

The Live Video Experience

In Mobile Sports, News and Game Streaming

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Key Findings

Norway tops global Live Video Experience

Our users in Norway have the best overall Live Video Experience in the world with a score of 55.3 points beating second-placed Netherlands by 1.2 points. Sweden and Denmark jointly take bronze with statistically tied scores of 53.6–53.7 points. European markets dominate the global top 20 list, with only three markets hailing from outside of Europe – South Korea (51.4 points), Taiwan (49.7 points) and Canada (49.6 points).

Indonesia has the highest 4G to 5G Live Video Experience uplift in the world

Indonesian users observe the biggest leap in their experience with 4G and 5G with an improvement of 32.7% for Live Video Experience. The Philippines comes second, with an uplift of 28.1% – followed by Peru (27.1%), South Africa (26.3%), and Malaysia (26%).

Canada scores the highest across the Americas

Across the Americas, Canadians have the best Live Video Experience with a score of 49.6 points. Uruguay sees the best result in Central and South America with its 45.8 points. The U.S. scores significantly lower than Canada – 40.7 points, placing sixth in the region along with Argentina (40.8). Brazil lags behind northern Americans' Live Video Experience with a score of 38.9 points, but Nicaraguans have the lowest experience with 32 points.

South Korea leads for Live Video Experience in Asia Pacific

South Koreans have the best Live Video Experience in the Asia Pacific region, with a score of 51.4 points. Taiwan (49.7 points) is the runner-up – 1.6 points behind the leader. Singapore and Japan are in a statistical tie for third place in the region, with scores of 48.7–49.1 points. Papua New Guinea has the worst Live Video Experience across Asia Pacific with a score of 26.8 points.

Turkey and Bahrain jointly come first in the Middle East and Africa

Turkey and Bahrain are the joint highest scorers, with statistically tied scores of 46.1–46.2 points. Tunisians enjoy the best Live Video Experience in North Africa with a score of 44.9 points, while South Africa and Kenya are in a statistical tie for the best Live Video Experience score among Sub-Saharan African markets (37.9–38.3 points), while Sudan (25 points) have the lowest score in that region.

Live Video Experience is key in the 5G era

In an industry first, Opensignal examines the Live Video Experience of mobile users across more than 100 global markets. This builds on years of Opensignal research and innovation. Previously, Opensignal has quantified users' experience playing real-time multiplayer games over mobile networks, when streaming recorded video, when communicating in group video calls, or with over-the-top voice applications.

This new report on live video streaming highlights how the experience of watching live events differs from watching videos on social media sites, on demand online TV shows, movies, or other types of pre-recorded video. Live events are considerably more challenging for streaming companies because of the need for the considerable back-end infrastructure that ensures reliable and high-quality distribution in real-time.

The live experience matters even more to mobile users because if there are any delays, or even small hiccups, in the production process or network, users' experience will be ruined. For example, if a user hears their neighbors cheer a winning goal in a football match, or a batter at the World Series – or in the IPL – being caught, before they are able to watch the incident happen firsthand.

With Live Video Experience Opensignal is using tests that specifically measure aspects of mobile network performance that are critical to live video. It analyzes the results to accurately reflect a user's true experience of watching a live video service. We compare Live Video Experience using the world's largest live video streaming platforms, examples of these such as YouTube Live and Twitch.

According to [analysis](#) from Vantage Market Research, the total global Live Video streaming market will reach \$4.3 billion by 2028, up from nearly \$1 billion in 2021 – which means a rapid compound annual growth rate of 23.5%.

