



Status of 5G Quality and Experience in Europe

MedUX Insights: 5G QoE Research Study

Detailed Report - Q1 2025

[CONFIDENTIAL]

8 July, 2025

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5G



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Executive Summary

- About this research study
- 5G QoE Crowdsourcing Overview
- Stats and Scope of the Benchmark
- Key findings

5G Crowdsourcing Benchmarking in Europe with TRUE QoE KPIs



MedUX Insights: 5G QoE Research Study

At MedUX we have conducted a first-of-its-kind pan-European research about **5G Quality of Experience (QoE) Benchmark in Europe**. This report presents the findings of a crowdsourcing-based study measuring the 5G QoE across Europe in Q1 2025.

This study uncovers two gaps: (1) a disconnect between advertised or theoretical 5G coverage and what users experience, and (2) a performance gap between 4G, basic 5G and more advanced 5G deployments.

We have leveraged our innovative 5G QoE Crowdsourcing testing solution to benchmark, monitor and improve mobile networks. It aims at improving customer satisfaction by delivering an honest, **independent review that enhances service quality** from the viewpoint of the people who matter most – the users.



Stats and Scope of

5G QoE Crowdsourcing

Benchmark in Europe

MedUX



+40 countries
monitored



Q1 2025
reference
period



+35MM
performance
tests executed



+4,9MM Km2
surface
monitored



+425 MM
inhabitants
covered



+350.000 MM
radio samples
collected

In Europe





Crowdsourcing overview

MedUX continuously expands its global crowdsourcing solution, gathering real end-user data via passive and active tests, and reaching millions of users covered and billions of samples collected.

Our comprehensive QoE crowdsourcing solution already covers most European countries. This benchmark report is based on data collected during Q1 2025, covering more than 40 countries and 425MM people.

Q12025 Scope

2025 Candidates



QoE Crowdsourcing Initiative

Active Testing with real services and applications



- Technology: Up to 5G+ & Wi-Fi 7.
- Active QoS Testing against popular CDNs: CloudFlare, Akamai, etc.
- Active QoE Testing against application servers: Youtube, Facebook, Tiktok, Blizzard, etc.
- Available testing against dedicated measurement servers (on-net or off-net).
- Consumer privacy protection, such as GDPR in Europe.



Four Insight Pillars

This Q1 2025 crowdsourcing benchmark report highlights the importance of an end-user and experience-centric Gigabit Society for All. Together, we can build a High-Quality Digital World to drive Societal Progress and Digital Transformation and to ensure citizens and businesses benefit from 5G full capabilities EVERYWHERE.



Discerning beyond coverage and real end-user experience

Official coverage figures, while often encouraging, do not always reflect the true end-user experience. End-users remain connected to 5G approximately 48% of the time (vs 94% 5G coverage estimates).



Understanding the importance of the Upper Mid-Band and 5G SA

Much of 5G deployment remains 'basic 5G,' heavily reliant on DSS and low-band frequencies. Networks enable a real-field Upper Mid-band usage of 25%, and true 5G Stand-Alone (SA) represents less than 1%.



Observing a potential 5G Divide among (and within) States

The study underscores a two-speed Europe in 5G deployments, especially in 5G Take-up, 5G Availability, C-Band 5G and SA 5G. Indeed, averages often mask regional gaps.



Catching up with ambitious Digital Decade Objectives

The gap for 2030 targets would be significantly bigger considering the end-user experience. Current "high-quality" 5G availability figures are far from universal.





Gap with 2030 objectives

The European Commission's Digital Decade Strategy sets a bold vision for a “Gigabit Society for All,” aiming for universal 5G coverage in urban areas by 2025 and populated areas by 2030. However, the MedUX report findings reveal a significant gap between these aspirations and the current reality of end-user experience. High-quality 5G is the real catalyst to a Digital 2030 Society



Discerning beyond coverage and real end-user experience

94 % Theoretical 5G coverage
vs

48 % Real field 5G technology usage



Understanding the importance of the Upper Mid-Band and 5G SA

25 % Real field Upper Mid-Band usage

1 % Real field 5G SA technology usage



Observing a potential 5G Divide among (and within) States in QoS

60 % vs 20 % 5G Availability

>100 vs <51 Mbps Download Speed

22 vs 14 Mbps QoS UL Speed

Leading vs lagging countries



Observing a potential 5G Divide among (and within) States in QoE

52 % vs 29 % 4K Streaming Playback

<45 vs >59 ms Gaming Latency

<1.4 vs >1.7 ms Social media loading time

Leading vs lagging countries



Key findings

This Q1 2025 crowdsourcing benchmark reveals substantial differences among European countries in 5G/5G SA availability, Quality of Service (QoS) and application-level Quality of Experience(QoE) metrics. These findings reflect real-world conditions and directly correlate with end-user satisfaction.



5G Availability

- **Overall 5G Availability:** The Netherlands, Greece, Czech Republic, Denmark and Luxembourg record the highest 5G Availability in Europe with more than 60% of 5G technology usage.
- **Top 5G C-Band Availability:** Switzerland, Bulgaria, Spain, Portugal and France lead in 3.4–3.8 GHz availability each exceeding 37 % of 5G usage on C-band.
- **Top 5G SA Availability:** Spain, the Czech Republic, Portugal, Greece and Austria report the greatest share of Stand-Alone 5G, each above 1.6 % of technology usage.



QoS Ranking

- **Top DL Speed:** Denmark, Norway, Luxembourg, the Netherlands and Switzerland stand out with average downlink throughput above 103 Mbps.
- **Top UL Speed:** The Netherlands, Switzerland, Norway, Denmark, and Sweden lead on uplink performance, each averaging more than 22 Mbps.
- **Top Latency:** Switzerland, the Netherlands, Austria, the Czech Republic, and Luxembourg deliver the lowest average latency in Europe, all below 20 ms.



QoE Ranking

- **Top Streaming 4K Playback:** Norway, Denmark, the Netherlands, Switzerland, and Sweden achieve the highest 4K playback rates, with more than 52 % of sessions in Ultra HD.
- **Top Gaming latency:** Switzerland, Luxembourg, the Netherlands, the Czech Republic, and Denmark provide top gaming experience, each with average latency below 45 ms.
- **Top Social media loading time:** Norway, the Netherlands, Denmark, Sweden, and Luxembourg outperform other markets, completing full social-media page loads in under 1.4 seconds on average.

- Netherlands:**
73.4% 5G Availability
- Switzerland:**
46% 5G C-Band Availability
- Spain:**
4.5% 5G SA Availability

- Denmark:**
155 Mbps Avg. DL Speed
- Netherlands:**
31 Mbps Avg. UL Speed
- Switzerland:**
16 ms Avg. Latency

- Norway:**
66% 4K Playback
- Switzerland:**
32 ms Avg. Latency
- Norway:**
1.3 sec Avg. SM loading time

Key findings

There are two distinct country clusters when it comes to 5G Availability, Quality of Service (QoS), and Quality of Experience (QoE). This analysis, based on extensive real-user measurements, highlights contrasting realities in terms of connectivity, performance and experience across Europe.

Leading 5G Countries

Best

	5G Availability		>65%
	QoS DL Speed		>100 Mbps
	QoS UL Speed		>22 Mbps
	QoS Latency		<20 ms
	QoE 4K Streaming Playback		>52%
	QoE Gaming Latency		<45 ms
	QoE Social media Loading Time		<1.4 sec

Lagging 5G Countries

Worst

	5G Availability		<35%
	QoS DL Speed		<51 Mbps
	QoS UL Speed		<14 Mbps
	QoS Latency		>28 ms
	QoE Streaming 4K Playback		<29%
	QoE Gaming latency		>59 ms
	QoE Social media loading time		>1.7 sec

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Introduction

Setting the Scene: 5G as a Catalyst for Digital Europe



After 10 successful years in the industry...

The Internet Quality of Experience Testing and Monitoring Company

10 years empowering
QoE Everywhere



... we decided to give back...

#MedUXImpact



5G transformative enabler: Fourth Industrial Revolution

Smart Communities

Digital Health

Digital Industries

Efficient Mobility

... and beyond



... and transform how we perceive Connectivity.

5G Connectivity Benchmarking in Europe

**The Time To Transform Connectivity
is Now**

Quality of Experience Everywhere in the digital Era

2030 DIGITAL DECADE



Where we need to go:

to enable a

Gigabit Society

Skills

20 million employed ICT specialists, more graduates + gender balance
80% of adults can use tech for everyday tasks

Government

Key Public Services - 100% online
Everyone can access health records online
Everyone can use eID



Infrastructure

Gigabit connectivity for everyone, high-speed mobile coverage (at least 5G) everywhere
EU produces 20% of world's semiconductors
10 000 cloud edge nodes = fast data access
EU quantum computing by 2025

Business

75% of companies using Cloud, AI or Big Data
Double the number of unicorn startups
90% of SMEs taking up tech

Future-proof Fixed and Mobile connectivity as an enabler for digital transformation and digital public services

100% 5G Coverage

*100% 3.4-3.8 GHz 5G Coverage

100% FTTP Coverage

100% Fixed VHCN

... and beyond



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Methodology

How We Collect and Validate Data

- MedUX QoE Crowdsourcing Methodology
- Quality of Experience - Ranking approach
 - KPIs and Metrics overview

MedUX QoE Crowdsourcing Methodology

MedUX delivers a comprehensive and objective view of mobile network experience through a global crowdsourcing methodology. By embedding a lightweight SDK into real mobile applications used by millions, MedUX captures user experience from the end-user perspective, generating reliable insights that support regulatory, operational, and commercial decisions across the telecom sector.

Real-world Data collection

Data is collected through a combination of passive and active measurements, providing a multi-dimensional view of network performance. Active tests are designed to replicate typical user activities — such as web browsing, file downloads, video streaming, or online gaming — and are executed under standardized conditions to ensure comparability across networks and geographies. Crucially, these tests are launched only when the device is idle and connected to a network, ensuring that ongoing user activity does not influence the results or create unrealistic performance scenarios. Passive measurements, on the other hand, capture ongoing network conditions and device behavior without initiating traffic. These include signal strength, type of network connection, cell transitions, and handovers.

Data is collected from a wide array of real-world conditions, covering urban and rural areas, indoor and outdoor environments, and users in motion or stationary. This broad coverage ensures the representativeness and contextual relevance of the collected dataset.

Data validation and processing

To guarantee the integrity and reliability of the dataset, all collected data is subjected to a rigorous, multi-stage validation process.

This begins with the automatic detection and exclusion of anomalous or corrupted samples, followed by the removal of duplicate entries and any data points that fall outside defined temporal and spatial uniqueness thresholds. Particular attention is given to identifying and filtering extreme values in both signal metrics and active test results, which may result from atypical environmental or device-specific anomalies.

Additionally, test results from devices running outdated versions of the operating system are discarded, as these can introduce inconsistencies in performance measurement. These comprehensive quality controls are part of a standardized methodology that aligns with international best practices and ITU-T recommendations, ensuring the consistency, comparability, and technical soundness of MedUX's performance analytics.

MedUX QoE Crowdsourcing Methodology

Representativeness and scale

MedUX's global panel of millions of devices enables a robust and statistically representative view of mobile network performance at national, regional, and operator-specific levels.

The extensive reach of the platform allows for consistent data collection across diverse geographies and user contexts. For each country analyzed, MedUX ensures that the number of samples and users meets the statistical conditions necessary to report with confidence.

Specifically, key performance indicators (KPIs) are calculated with a 95% confidence level and a maximum margin of error of $\pm 5\%$, derived from the national-level sample size and distribution.

While this precision may vary for more granular segments, such as regional or technological splits, the methodology ensures that broader national comparisons remain statistically robust and meaningful.

Thanks to the sheer volume, variety, and continuous nature of data acquisition, MedUX delivers near real-time visibility into mobile connectivity trends, enabling stakeholders to make well-informed, evidence-based decisions.

Privacy and data security

User privacy is a foundational principle in MedUX's approach, underpinning every aspect of data collection and processing. At no stage is any personally identifiable information (PII) collected, stored, or analyzed. IP addresses are systematically anonymized or aggregated, and all datasets are pseudonymized to prevent any possibility of user identification, even in cases of large-scale data analysis.

The SDK operates seamlessly in the background, designed to have minimal impact on battery life, data usage, or device performance. It requests only the permissions that are strictly necessary for measurement purposes, following a transparent and consent-based process.

Moreover, MedUX adheres to the highest international standards of data protection, with full compliance to the GDPR and all applicable local regulations. Internal procedures are regularly audited to maintain security, and data is stored and processed using secure infrastructure. This ensures not only compliance, but also builds trust with users and partners by guaranteeing the ethical handling of sensitive network performance data.

