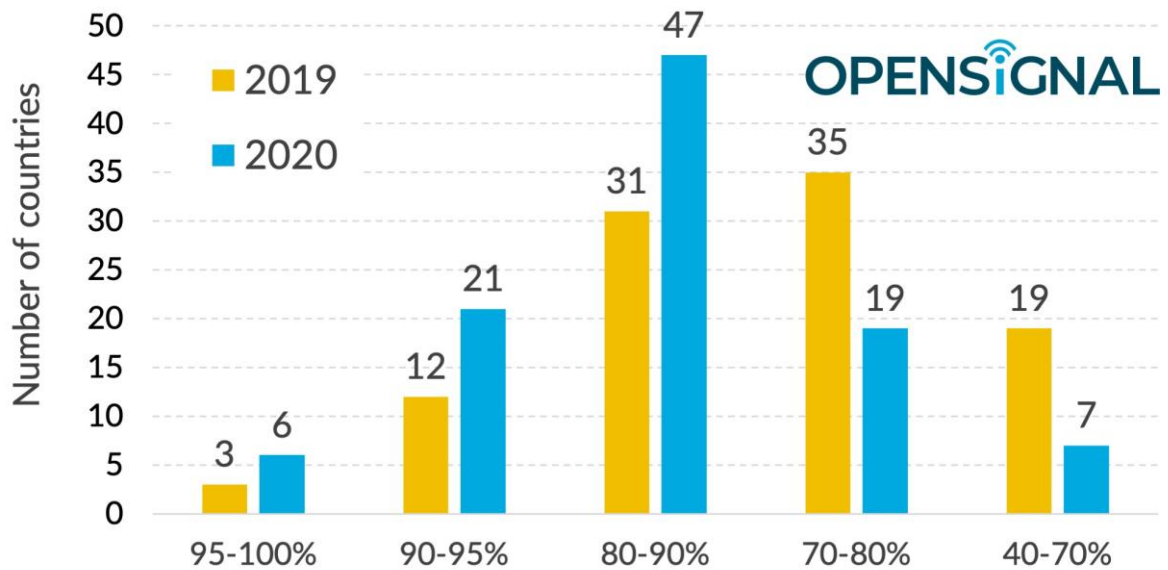
Out of the 100 countries we've been tracking for this analysis, we observed the highest 4G Availability – the percentage of time that 4G users spend connected to 4G – in Japan, with Japanese 4G users' smartphones spent an incredible 98.5% of the time on 4G. However, South Korea – which placed first last year – was only 0.1% short of tying with Japan. The U.S. placed third in 4G Availability with a score of 96.1% – a remarkable achievement given the sheer size of its territory.

While 5G is rolling out in all three of these countries, 4G remains critical for both 4G and 5G users. For now, most users continue to have 4G-only smartphone handsets. Plus, even those who own a 5G smartphone must continue to connect to a 4G signal at the same time as a 5G connection, for the current non-standalone access 5G service to work. In other words, if there's no 4G connection available, current smartphones (using non-standalone access) cannot connect to 5G!



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Number of countries by 4G Availability



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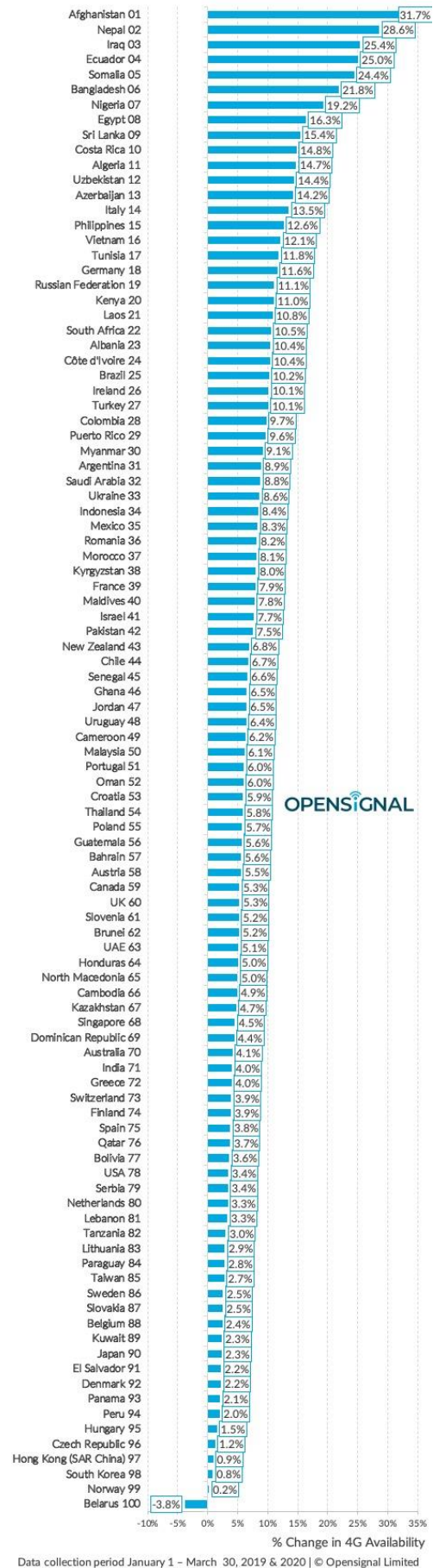
The number of countries where 4G Availability was in excess of 95% has doubled from three to six countries in the last year. Users in 21 countries have reported 4G Availability in the 90-95% range – up from 12 – while the number of countries where our 4G users were on average connected to a 4G signal 40-70% of the time has shrunk from 19 to just 7.