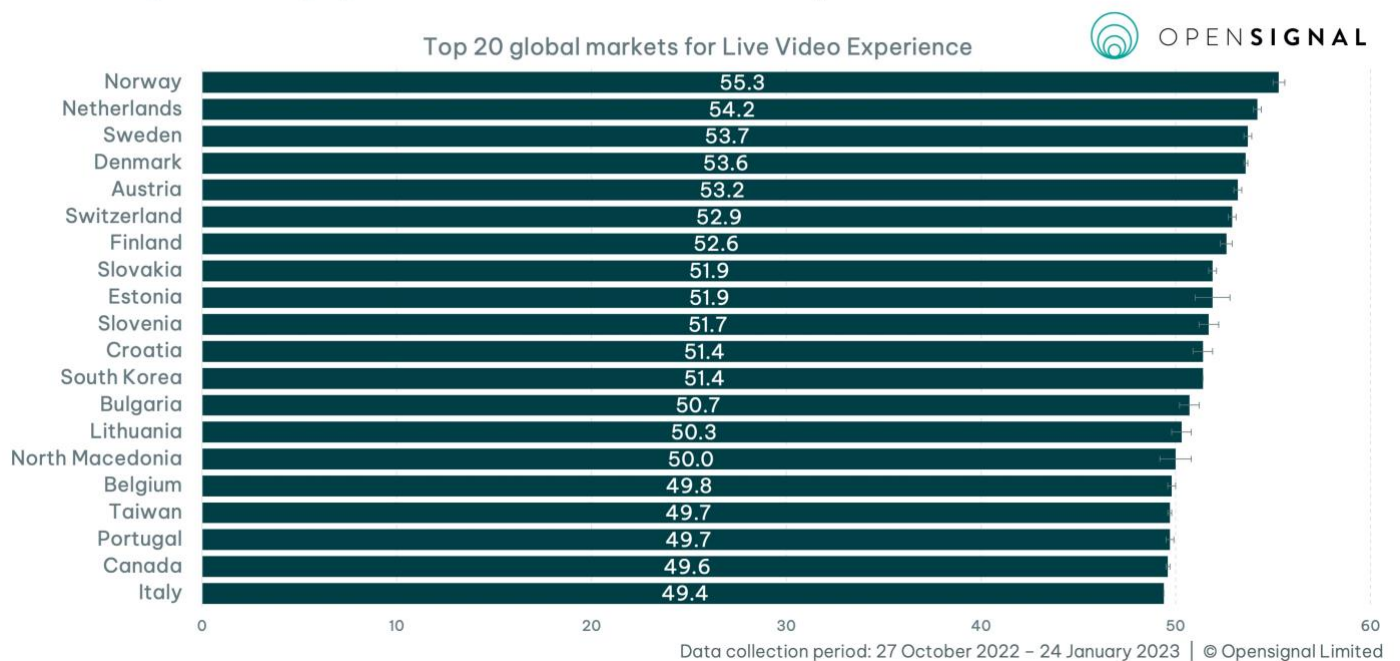
Popular types of live video streaming services include:

- **Live sports broadcasts** (e.g. Amazon Prime Video, Apple TV+, Dazn Group, ESPN+, Hotstar, NBC Sports, MLB.tv as well as many regional market-specific players)
- **Live gaming/e-sports broadcasts and streams** (e.g. Twitch, YouTube Live)
- **Live news** (e.g. Al Jazeera, Bloomberg, BBC, CNBC, Channel NewsAsia, CNN, France 24, NHK)
- **Live events and entertainment shows** – e.g. concerts, festivals, variety shows – both produced by individual creators on social media (YouTube Live, Facebook Live, Instagram Live, TikTok) or streaming platforms (e.g. Amazon Video)
- **Live video feeds through social media platforms** (e.g. Instagram, TikTok, Twitter) – including live product demonstrations and reviews
- **Webinars or live online classes** – for example, facilitated via cloud TV platforms (e.g. Kaltura)

With live-streams, users have a more interactive experience than with pre-recorded content, as it facilitates communication and engagement between broadcasters and their audience. For example, video live streaming provides opportunities for online creators and influencers to share their content in real-time and monetize it, e.g. through donations from their online communities during streams or through advertising revenues or sponsorship deals. Creators can also be more spontaneous with their streams, as they don't always need to be in their studios, with access to specialized technical equipment.

Live streaming is also convenient for mobile users thanks to increased accessibility, as they can connect to video streams from anywhere, within the reach of a mobile signal, e.g. when on holiday or while commuting – which makes it easier for organizations and businesses to reach a wider audience.