MedUX QoE Crowdsourcing Methodology

MedUX mobile benchmarking approach, based on our global crowdsourcing data, assesses network performance and end-user experience in the 5G Era. We revisit criteria and thresholds once a year to consider best practices but also to reflect technology and industry development.

At MedUX we use a set of KPIs for most of the rankings, which ratings are algorithmically estimated based on test results and KPIs, in line with industry standards and recommendations. For this Q1 2025 report we have chosen some key representative metrics, but in forthcoming reports we will be including services experience scores.

- **5G:**
 - **5G Availability** – share of usage on any 5G mode (DSS, NSA, SA) measured during an active data transfer, a proxy of 5G actual usage.
 - **5G SA Availability** - share of usage on 5G Stand Alone measured during an active data transfer, a proxy of 5G SA actual usage.
 - **5G C-Band Availability** - share of usage on 5G C-Band measured during an active data transfer, a proxy of 5G C-Band actual usage.
- **QoS:**
 - **Download and Upload Speed** (Throughput) - how much data can be transferred. Particularly in 5G it measures how is the network capacity when stressing the line (multi-thread stress test).
 - **Latency** (responsiveness) – how long it takes to access the network. Particularly in 5G it measures how long it takes to access the 5G network across all testing categories while taking latency and network responsiveness results into account.
- **QoE:**
 - **Video Streaming experience** - it measures the average video experience while considering video resolution, video loading time, and stall ratio.
 - **Gaming experience** - it measures the average gaming latency against gaming servers.
 - **Social media experience** - it measures how quickly and smoothly social media platforms load by analyzing key metrics when accessing popular destinations

Measurement Catalogue (>100 KPIs)

Performance data

	Cloud DL	Multi Thread download speed test
	Cloud UL	Multi Thread upload speed test
	Latency	Echo request to a specific IP or URL
	Streaming	Video playback based on youtube
	Voice/VoIP	CS and SIP Call
	Social Media and web browsing	Connection to main SM and websites

Connection data

	Network	ISP, ASN, MCC, MNC
	Signal	RSRP, RSRQ, SINR, RSSI
	Node	LAC, TAC, CID, Cell, PCI
	Radio	ARFCN, Bandwidth, PSC
	Location	Lat, lon, altitude, speed
	Type	5G, 4G, 3G, 2G, Wi-Fi

Device data

	OS Version	Android 15, 14, etc
	Manufacturer	Samsung, Xiaomi, etc.
	Device	Galaxy S23, Xiaomi 14, etc.
	CPU	CPU Load (%)
	RAM	Available Ram (MB)
	Charge	Phone charge (%)



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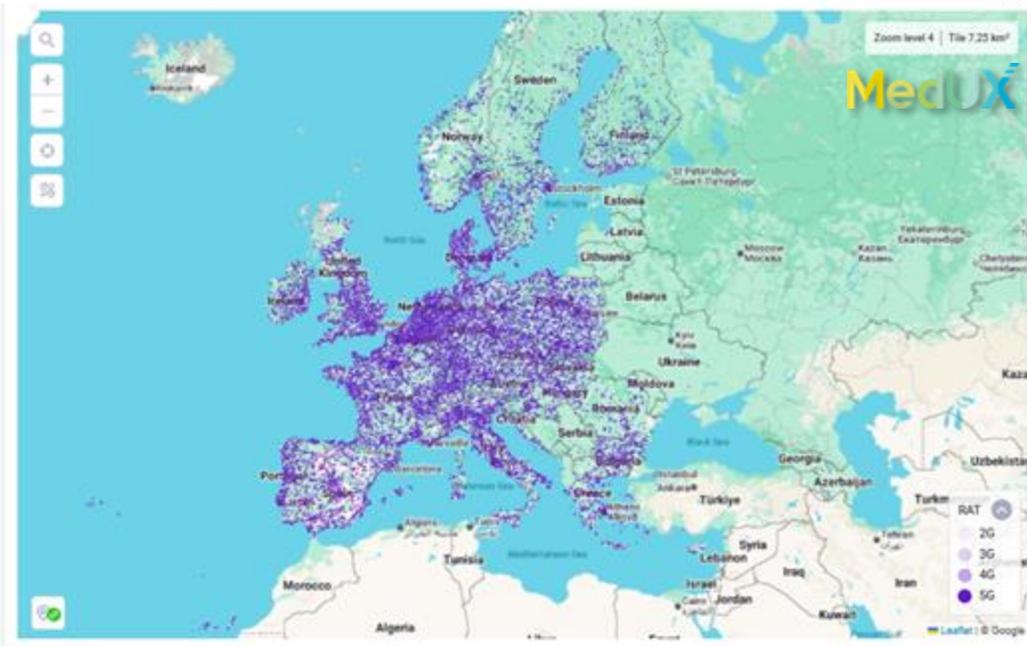
5G Quality and Deployment Insights

- Status of 5G deployments and availability
- QoS country-level comparisons

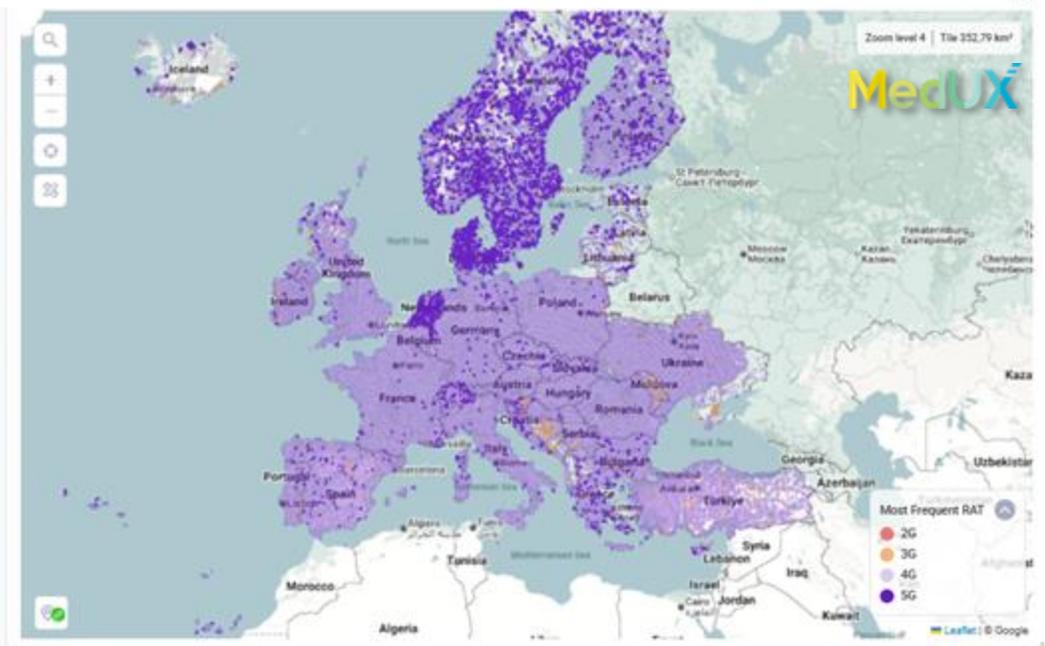
Progress toward the Digital Decade Targets – 5G Availability

5G Availability is far from universal when we consider not only urban, but also suburban and rural areas (*)

5G Availability



Predominant Radio Access Technology (All devices)



- While the push for widespread 5G appears promising, our latest real-world measurements based on our newly deployed 5G QoE Crowdsourcing solution reveal significant differences among and within European States.
- Only a few countries can say that 5G is starting to be a predominant access technology, especially the Netherlands and Denmark. What we see in those countries, it is the result of advanced network deployments and accelerated 5G technology take-up.



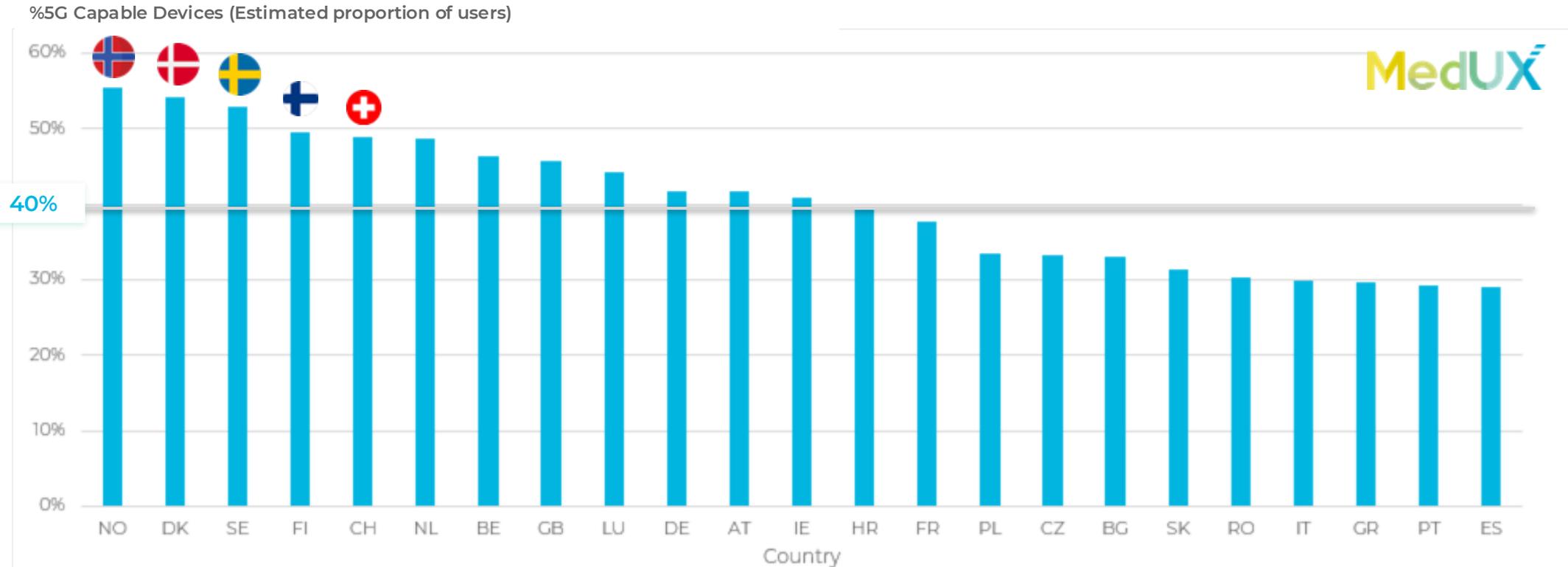
(*) Note that only countries that achieve a 95% confidence level and have a margin of error lower than $\pm 5\%$, based on national-level sample size and distribution, are ranked - resulting in 24 out of 41 monitored in Q1 2025.

Have a look at our 5G QoE Crowdsourcing [here](#)



Progress toward the Digital Decade Targets – 5G Take-up

5G Take-up is a challenge based on our estimations of users with 5G-capable devices



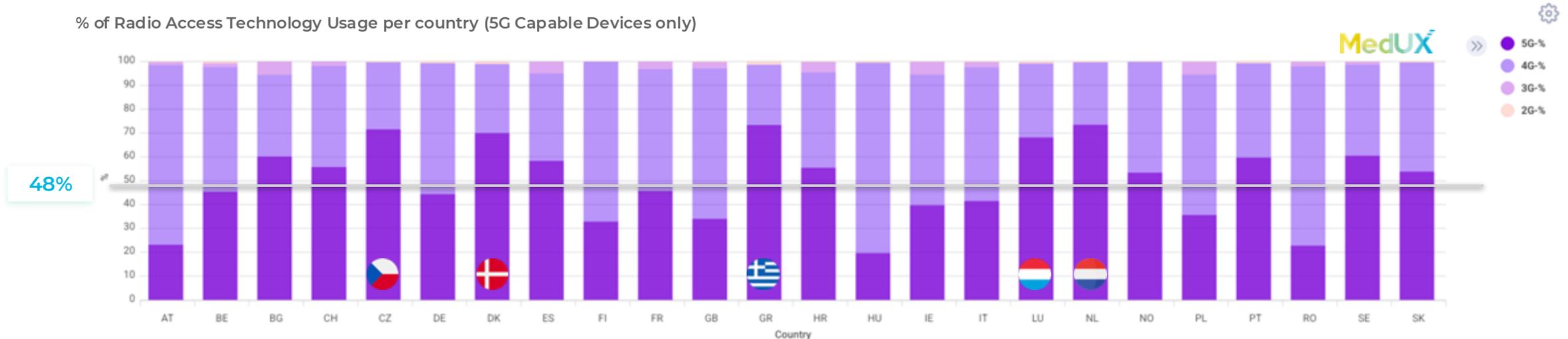
- Based on the percentage of 5G Capable devices, significant differences in take-up rates can be observed. **5G “Take-up” at European level stands at 40%.**
- Nordic Countries and Switzerland lead in general this “take-up” ranking. If we consider only the users with 5G-capable devices, the previous 5G Availability snapshot would be closer to the reality of 5G deployments (but less representative of overall average user experience).