Our users have observed double-digit improvements in 4G Availability in 11 countries – a combined population of more than 683 million. We’ve seen some spectacular improvements in percentage terms with Afghanistan and Nepal seeing increases in excess of 25%.

While some of the largest increases in percentage terms were in countries that have experienced great strife in recent years, a number of their more stable counterparts also saw strong growth in this measure of the mobile experience. For example, Italy, the Philippines, Vietnam, Tunisia and Germany saw their 4G Availability scores improve by 11.6-13.5%, while our users in Bangladesh observed an impressive leap of 21.8%.

The average 4G Availability we have observed across the 100 countries we’ve been tracking (weighted by population) has risen by 6.1 percentage points to 86.8%. If the current trends continue, it will not be long before this group of countries – an impressive 70% of the world’s population, 5.3 billion people – will see 4G Availability in excess of 90%.

Percentage change in 4G Availability, since 2019



The future of mobile experience

We can see mobile experience has improved dramatically in the past year in all kinds of countries including those that ranked highly a year ago.

It is still early days for 5G despite launches in many countries, increasingly significant user bases in a select number especially in the case of South Korea and a rapidly growing range of 5G smartphones.

While 5G is one of the biggest talking points in the telecoms industry, in many markets much work is still needed to provide users with a good mobile 4G experience. This older 4G technology is the foundation of mobile experience, for 4G users and also as a necessary foundation for offering 5G services.

However, the COVID-19 pandemic and the associated economic damage and disruption will mean that when we look to the future state of mobile network experience everything is very uncertain. But the habits formed during the crisis, and the critical role of mobile telecoms in everyone's lives in these difficult times, will lead to many mobile initiatives in the years ahead.

In 2019, mobile operators were seizing on mobile gaming to market 5G – this looks set to continue given that [spending on digital video games hit a record high \\$10 billion in March](#) despite the crisis. Using smartphones for mobile video streaming is now common. And, in 2020, people are connecting through voice and video communications more than ever – highlighting the importance of different ways of measuring the quality of the real-world mobile experience.

Our Methodology

Opensignal measures the real-world experience of consumers on mobile networks as they go about their daily lives.

We collect billions of individual measurements every day from many 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.

Confidence Intervals

For every metric we calculate statistical confidence intervals indicated on our graphs. When confidence intervals overlap, our measured results are too close to declare a winner. In those cases, we show a statistical draw. For this reason, some metrics have multiple operator winners.

In our bar graphs we represent confidence intervals as boundaries on either sides of graph bars. In our supporting-metric charts we show confidence intervals as +/- numerical values.

Our Metrics

Video Experience

Measures the average video experience of Opensignal users on 3G and 4G networks for each operator. Our methodology involves measuring real-world video streams and uses an ITU-based approach for determining video quality. The metric calculation takes picture quality, video loading time and stall rate into account. We report video experience on a scale of 0-100.

Voice App Experience

Measures the quality of experience for over-the-top (OTT) voice services – mobile voice apps such as WhatsApp, Skype, Facebook Messenger etc. – using a model derived from the International Telecommunication Union (ITU)-based approach for quantifying overall voice call quality and a series of calibrated technical parameters. This model characterizes the exact relationship between the technical measurements and perceived call quality. Voice App Experience for each operator is calculated on a scale from 0 to 100.

Games Experience

Measures how mobile users experience real-time multiplayer mobile gaming on an operator's network. Measured on a scale of 0-100, it analyzes how the multiplayer mobile Games Experience is affected by mobile network conditions including latency, packet loss and jitter to determine the impact on gameplay and the overall multiplayer Games Experience.

4G Availability

Measures the average proportion of time Opensignal users spend with a 4G connection on each operator's network.

Download Speed Experience

Measures the average download speed experienced by Opensignal users across an operator's 3G and 4G networks. It doesn't just factor in 3G and 4G speeds, but also the availability of each network technology. Operators with lower 4G Availability tend to have a lower Download Speed Experience because their customers spend more time connected to slower 3G networks.

Upload Speed Experience

Measures the average upload speed experienced by Opensignal users across an operator's 3G and 4G networks. Upload Speed Experience doesn't just factor in 3G and 4G speeds, but also the availability of each network technology. Operators with lower 4G Availability tend to have a lower Upload Speed Experience because their customers spend more time connected to slower 3G networks.

Latency Experience

Measures the average latency experienced by Opensignal users across an operator's 3G and 4G networks. Latency, measured in milliseconds, is the delay users experience as data makes a round trip through the network. A lower score in this metric is a sign of a more responsive network.

4G Coverage Experience

Measures how mobile subscribers experience 4G coverage on an operator's network. Measured on a scale of 0-10, it analyzes the locations where customers of a network operator received a 4G signal relative to the locations visited by users of all network operators.