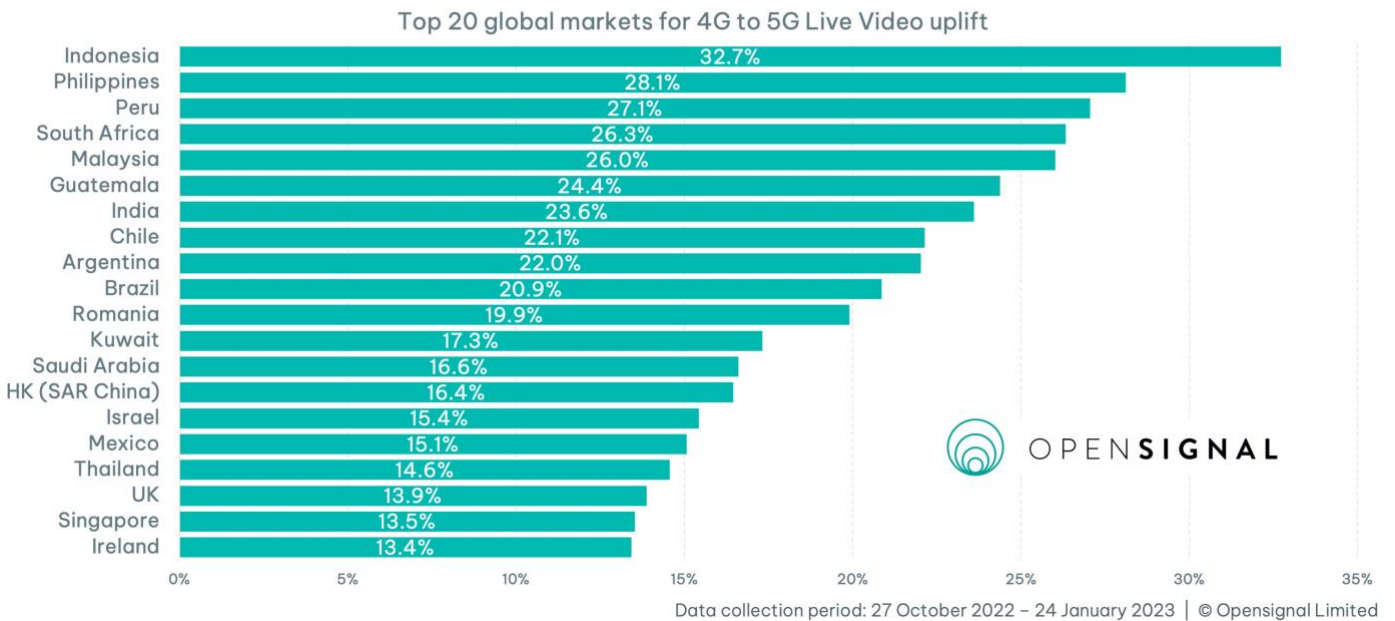
Norwegians enjoy the best Live Video Experience in the world



Our users in Norway have the best overall Live Video Experience in the world, as the market scores 55.3 points on a 100-point scale – beating second-placed Netherlands by 1.2 points. Sweden and Denmark jointly share third place, with scores in the 53.6-53.7 points range.

European markets dominate the top 20 list. However, both South Korea and Taiwan feature among the global leaders as they are the highest-scoring Asia Pacific markets. The only market to represent the Americas is Canada – often a highly ranked market on other Opensignal global comparisons – with a score of 49.6 points.

Using 5G, Indonesian users see the biggest improvement in Live Video Experience compared with 4G



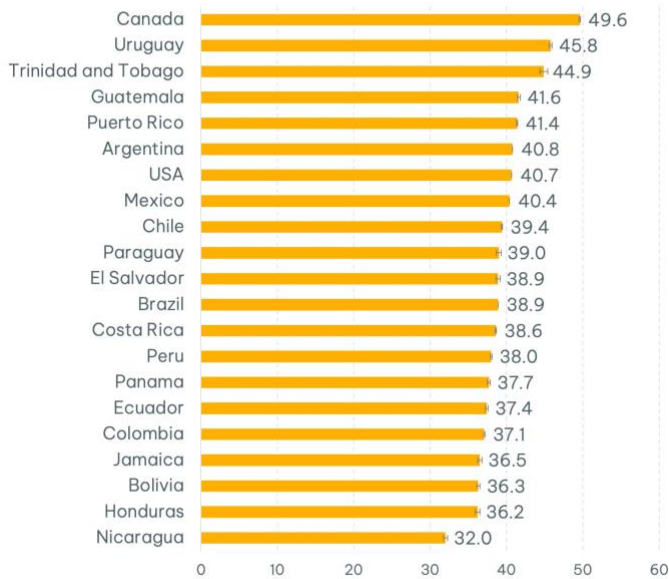
Video live streaming is one of the services that benefit greatly from the arrival of 5G technology. Compared to 4G, 5G comes with faster speeds, lower latency, and increased network capacity which result in less buffering and fewer disruptions during playback, especially when more users stream videos at the same time.