Progress toward the Digital Decade Targets

And there is a long way to go, especially when it comes to universal 5G...

% of Radio Access Technology Usage per country (5G Capable Devices only)



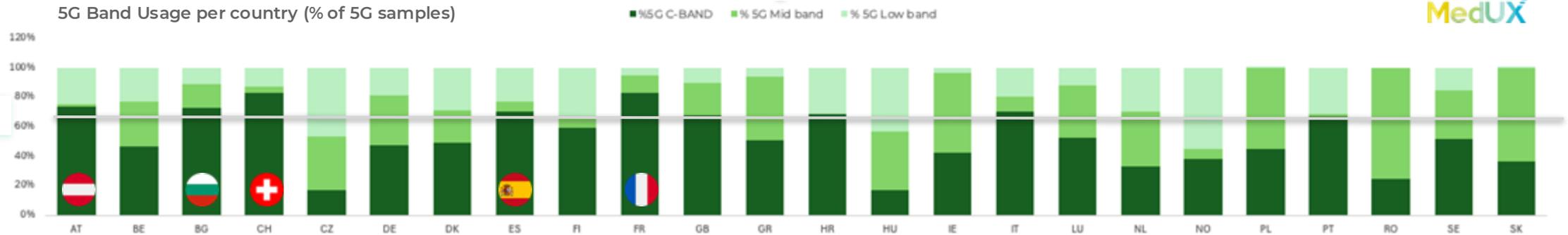
- In many countries, users still connect predominantly to 4G—even when 5G coverage exists on paper.
- However, countries such as The Netherlands, Denmark, Greece or Czech Republic already stand at approx. 70% of 5G Availability and end users already connect more often to 5G than to older technologies; elsewhere 4G still dominates.
- Overall, across European states, **5G Availability (any type of 5G) stood at approx. 48%** based on end-user experience (5G Devices only). Across Europe more than half of traffic from 5G-ready devices would still flow over 4G or previous access technologies.



Progress toward the Digital Decade Targets

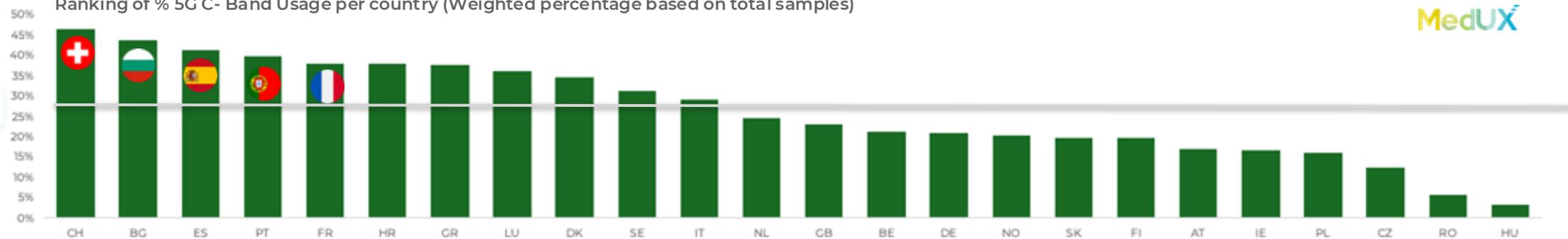
... but also, when it comes to universal “high-quality” 5G (3.4 - 3.8 GHz band)...

5G Band Usage per country (% of 5G samples)



65%

Ranking of % 5G C- Band Usage per country (Weighted percentage based on total samples)



25%

- While 5G coverage has expanded significantly, much of it still consists of ‘basic 5G’ deployments—networks that still depend on Dynamic Spectrum Sharing (DSS) or low- and mid-band frequencies (not the upper mid-band or “high quality” 5G).
- Of the overall 5G deployments, usage of C-Band (“high-performance” 3.4-3.8 GHz) has reached approx. 65% (when users are connected to 5G).
- However, our field measurements confirm that, on average considering all network technologies, end-users are only connected approx. 25% of the times to the high-performance 3.4-3.8 GHz band (“high-quality” 5G deployments in C-Band), and some 5G networks fail to deliver their promised speed advantages.

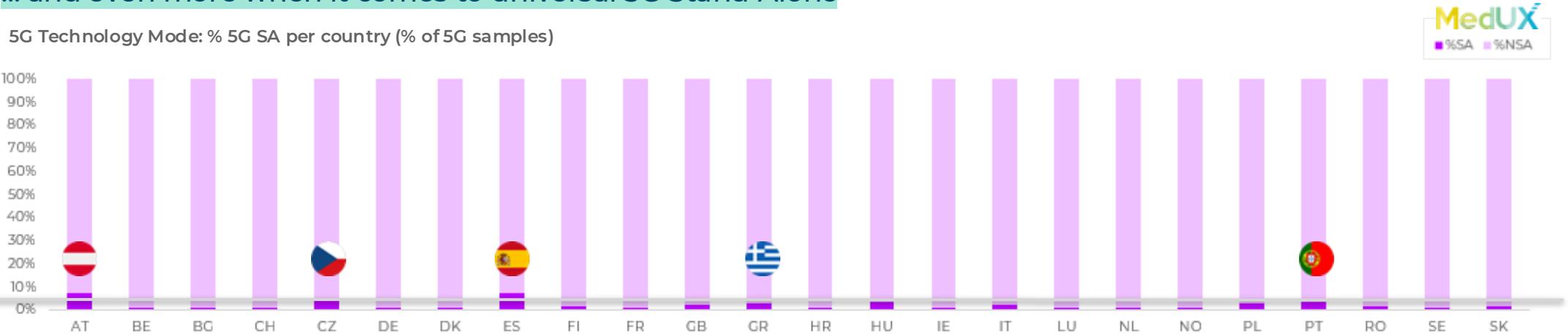


5G QoE Crowdsourcing Benchmark in Europe (Q1 2025)

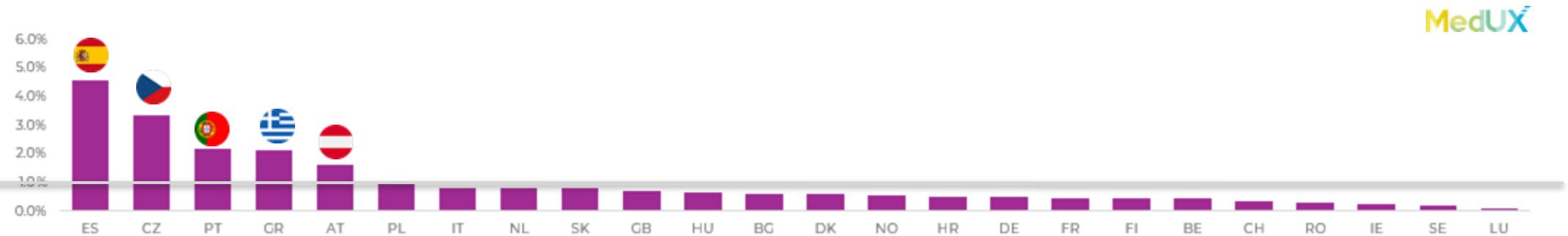
Progress toward the Digital Decade Targets

... and even more when it comes to universal 5G Stand-Alone

5G Technology Mode: % 5G SA per country (% of 5G samples)



Ranking of % 5G SA Usage per country (Weighted percentage based on total samples)



- Of the overall 5G deployments, 5G SA represents less than 5% (when users are connected to 5G).
- Considering all technologies, 5G SA represents approximately 1% of access technology usage in Europe; most operators remain in 5G NSA phase.





Throughput



Scope

The **Speed Test** evaluates the performance of an internet connection by measuring download and upload speeds — providing a reliable view of how fast and responsive the network really is for the end user.



Main Throughput KPIs

Download & Upload Speed



QoS Country-level comparisons | Speed Metrics - Avg DL Speed



Denmark, Norway, Luxemburg, the Netherlands and Switzerland lead in average download speed (100 + Mbps) — performance across Europe varies markedly.

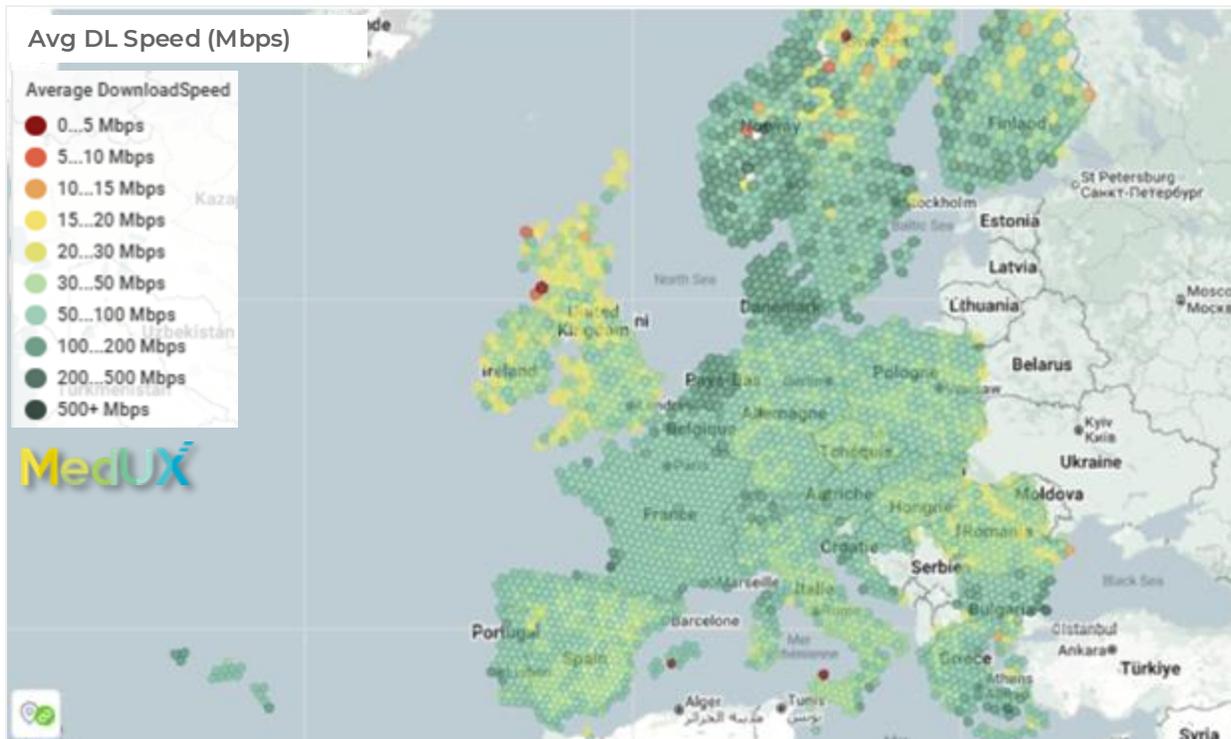
- **Speed is unevenly distributed, even within the same country.**

Local differences are visible, with regions in the same country delivering vastly different user experiences. Averages often mask regional gaps.

- **High averages don't mean high consistency.** Some countries rank high overall but still include clusters with download speeds below 20-30 Mbps — especially in rural or peripheral areas.

- **The next step is consistent high-performance coverage.**

It's not just about reaching more areas but ensuring high quality everywhere.



QoS Country-level comparisons | Speed Metrics - Avg UL Speed



The Netherlands, Switzerland, Norway, Denmark and Sweden lead in average upload speeds — but most of Europe still lags behind.



- Upload speeds remain modest across large areas.

Many regions still average below 10 Mbps, far from what's needed for advanced use cases.

- Upload remains comparatively worse in everyday internet performance.

While download performance has improved, upload speed still holds back creators, remote workers, and interactive services.

- Closing the UL gap for inclusion and productivity.

Reliable upload performance is no longer optional — it's a must for creators, cloud-backup and use cases dependent on a strong and reliable uplink.





Network Responsiveness



Scope

The Network Responsiveness Test measures how quickly and reliably the network reacts to user requests — helping assess the real-time quality of the connection, essential for activities like web browsing, gaming, or video calls.

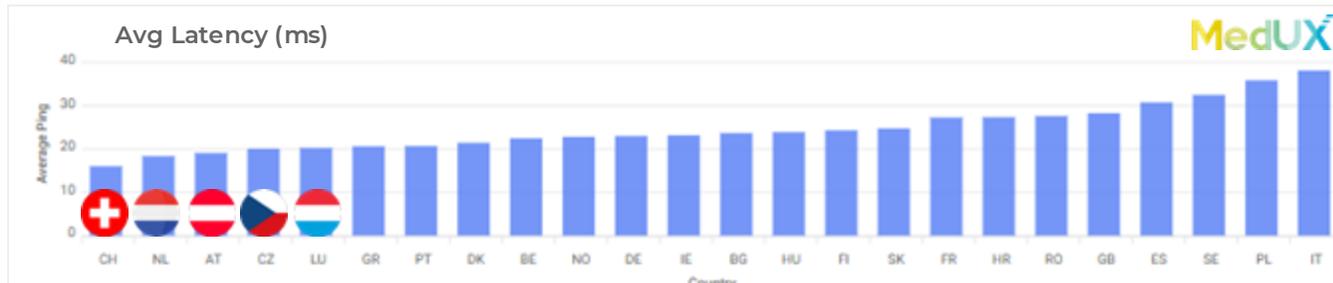


Main Network Responsiveness KPIs

Avg Latency, Jitter & Packet Loss.



QoS Country-level comparisons | Latency Metrics - Avg Latency



Low latency was one of the 5G promises — but sub-15ms performance remains the exception, not the rule. **Switzerland, the Netherlands and Austria** leading in performance.

- **Latency is still too high for ultra-responsive applications.**

Most areas operate above 15 ms, limiting critical use cases like remote control, AR/VR or industrial automation.

- **Truly low-latency zones are rare and isolated.** Only a few localized regions consistently achieve below 10–15 ms, mostly in urban cores.

- **Consistent low-latency must be a key deployment goal.**

Achieving real-time 5G responsiveness for massive use-cases depends not just on averages, but on minimizing latency variations across the entire network.



QoS Country-level comparisons | Latency Metrics - Jitter & Packet Loss

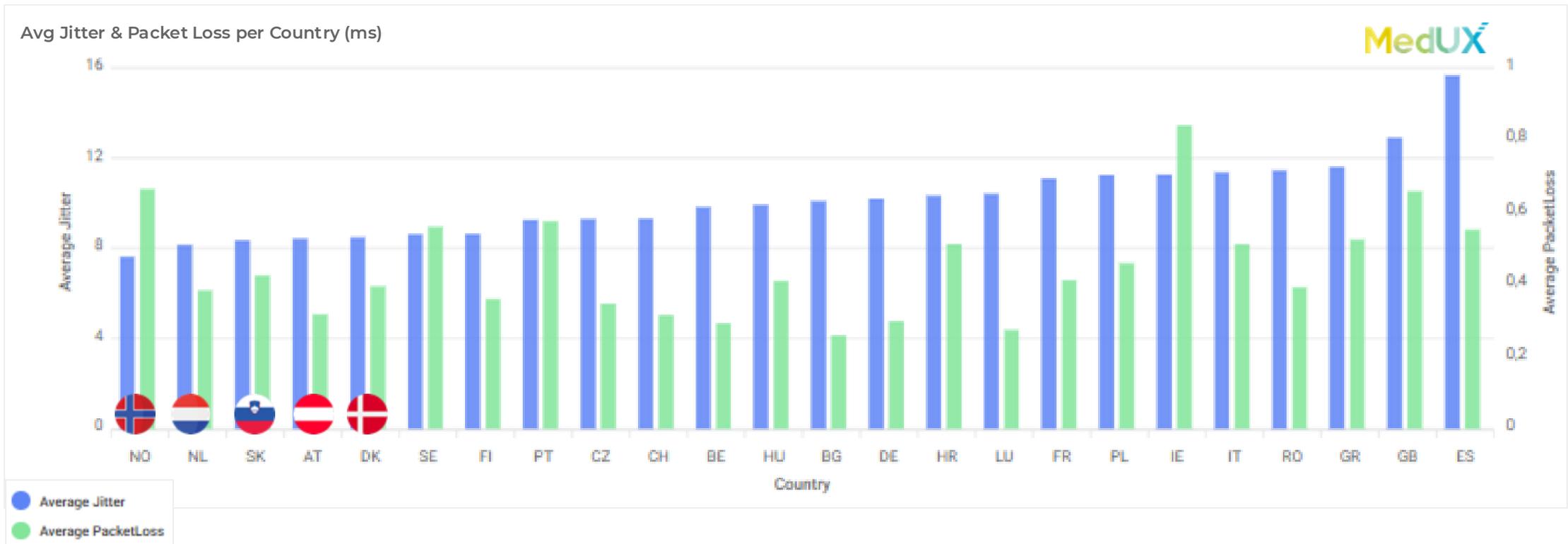
Norway, the Netherlands, Slovakia, Austria and Denmark lead in average stability —with the lowest jitter and in general with low packet loss across Europe (not always).

- Jitter performance is mostly good, but not everywhere.

Average jitter stays below 10ms in the majority of markets, with top performers like **Norway, Netherlands, Slovakia, and Austria** maintaining values close to or below 8 ms.

- Packet loss remains minimal in high-performing countries.

Countries such as **Switzerland, Netherlands, and Denmark** show average packet loss close to 0.3% on average, while others like **UK and Spain** exceed 0.6%, threatening real-time applications.

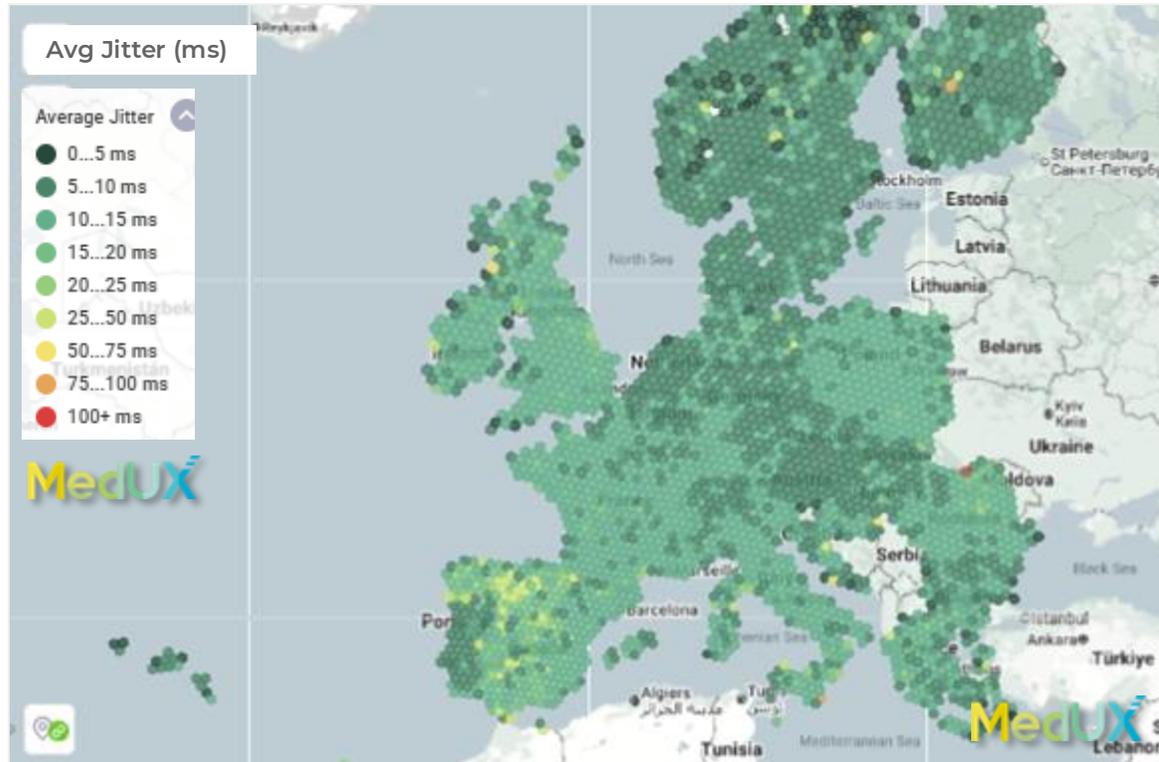


QoS Country-level comparisons | Latency Metrics - Jitter & Packet Loss

Average jitter and packet loss remain within acceptable levels in most of Europe — but outliers still threaten real-time performance.

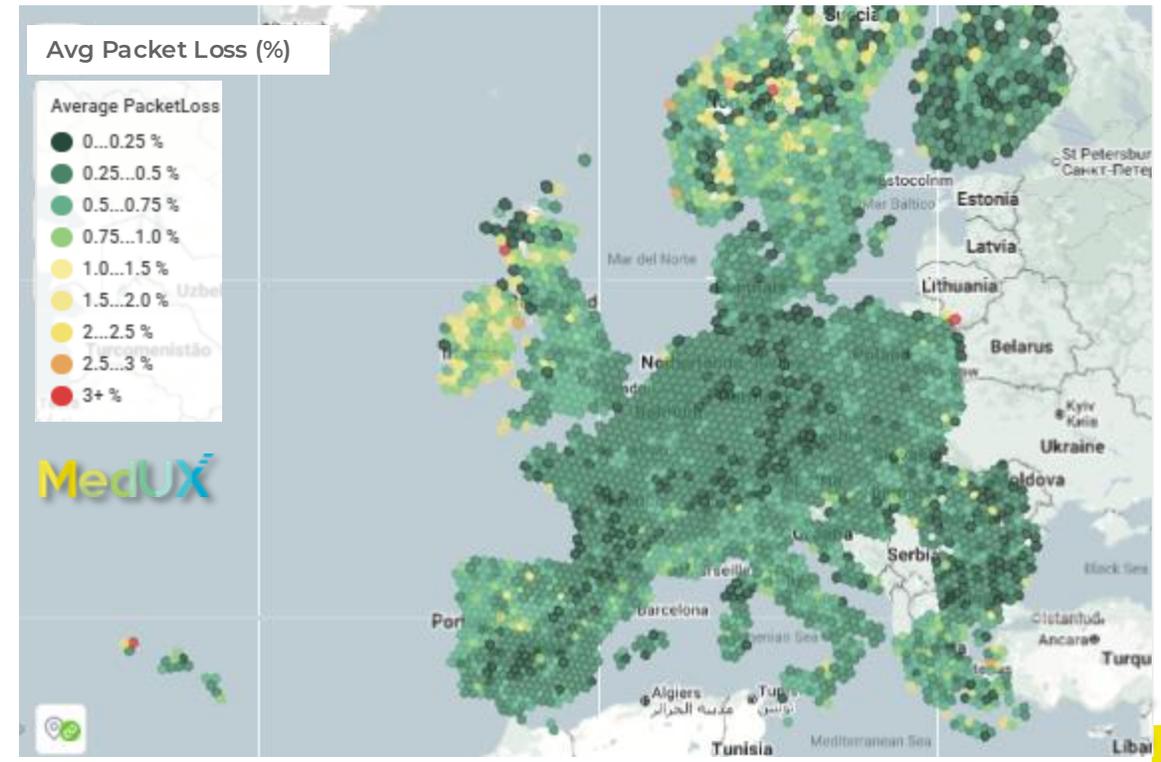
- **Jitter performance is mostly good, but not everywhere.**

Most of Europe shows acceptable levels (<15 ms), but there are still critical pockets above 50 ms, especially in southern regions.



- **Packet loss is low in general, but local exceptions persist.**

Several zones show values above 1%, which can disrupt real-time sensitive applications such as video calls or online gaming.