5G services also use new spectrum bands that allow users to side-step network congestion at busy times of the day. Often, users mostly want to watch live video streams at the busiest times of day, because those times are also when sports events happen or when popular TV shows are scheduled.

Looking at the markets where our users enjoyed the biggest improvement in Live Video Experience between 5G and 4G technologies, Indonesians observe the biggest leap in the world between their 4G and 5G Live Video Experience scores with an improvement in their experience of 32.7%. The Philippines comes second, with an improvement of 28.1%.

Peru, South Africa, and Malaysia are other markets with more than a quarter in the score improvement between 4G and 5G for Live Video Experience. Out of all European markets, Romania sees the highest gain in its Live Video Experience score, of nearly 20%. The UK and Ireland also make it into the top 20 global list for 5G uplift on Live Video Experience, with improvements of 13.9% and 13.4%, respectively.

Americas – Live Video Experience



Data collection period: 27 October 2022 – 24 January 2023 | © Opensignal Limited

Opensignal has also looked at global markets by region, to see how markets fare compared to their neighbors. Across both Americas, Canada has the highest Live Video Experience score, of 49.6 points – 3.8 points ahead of Uruguay, which sees the best result in Central and South America with its 45.8 points. Trinidad and Tobago comes third in both Americas, as it scores 44.9 points.

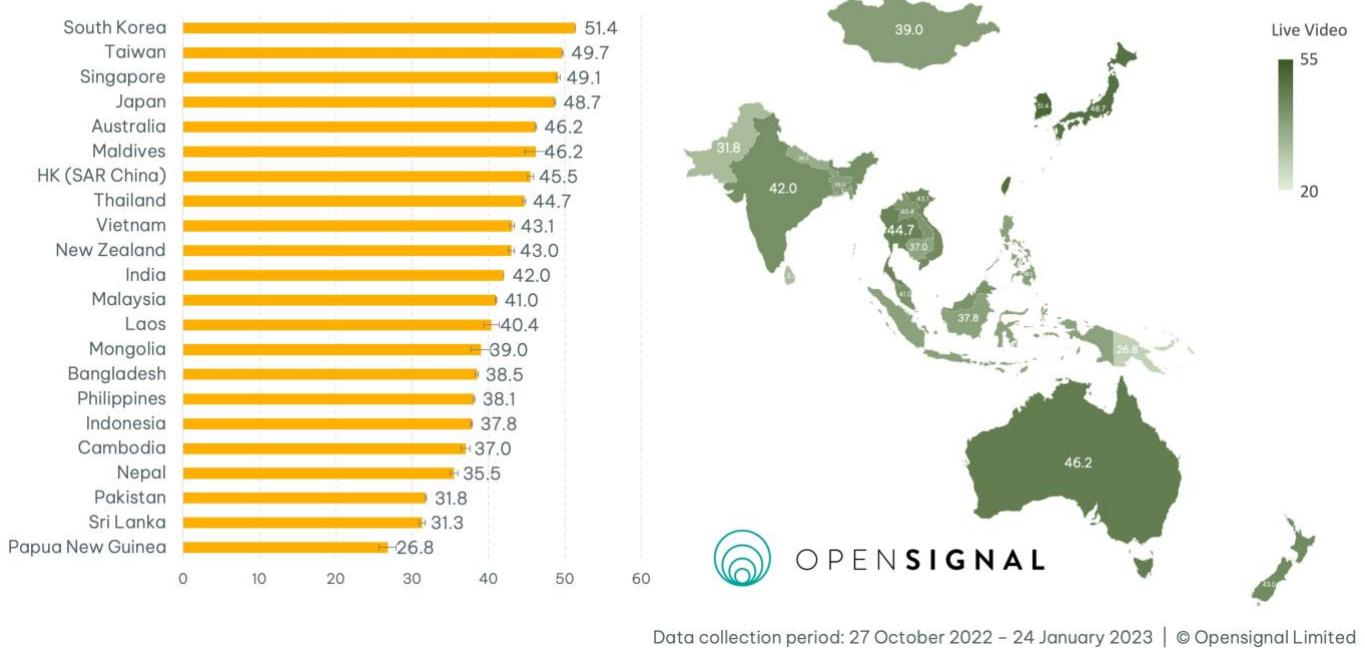
Compared to Canada, the U.S. scores significantly lower – 40.7 points, 8.9 points behind its northern neighbor. The relatively lower scores in the U.S. are in part due to more use of data traffic management and optimization by carriers that affect video streaming. The U.S. takes joint sixth in the Americas in a statistical tie with Argentina (40.8 points). Chile comes ninth with a score of 39.4 points. In this regional comparison, Brazil lags behind northern Americans' Live Video Experience with a score of 38.9 points, but Nicaragua is last with 32 points.