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Quality of Experience Insights

- Service performance (streaming, gaming and social media experience)



Streaming Experience



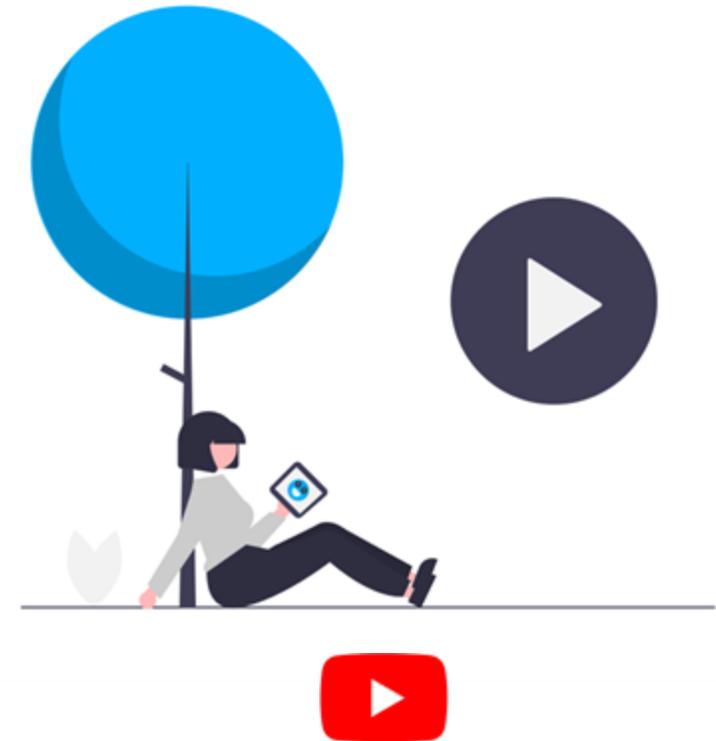
Scope

The Video Streaming Test checks how well video streams are delivered to end-users. We play the requested video stream and evaluate the video playback and exploring the different phases

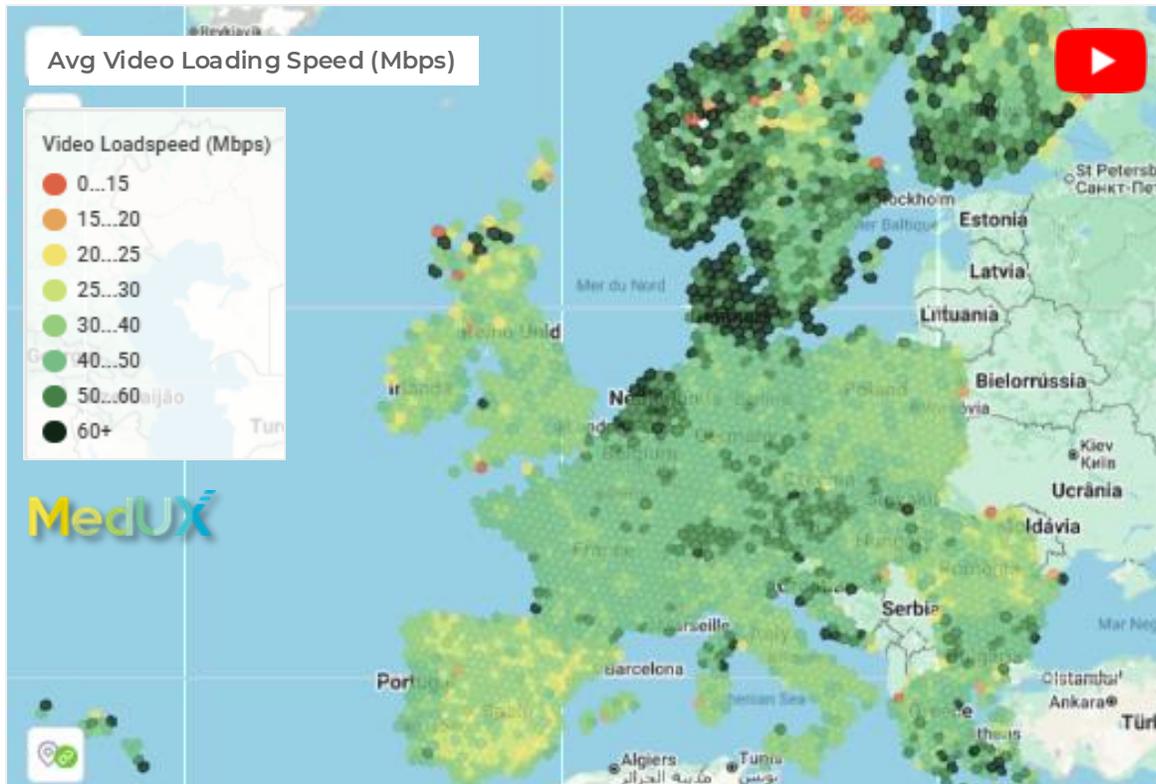
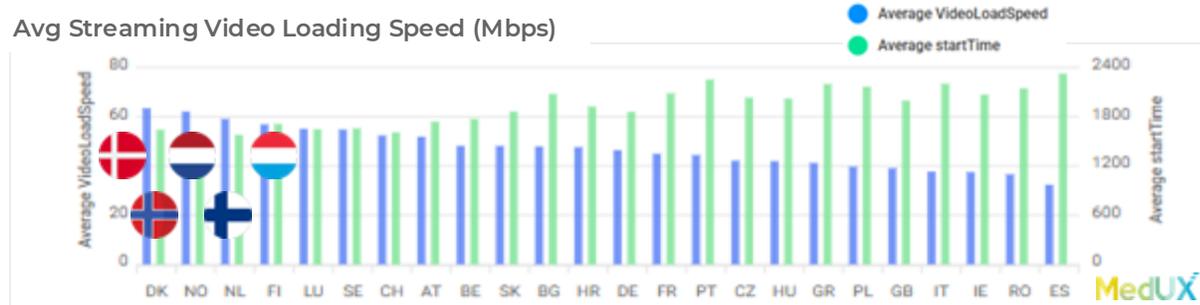


Main Streaming Experience KPIs

Video download speed, Video streaming bitrate, Video startup time, Number of rebuffering events, Video Stalling Ratio or Dominant Streaming Bitrate



Service performance | Streaming (Loading Speed (Mbps))



Fast video loading doesn't always mean best quality — user experience depends not only on speed, but also on time-to-content, resolution and stalls.

- **High video load speed does not always translate into short start-up delay.**

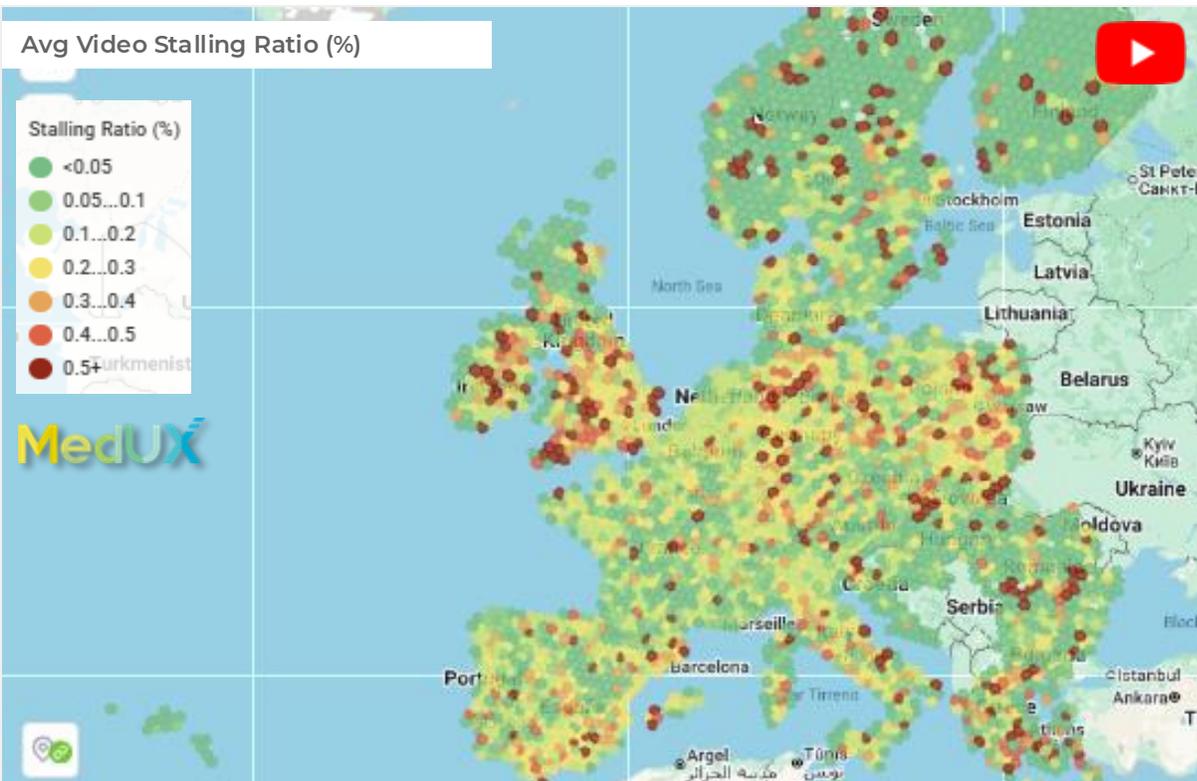
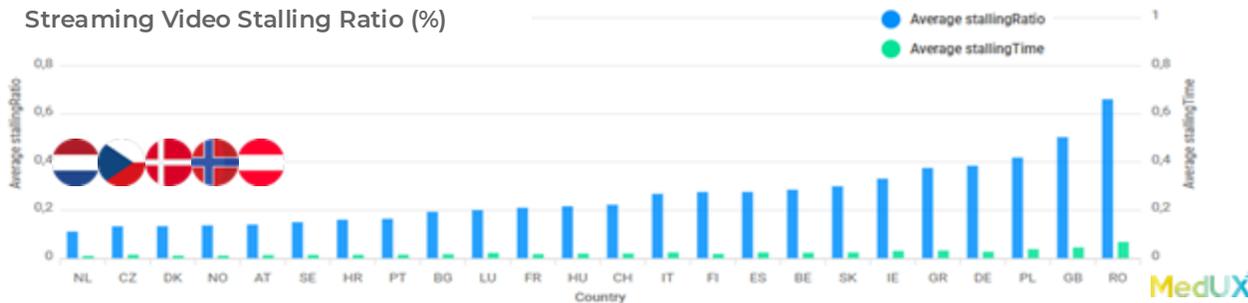
Some countries show high loading speeds but still experience long start times, suggesting buffering or delivery issues.

- **Video loading speed varies significantly across Europe.**

While many regions reach 30+ Mbps, others still struggle below 20 Mbps, especially in Eastern and Southern areas.



Service performance | Streaming | Streaming (Stalling Ratio (%))



Stalling is one the most impactful aspects when it comes to a degraded streaming experience — and it still affects large parts of Europe’s 5G experience.

- **There’s a gap between throughput and perceived quality.**

Even in countries with decent video loading speeds, stalling persists, pointing to instability in the delivery chain.

- **Stalling remains a critical issue in several regions.**

Stalling ratios above 0.4% are observed in Southern and Eastern Europe. Stalling persists in several markets despite good headline speeds.



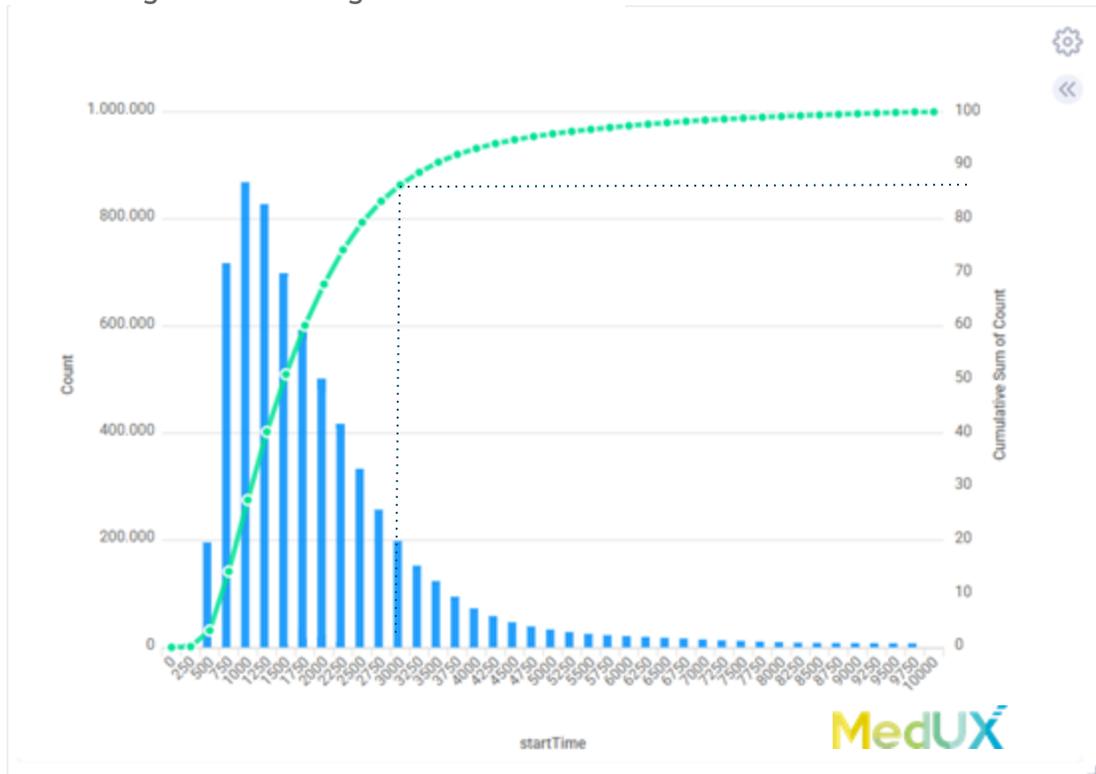
Service performance | Streaming Video Quality Rate

Start time and video quality still vary widely — seamless 5G streaming remains an inconsistent reality across Europe

- **Most videos start within 1.5 seconds, but many still struggle.**

The histogram shows a long tail: while many sessions load quickly, more than 15% exceed the 3s critical threshold for user experience. Indeed, 95th-percentile start-up delay is approx 4.5s.