There are numerous popular live video services across different parts of the Americas. In the U.S., Apple has signed deals with [Major League Baseball](#) and [Major League Soccer](#). Meanwhile, YouTube secured NFL Sunday Ticket in a landmark streaming deal for \$2 billion per season in a multi-year agreement in [December 2022](#) and renewed its live streaming deal with [Coachella Festival](#) in January 2023.

Netflix is also belatedly making its initial steps into the live streaming space, as it has signed a multi-year deal to host the annual Screen Actors Guild (SAG) Awards on its platform from [2024](#) onward. Amazon has inked a global deal with [DAZN Group](#) to distribute its live streaming and video on demand (VOD) content over its Prime Video channels. DAZN said in a statement that the partnership would give Prime Video customers access to its rich selection of live and on demand sports content with a single click for an additional monthly fee.

Central and South America is one of the fastest-growing live video streaming markets globally and has become a [strategic area](#) for the expansion of major streaming players. Claro Video, DirectTV Go and Movistar Play are some of the live streaming platforms established by mobile and fixed network providers in Central and South America. In Brazil, Formula 1 signed a strategic distribution agreement with [Claro](#), making the operator the exclusive distribution partner of F1 TV Pro – available to its customers as part of an additional paid subscription.

Asia Pacific and South Asia – Live Video Experience

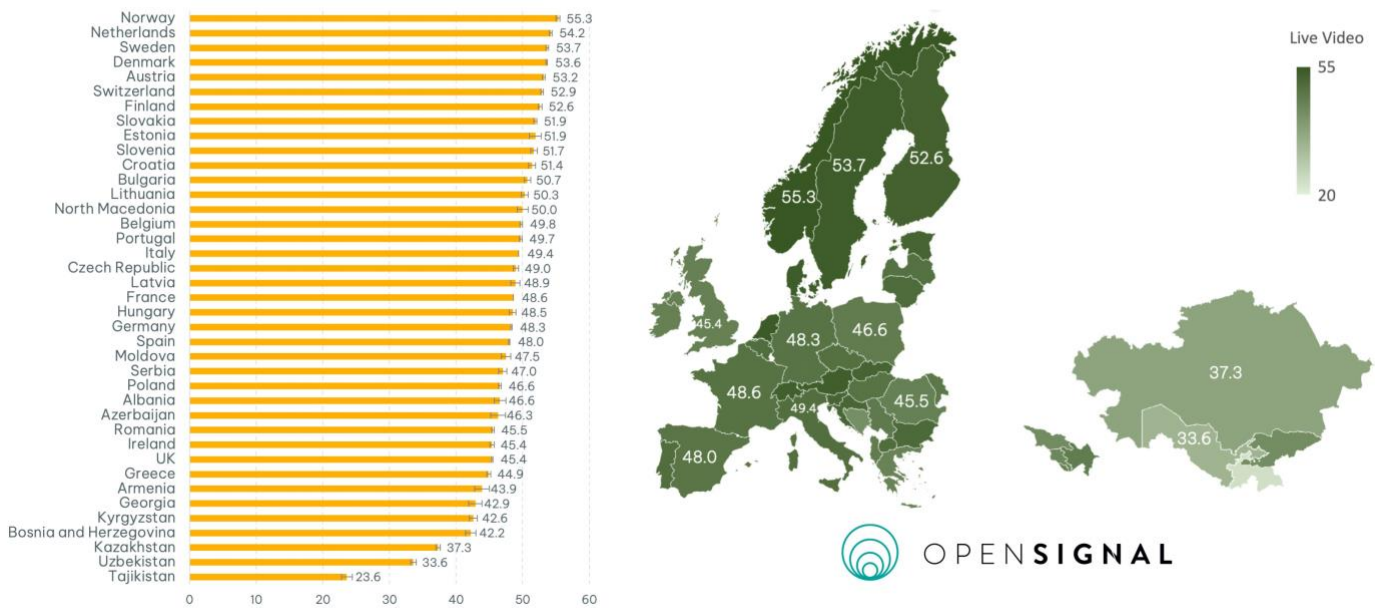


South Korea ranks first in the Asia Pacific region, with a score of 51.4 points. Taiwan is the runner-up with a score of 49.7 points – 1.6 points behind the leader. Singapore and Japan are in a statistical tie for third place with scores of 48.7-49.1 points.