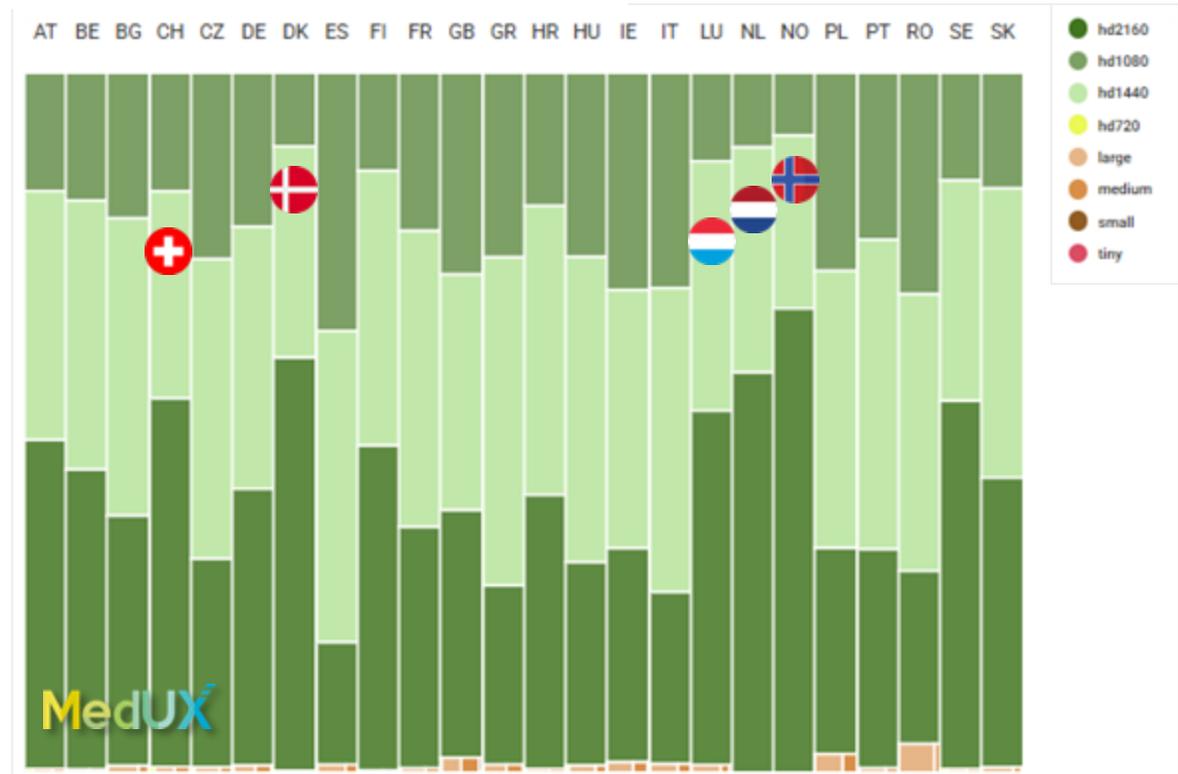
Streaming StartTime Histogram



- **Bitrate distribution reveals fragmentation in streaming quality.**

Some countries still serve a large share of video sessions in medium or low quality, despite having 5G connectivity. Overall, 50% of the streaming sessions reach Ultra HD (2160p) quality.

Streaming Dominant Bit Rate by Country





Gaming Experience



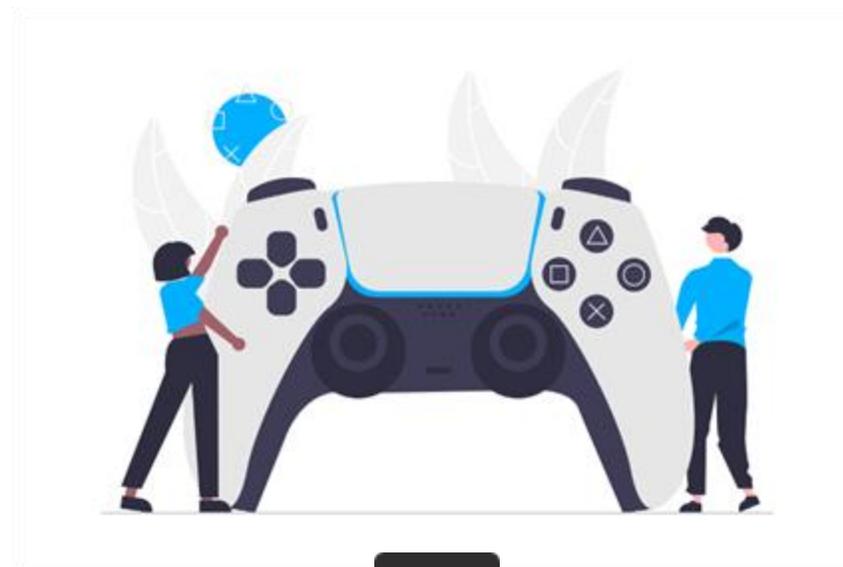
Scope

The Gaming Experience Test evaluates how well real-time online games perform by measuring key metrics such as latency, jitter, and packet loss, using some of the most popular gaming destinations like Epic Games and Riot Games.



Main Gaming Experience KPIs

latency, jitter, and packet loss

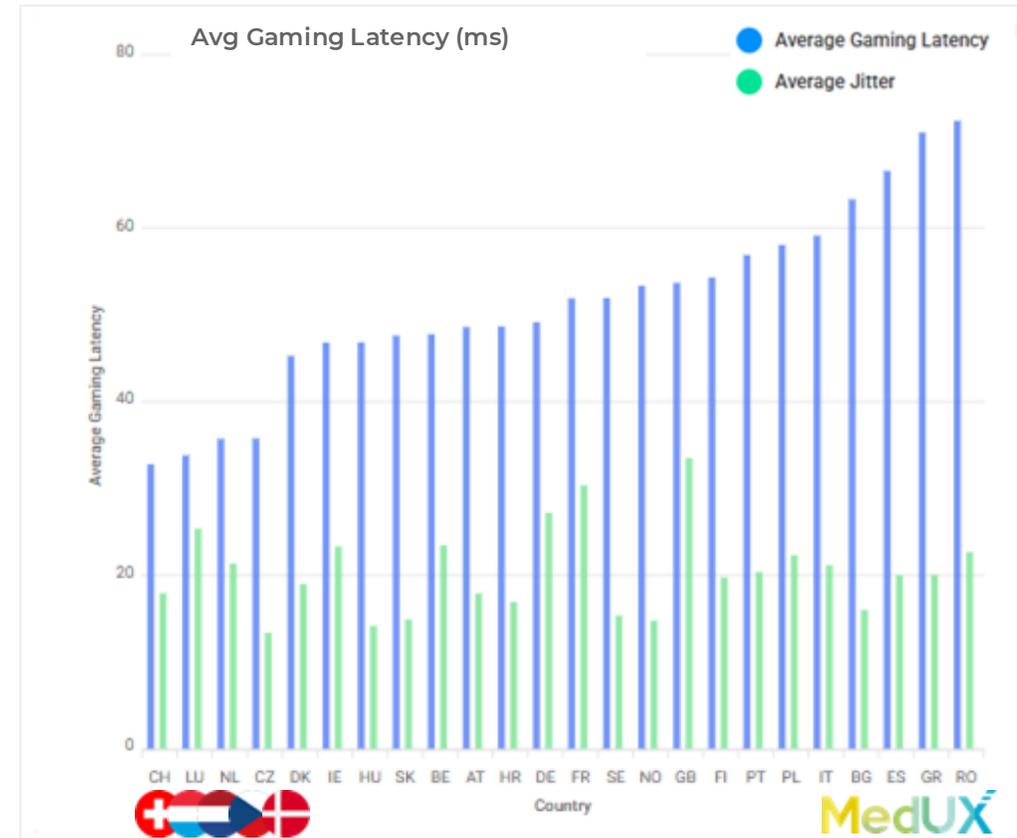
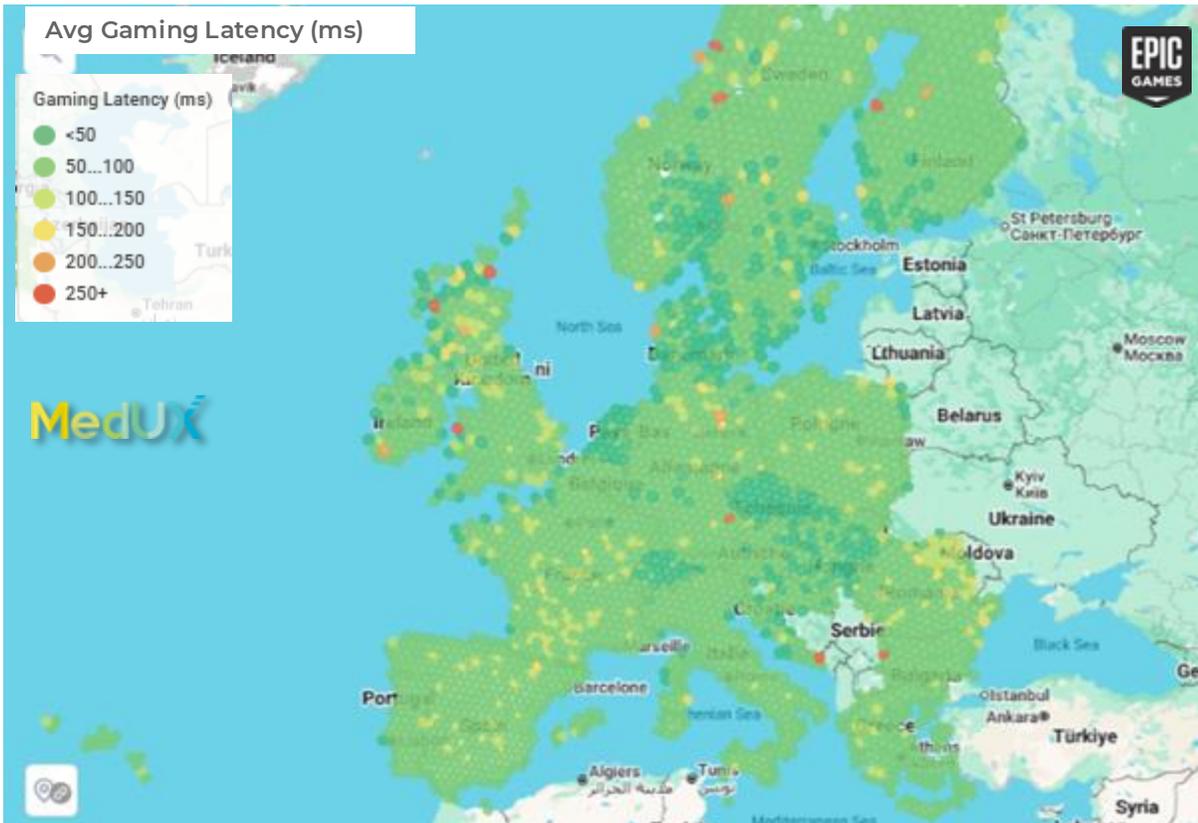


Service Performance | Gaming Latency (ms)

Gaming latency is improving, but variability and packet loss issues still affect the real-time experience in many countries

- **Most of Europe achieves latency under 50 ms, ideal for gaming.** However, certain more rural and remote areas in Europe still show values above 100 ms, which degrade responsiveness.

- **Low latency doesn't guarantee good gaming experience.** Some countries with good average latency still may show elevated jitter or packet loss, potentially disrupting gameplay.