Australia and the Maldives jointly place fifth in Asia Pacific with identical scores of 46.2 points. Australia is the highest-scoring market from the Oceania sub-region, while the Maldives leads among South Asian markets. Thailand scores 44.7 points, while Indonesia is lower on the list, with a score of 37.8 points. Indonesia Papua New Guinea brings up the rear in Asia Pacific with a score of 26.8 points.

Live video streaming providers also aim to seize opportunities in the Asia Pacific market – Formula 1 and beIN SPORTS inked a [multi-year agreement](#) to exclusively stream Formula 1 races across 10 Asian markets between 2023 and 2025 using the beIN SPORTS channel and the CONNECT app. The 10 markets are: Hong Kong, Singapore, Malaysia, Brunei, Indonesia, Timor-Leste, Thailand, Laos, Cambodia, and the Philippines. In Japan, Amazon has secured exclusive live broadcasting rights to a [World Championship Boxing](#) event in April 2023, while streaming platform [SPOTV Now](#) has purchased the rights to show Italian Serie A football in Japan.

Europe & Central Asia – Live Video Experience



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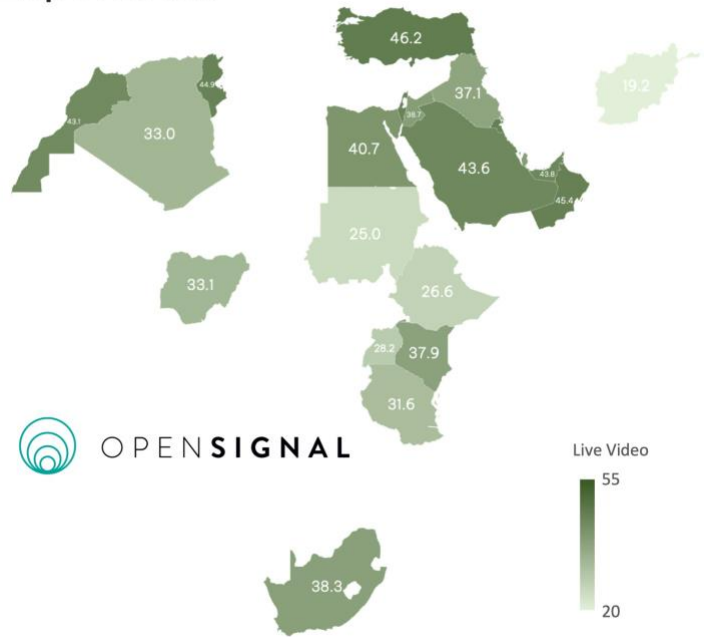
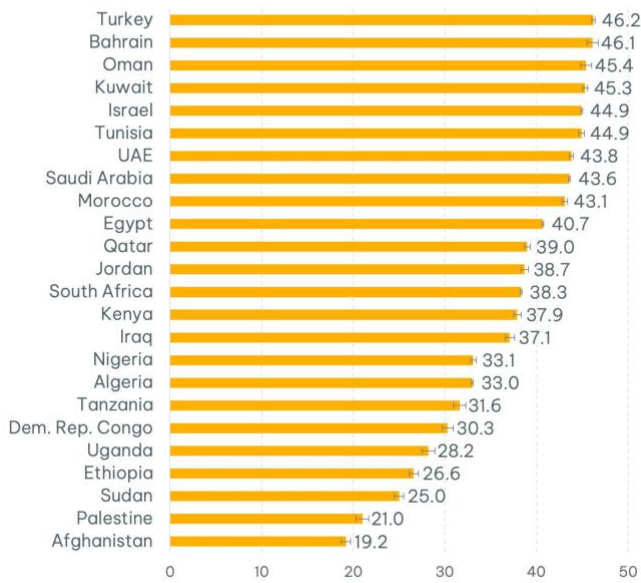
Given how European markets dominated the list of top 20 markets in the world for Live Video Experience, the top of the list in the Europe and Central Asia region is similar to the global leaders. Norway leads with a score of 55.3 points, ahead of the Netherlands and statistically tied Sweden and Denmark. Austria takes the fifth spot with a score of 53.2 points, right ahead of Switzerland which scores 52.9 points.