Social Media Experience



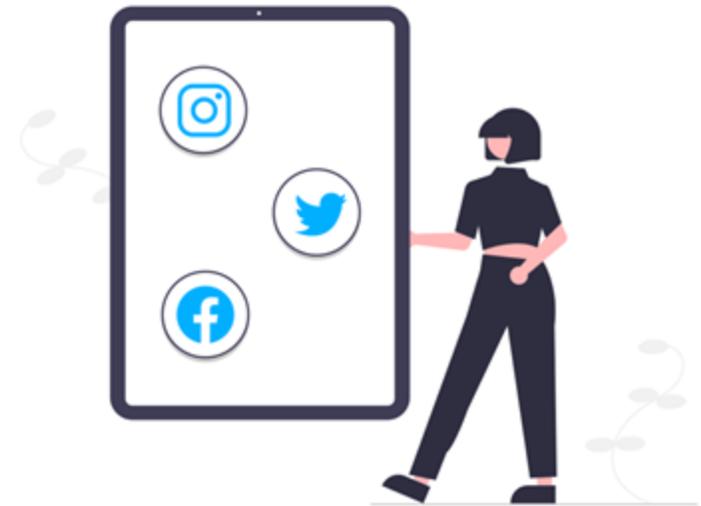
Scope

The Social Media Experience Test measures how quickly and smoothly social media platforms load by analyzing key browsing metrics when accessing popular destinations like Facebook, Instagram, and TikTok.

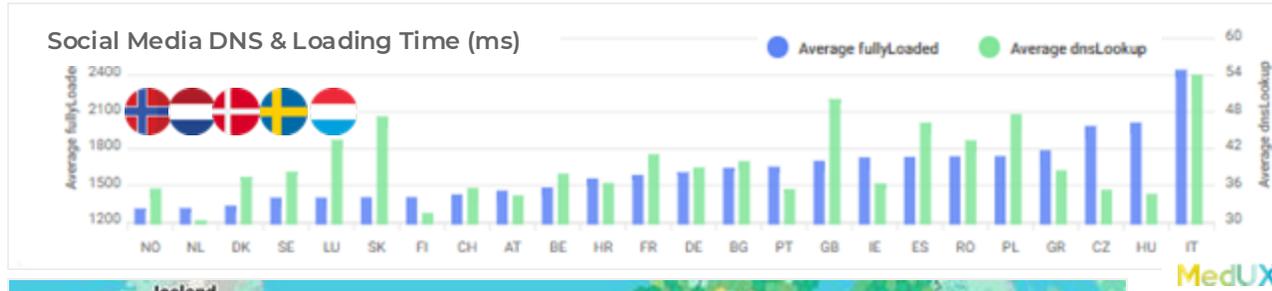


Main Social Media Experience KPIs

Social Media Avg Loading Time, Avg DNS Time, Avg Fully Loaded or Number of Resources.



Service Performance | Social Media Loading Time (ms)



MedUX

Social media experience is uneven — loading times and time-to-content vary significantly by region and platform.

- Loading times are best in Central and Northern Europe.

Countries like Norway, the Netherlands and Denmark achieve average loading time well below 1500 ms, while some regions exceed the 2500 ms (+66%) especially in Eastern and Southeastern Europe or some rural and remote areas in general.

- Platform optimization plays a key role.

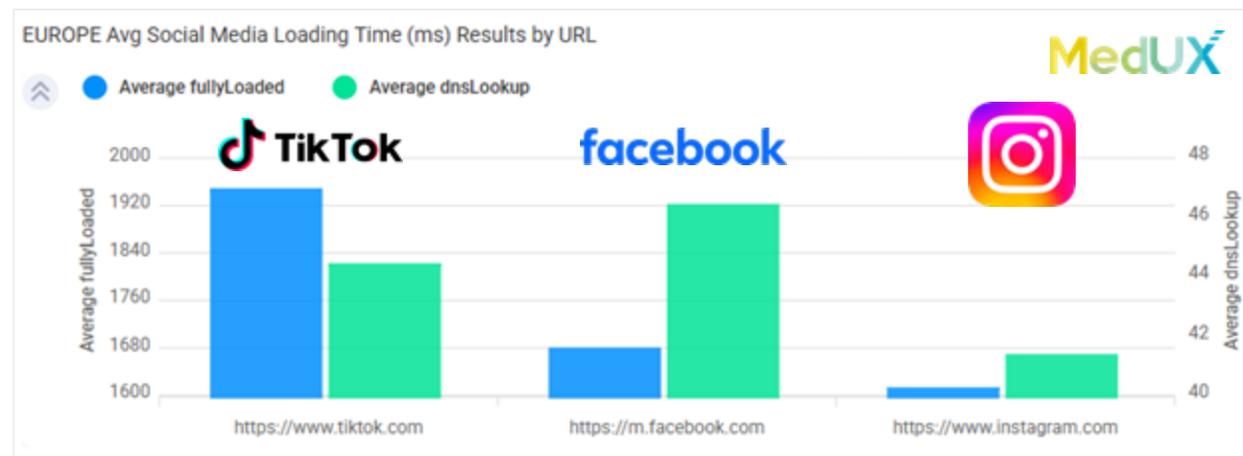
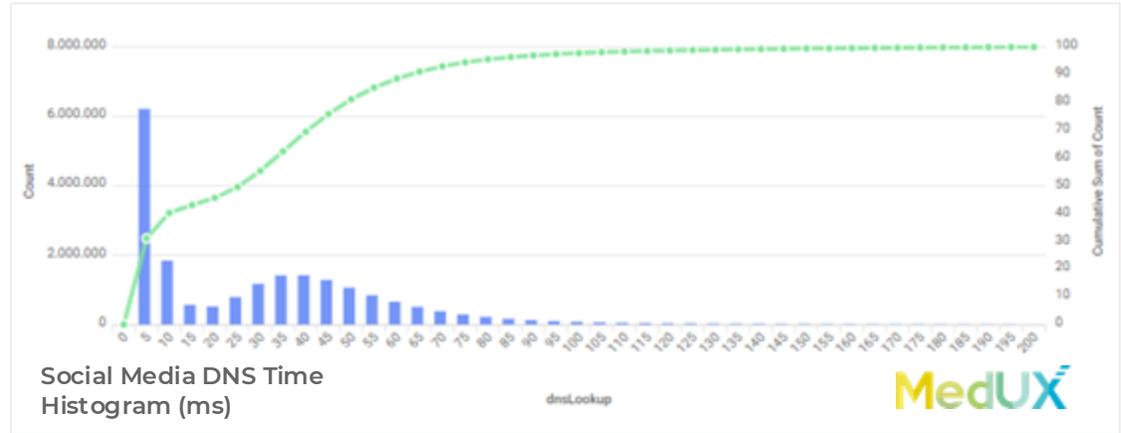
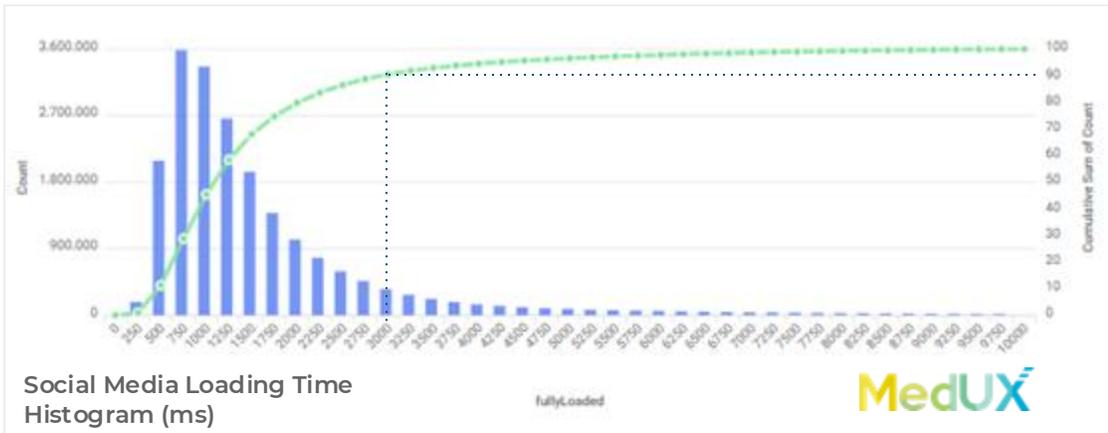
Instagram loads significantly faster than TikTok or Facebook, suggesting backend, IX/peering or CDN particularities may impact user experience.



Service Performance | Social Media KPIs

KPIs' statistical distributions and in-depth analysis across social media platforms confirm experience issues on 5G

More than 10% of social media sessions exceeded the 3-second loading threshold — highlighting persistent experience gaps even on modern networks. Instagram loads ~30 % faster than TikTok or Facebook, and has in general a better experience.



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Challenges and Opportunities in Europe

The role of 5G in Achieving Europe's Digital Decade 2030 Goals

Unlocking the Power of Connectivity for a More Innovative and Inclusive Europe



Digital Infrastructure

5G enables faster, reliable and high-quality connectivity for all urban and rural regions, reducing digital divides.



Digital Transformation

5G supports cutting-edge tech (AI, IoT) by delivering the infrastructure for real-time data processing and innovation in industries.



Digital Skills

5G accelerates access to online learning platforms and digital services, improving access to education and job opportunities



Digital Public Services

5G enhances the delivery of smart cities and governments, remote healthcare, and accessibility to public services.





Time for action

- **Insufficient progress** in reaching targets
- High quality coverage, particularly a Meaningful Connectivity, still **requiring +200 EUR bln investment**
- Variety of **types and methods for Gigabit broadband** rollout reveals differences in Quality of Experience
- **Need for specific quality metrics** beyond coverage for properly monitoring and reporting progress

Competitiveness

Economic Recovery

Prosperity

Resilience

Annexes: Detailed Benchmarking Results



The Time to Transform 5G Connectivity is NOW!

Together, we can build a High-Quality Digital World to drive Societal Progress and Digital Transformation and to ensure citizens and businesses benefit from 5G full capabilities EVERYWHERE



Go beyond coverage for a meaningful connectivity

Ambitioning **top-notch quality and service experience** as pivotal elements to transform basic connectivity into an impactful tool for long-term societal development.



Understand the devil of 5G potential is in the details

Grasping the details about **5G flavors and use cases requirements** is key. DSS deployment is still very common, lacking 3.4-3.8 GHz 5G Coverage in many regions and NR SA lagging behind.



Anticipate a potential 5G Divide among and within States

Considering **quality of experience differences** in Europe as a “wake-up call” to ensure citizens and businesses benefit from the full capabilities offered by 5G everywhere.



Catch up with world-class 5G technology leaders

Needing more ambitious National Digital Decade Strategy Roadmaps and accelerating **high-quality 5G investments** and deployment pace.



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5G QoS KPIs: European Countries

MedU Country	Average DL (Mbps)	Average UL (Mbps)	Average Ping (ms)	Average Jitter (ms)	Average PacketLoss (%)
AT	76.23	21.68	3	4	0.32
BE	83.96	19.28	22.48	9.84	3
BG	94.67	19.62	23.69	10.09	1
CH	5	2	1	9.32	5
CZ	45.87	14.74	4	20.06	0.35
DE	58.87	17.19	23.01	10.20	4
DK	1	4	21.43	5	0.39
ES	62.47	15.73	30.77	15.67	0.55
FI	99.01	18.35	24.30	8.62	0.36
FR	85.33	17.51	27.27	11.10	0.41
GB	51.24	14.43	28.27	12.91	0.66
GR	67.20	14.52	20.62	11.60	0.52
HR	86.79	18.29	27.35	10.34	0.51
HU	47.30	15.38	23.89	9.93	0.41
IE	52.83	16.07	23.15	11.28	0.84
IT	51.15	12.81	38.14	11.38	0.51
LU	3	22.13	5	20.25	2
NL	4	1	2	18.35	2
NO	2	3	22.81	1	0.66
PL	63.78	13.94	35.87	11.25	0.46
PT	83.23	16.91	20.68	9.27	0.57
RO	46.46	17.15	27.62	11.46	0.39
SE	98.57	5	32.48	8.61	0.56
SK	67.39	19.66	24.74	3	0.43

Speed is just the beginning — latency, jitter and stability define the real 5G experience.

5G performance must be measured beyond speed.

Advanced real-time experiences demand **low latency, minimal jitter, and near-zero packet loss.**

Two countries among the Europe's gold standard:

- **Switzerland** – ~104 Mbps DL, ~28 Mbps UL, best latency at ~16 ms, 9 ms jitter and approx. 0.3% loss — top-5 in four of five QoS dimensions.
- **Netherlands** – Fastest UL at 31 Mbps, plus top-tier DL at ~122 Mbps), ~18 ms latency and 8 ms jitter — ranking in the top-5 for four metrics as well.