In Central and Eastern Europe Slovakia, Estonia, Slovenia and Croatia jointly have the best Live Video Experience with statistically tied scores in the 51.4–51.9 points range. Larger European mobile markets place lower down on the list – Italy scores 49.4 points and Germany 48.3 points – while the UK’s score is 45.4 points.

Compared to European markets, Central Asian markets lag behind on users’ Live Video Experience. Kazakhstan and Uzbekistan score below the 40–point mark, while Tajikistan brings up the rear with a score of 23.6 points – 10 points behind Uzbekistan, which is second to last in the region.

European operators have closely cooperated with live video streaming giants for several years now, including deals for sports streaming services. Italy’s Vodafone signed a deal with Amazon Prime Video in [2020](#), while BT-owned mobile operator EE has invested in UK sports rights, including Premier League football, which it offers to its mobile customers through access to [BT Sport](#). Similarly, in Germany Telekom offers access to sports-specialist [DAZN](#)’s offerings.

Middle East & Africa – Live Video Experience



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Turning to the Middle East and Africa, two markets top the Live Video Experience chart as joint highest scorers – Turkey and Bahrain – with statistically tied scores of 46.1–46.2. The upper half of the table is dominated by Middle Eastern and North African markets, with the UAE and Saudi Arabia tying for seventh place with scores of 43.6–43.8 points.

Tunisians see the best experience in North Africa with a score of 44.9 points, beating Morocco and Egypt. Among Sub-Saharan African markets, South Africa and Kenya are in a statistical tie for Live Video Experience leadership, with scores of 37.9–38.3 points. Sudan (25 points) has the lowest score in Sub-Saharan Africa, while Afghanistan brings up the rear for the entire Middle East and Africa region, with a score of 19.2 points.

Zain Kuwait entered a [partnership](#) with video provider Starzplay to offer the platform’s video and sports packages to Zain subscribers as part of its 5G plans. This makes Kuwait another market in the Middle East in which the two companies cooperate alongside Saudi Arabia. Starzplay also has an ongoing partnership with UAE-headquartered [Etisalat](#), while [beln Sports](#), has worked closely with Ooredoo.

Measuring Live Video Experience

Watching live video places different demands on the network to video on demand services (VOD) which only stream pre-recorded and pre-rendered videos. For example, a video stream at full HD 1080p picture quality typically needs higher network bandwidth than a pre-rendered 1080p video for the same perceived video experience. Similarly, with live video providers are not able to buffer as much data to compensate for temporary drops in network service because with live video users expect any delay between what they see and the original live event's time to be kept to a minimum.

The Opensignal Live Video Experience metric measures the users' live streaming experience with a Mean Opinion Score (MOS) on a 100-point scale. The overall score is derived from a model that is driven by the following measures weighted according to their impact on users' perceived video experience:

- Initial delay – how long a video takes to start playing.
- Number of stalling events during the test – how much playback of the video stream is interrupted.
- Total stalling time – the amount of time video playback is interrupted.
- Time spent on each video resolution – as the video stream adapts to network conditions.
- average bitrate at each resolution – an indicator of the amount of data transmitted.
- Down switching and negative quality changes – how much video quality drops in response to network conditions.
- Live offset – the time difference between the current playback position a viewer sees and the real-time when the event being shown to the viewer was recorded.

In some countries like the U.S., mobile operators use optimization techniques for data traffic management of video services, which partly affects their final Live Video Experience scores.

Opensignal has conducted extensive research to measure the experience of live video streaming in the real world. Video stalling, the time for a video to start playing and the live offset are especially important for Live Video Experience. The degree of influence of the live offset was developed by surveying users and to understand users' sensitivity to the trade-off between live offset (delay) and image quality.

Users are aware of the live offset on their connection when they notice reactions to the event they're viewing from other streamers with a lower offset. Examples of this include sports streams – people cheering in the neighborhood about goals scored or posting reactions on social media – or gaming streams when users see the audience comments first ahead of streamers' actions. The value proposition for live streams is the content is instantly delivered and not spoiled for their audience.