Stability, reliability and consistency metrics determine the real 5G experience:

- Latency — Cloud gaming and industrial control need < 20 ms.
- Jitter — Variations above 5 ms may create audio/video glitches.
- Packet loss — Anything > 1% may degrade VoIP.



Service performance | Streaming KPIs

Country	Avg VideoLoadSpeed (Mbps)	Avg startTime (ms)	Most Frequent Value dominantBitrate	Avg stallingRatio (%)	4K (%)
AT	51.83	1738.65	hd2160	0.14	46.84
BE	48.17	1772.11	hd2160	0.28	42.73
BG	47.88	2077.82	hd1440	0.19	35.64
CH	52.37	1608.92	hd2160	0.22	52.47
CZ	42.15	2033.78	hd1440	0.13	29.70
DE	46.40	1859.30	hd2160	0.38	39.41
DK	63.41	1640.68	hd2160	0.13	58.82
ES	32.35	2322.89	hd1440	0.28	17.41
FI	56.89	1711.05	hd2160	0.28	46.23
FR	44.96	2085.79	hd1440	0.21	34.37
GB	39.05	1996.19	hd2160	0.50	35.23
GR	41.25	2197.71	hd1440	0.38	25.50
HR	47.61	1922.93	hd1440	0.16	39.03
HU	41.95	2021.25	hd1440	0.22	28.95
IE	37.50	2068.62	hd1440	0.33	30.46
IT	37.69	2201.32	hd1440	0.27	24.48
LU	55.09	1646.88	hd2160	0.20	50.44
NL	59.12	1577.41	hd2160	0.11	56.98
NO	62.12	1454.11	hd2160	0.14	66.13
PL	39.70	2163.18	hd1440	0.42	29.31
PT	44.42	2251.97	hd1440	0.16	31.17
RO	36.60	2146.90	hd1440	0.66	24.63
SE	54.76	1657.47	hd2160	0.15	52.45
SK	48.15	1863.61	hd2160	0.30	41.26

High bitrates alone do not guarantee a flawless viewing session — users still face long start-up delays and playback stalls.

- **hd1440 is most common, but fragile.**

Many networks reach 1440 p as the dominant bitrate, yet stability varies widely.

- **Fast pipes, slow starts.**

Several countries exceed 45 Mbps average video loading speed, yet average start-up delays remain above 2 s (e.g., BE, GR, BG).

- **Stalling ratio > 0.2 % in half of markets.**

Despite good bitrate performance, stalling ratios are significant in many markets, suggesting buffering and experience issues persist.

To unlock true 5G video quality operators must optimise the entire stream path, including core, CDN and transport — not just radio speed.



Service Performance | Gaming KPIs per Country

MedU Country	Average Ping (ms)	Average Jitter (ms)	Average Packet Loss (%)
AT	48,55	17,85	0,016
BE	47,75	23,42	0,015
BG	63,30	15,98	0,019
CH	1 32,74	17,83	0,013
CZ	4 35,72	1 13,32	2 0,008
DE	49,12	27,16	0,023
DK	5 45,27	18,97	0,017
ES	66,58	20,00	0,020
FI	54,30	19,74	5 0,011
FR	51,88	30,35	0,021
GB	53,66	33,48	0,026
GR	71,01	20,03	0,016
HR	48,65	16,90	0,015
HU	46,83	2 14,15	3 0,008
IE	46,80	23,30	0,020
IT	59,12	21,15	0,019
LU	2 33,82	25,37	1 0,008
NL	3 35,70	21,35	0,016
NO	53,31	3 14,74	0,019
PL	58,05	22,30	0,016
PT	56,85	20,24	4 0,008
RO	72,35	22,65	0,016
SE	51,94	5 15,35	0,016
SK	47,60	4 14,89	0,011

Gaming KPIs confirm that strong performance is mostly about low latency — but also jitter and packet loss play a key role in user experience

- **Low ping doesn't always equal top gaming experience.**

Some countries with reasonably good average latency (e.g. France or the United Kingdom) may still suffer from worse than average stability (high jitter) or packet loss.

- **Packet loss remains a challenge for specific users.**

Countries like the United Kingdom, Germany, France, Ireland and Spain show average values above 0.02%. However, averages often mask temporary but relevant issues that degrade real-time experience.



Service Performance | Social Media KPIs

MedU Country	Average PageLoadSpeed (Mbps)	Average TTFB (ms)	Average dnsLookup (ms)	Average fullyLoaded (ms)		
AT	5.03	445.88	3	1458.00		
BE	5.81	450.15		1483.05		
BG	5.73	474.68		1643.24		
CH	6.38	2	400.60	1426.60		
CZ	2	8.85	5	1986.21		
DE	6.42	450.28		1607.45		
DK	4	7.68		3	1334.70	
ES	3.94	484.06		1733.21		
FI	3	8.58	4	2	1404.51	
FR	5.12	458.66		1585.54		
GB	5.50	482.45		1700.85		
GR	5.98	525.25		1787.49		
HR	5.60	478.06		1557.05		
HU	1	8.87	4	2014.05		
IE	5.14	469.14		1729.11		
IT	4.43	548.15		2445.04		
LU	5.24	3	430.54	5	1400.77	
NL	6.88	1	395.43	1	2	1315.13
NO	6.30	439.53		1	1311.74	
PL	4.92	519.14		1740.04		
PT	4.78	454.61		1652.61		
RO	5.48	493.48		1738.01		
SE	5	6.96	5	4	1400.72	
SK	4.78	435.00		1403.47		

5G isn't a cure-all for social media experience. Significant gaps in loading speed, responsiveness, and time-to-content observed

- **Loading times are best in Western Europe.**

Countries like Norway, the Netherlands and Denmark achieve average loading time well below 1500 ms, while some regions exceed the 2500 ms (+66%) especially in Eastern and Southeastern Europe or some rural and remote areas in general.

- **Backend responsiveness (TTFB) is a key bottleneck**

Slow response from platforms is a major cause of delays — even when the connection is fast, users in countries like Italy still wait longer for content to appear.

Operators and platforms must coordinate on topics, such as CDN placement, edge caching, IX/peering among other to enable a better social media experience.



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3G

4G

5G



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5G

Benchmarking

Wholesale control

2



Regulatory compliance

Anomaly Detection

3



Grand scale QoE monitoring

Massive field-data monitoring

4



In-Home performance

CPE performance





Our clients



Communication service Providers

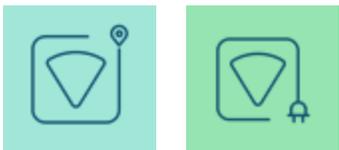


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Agent App

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Advanced Analytics

Offers Agile tools for monitoring network services and discovering insights in real time.





QoE Revolution.

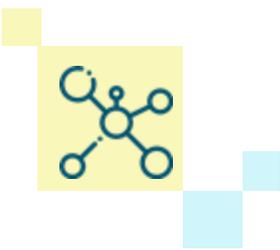
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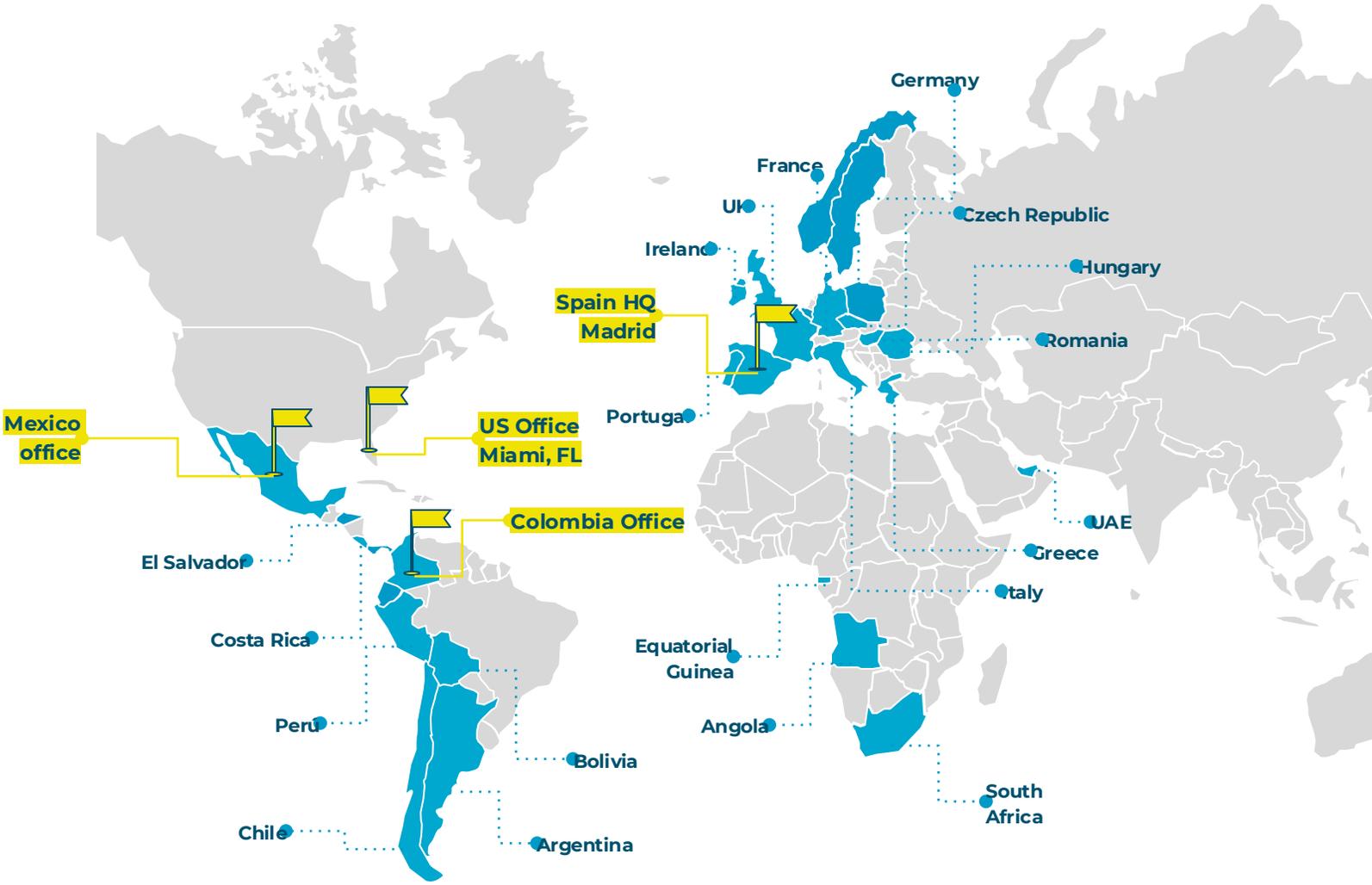
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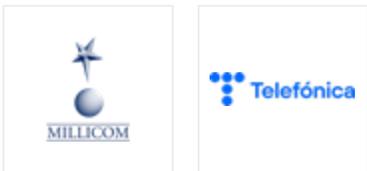
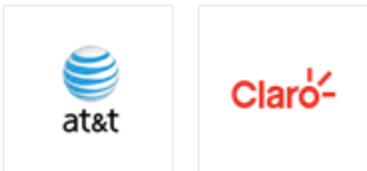
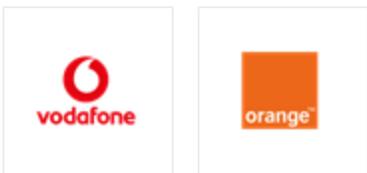
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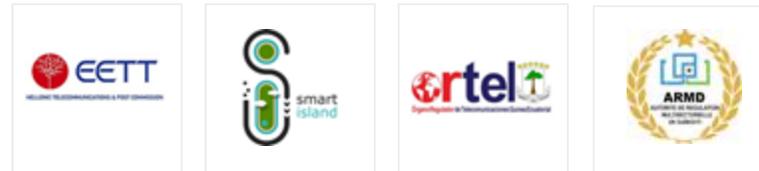
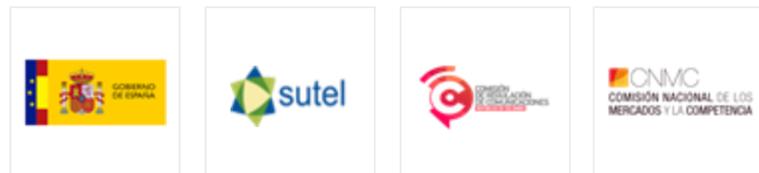


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