According to Opensignal's research, the experience of users worsens as the live offset increases. Compared with on demand video, live streaming providers have less opportunity to reduce stream size through smart encoding because more intensive encoding is costly and takes time,

which increases the live offset. This is the reason that the on demand stream of a TV show will look better than the live stream, even with the same network conditions and at the same bitrate.

Initial delay has a close correlation with Live Video Experience

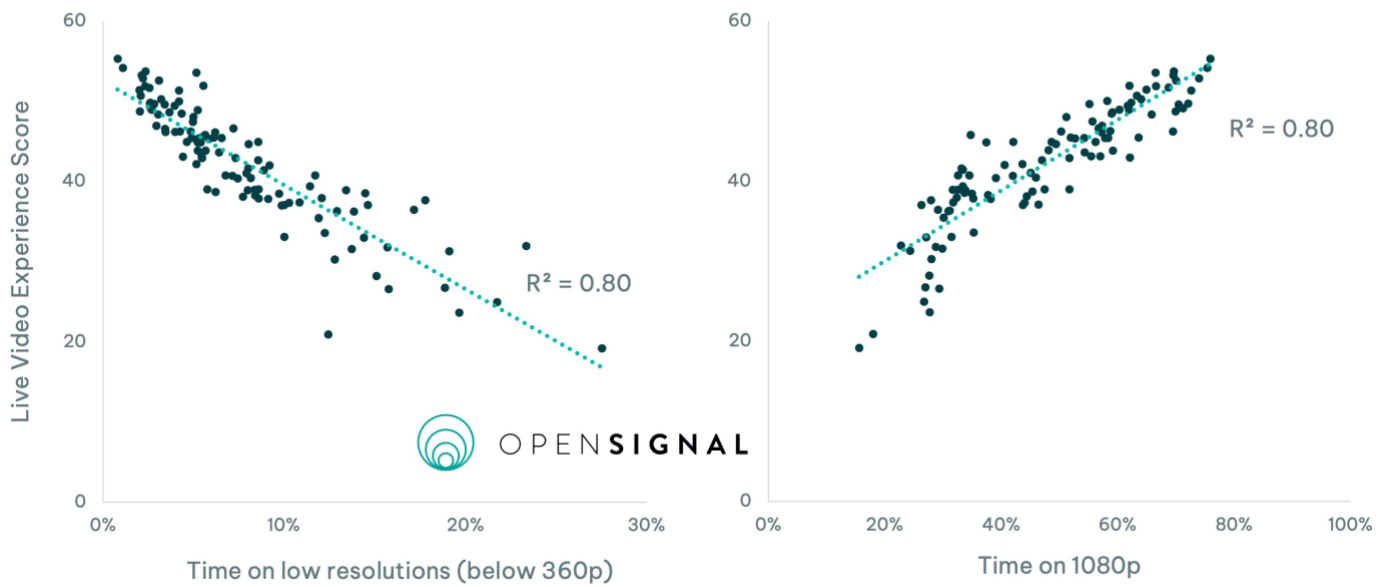


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When comparing Live Video Experience scores to real-world measurements, we observed that the initial delay in video playback showed one of the highest relationships with the final Live Video Experience scores, with an R^2 value of 0.87. There is a negative correlation between increasing the amount of the initial delay and decreasing Live Video Experience scores.

With an initial delay of three seconds on average, Live Video Experience scores are above 50 points. However, an initial delay exceeding 10 seconds means overall Live Video Experience scores typically dropped below the 30-point mark. Opensignal also observed a negative correlation between stalling time and Live Video Experience as higher stalling time paired with lower Live Video Experience scores at a national level.

More time spent on lower resolutions hampers Live Video scores



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Opensignal compared Live Video Experience scores with the time users spend on both low video resolutions (below 360p, or standard definition) and high definition video (1080p) across national markets. Live Video Experience is based on an adaptive bitrate and the video resolution viewers see will vary automatically based on network conditions. This variation is an important driver of the Live Video Experience score.

We observed strong correlations in both with an R^2 value of 0.8 in the two cases. Markets where users spend more time on low video resolutions usually had lower Live Video Experience scores. Consequently, the more time users in a market spend watching higher 1080p video resolution the higher the Live Video Experience scores.

How Opensignal measures mobile network experience

We report as accurately as possible the real-world mobile experience as recorded by mobile network users. To make decisions based on our market insights, network operators, regulators, analysts and consumers need to know the facts we present are accurate and that the comparisons we make are valid.

Please visit: <https://www.opensignal.com/methodology-overview>

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