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Ericsson Mobility Report

June 2025

Letter from the publisher

Ecosystem collaboration drives innovation

We are at an inflection point, where 5G and the ecosystem are set to unleash a wave of innovation.

In this Ericsson Mobility Report, we explore how an ecosystem partner is leveraging 5G, network slicing and dynamic Quality of Service (QoS) that will take live broadcasting to a new level, by ensuring seamless, high-quality video streaming – even in crowded environments. The recent advancements in 5G standalone (SA) networks, coupled with the progress in 5G-enabled devices, have led to an ecosystem poised to unlock transformative opportunities for connected creativity.

Service providers have recognized this potential of 5G and are beginning to monetize it through innovative service offerings that extend beyond merely selling data plans. To fully realize the potential of 5G, it is essential to continue deploying 5G SA and to further build out mid-band sites. 5G SA capabilities serve as a catalyst for driving new business growth opportunities.

An increasing number of service providers are now leveraging the new capabilities that SA brings by offering differentiated connectivity services to consumers, enterprises and society. In this edition, a leading service provider demonstrates how it launched 5G SA, alongside carrier aggregation to enhance user experience and change its go-to-market strategy.

On the forecast side, we see continued mobile network traffic growth with a 20 percent increase year-on-year, meaning it's expected to more than double in five years. Fixed Wireless Access is experiencing robust growth and is projected to make up over 35 percent of all new fixed broadband connections by 2030, as service providers capitalize on its flexible and rapid deployment capabilities, offering extensive coverage and an exceptional user experience, compared to other technologies.

Finally, we explore the impact of increased usage of GenAI on the consumer side, as it moves from text to voice, video and multimodal. We analyze how GenAI could impact mobile data traffic volumes and characteristics going forward. Differentiated connectivity will be key in enabling a high-quality user experience for these and other conversational applications. There will be no personal AI without mobile.

I trust that you will find this report engaging, and that it offers valuable insights as we enter the next wave of mobile.

Erik Ekudden
Senior Vice President and
Chief Technology Officer

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Articles

Executive Editor: Peter Jonsson
Project Sponsor: Patrik Cerwall
Project Manager: Anette Lundvall
Forecasts: David von Koch
Writer Editor: Steven Davis

Co-writers:
Reza Rahnama (BT Group)
Takayoshi Hirasawa (Sony)
Daisuke Yamada (Sony)

Contributors:
Jari Arkko, Mats Arvedson, Michael Axelsson, Jan Backman, Greger Blennerud, Mats Blomgren, Mischa Dohler, Lisa Englund, Nikit Gangwani, Elmar Hajizada, Raquel Herranz, Josip Jelić, Doroteja Kobescak, Aziz Koleilat, Ivan Komljenović, Per Lindberg, Reiner Ludwig, Marcelo Malizia, Frank Muller, Carin Omurcali, Christoper Price, John Yazlle

Forecasts

5G subscriptions are growing apace, accounting for over one-quarter of total mobile subscriptions at the end of 2024. 5G mid-band population coverage continues to grow, though it varies between global regions, only recently passing 50 percent coverage in Europe. 5G mid-band is ideal for providing both capacity and coverage, and therefore enhancing user experience. Mobile network data traffic continues to grow, but with a declining year-on-year growth rate, resulting in a forecast CAGR of 17 percent through 2030. As 5G evolves, service providers are increasingly exploring innovative use cases and new monetization opportunities by offering differentiated connectivity services.

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At the end of 2025, 5G is set to account for one-third of global mobile subscriptions.

50%

5G mid-band coverage in Europe reached 50 percent at the end of 2024.

>35%

FWA is projected to account for over 35 percent of new fixed broadband connections through 2030.

6.3 bn

5G subscriptions are forecast to reach 6.3 billion by the end of 2030.

5G to account for one-third of mobile subscriptions in 2025

During the first quarter of 2025, 145 million 5G subscriptions were added, bringing the total to just above 2.4 billion.

5G subscription uptake continues apace and is expected to reach close to 2.9 billion at the end of 2025, accounting for one-third of all mobile subscriptions at that time. The number of 4G subscriptions continues to decline as subscribers migrate to 5G. 4G declined by 55 million during the first quarter of 2025, bringing the total to just below 4.9 billion. 3G subscriptions declined by 19 million during the quarter, while 2G subscriptions dropped by 30 million.

2G and 3G network sunsetting continues around the world. The phasing out of 3G networks is anticipated to happen more quickly than that of 2G in the coming years, but the timeline for this transition varies based on country and service provider.

At the end of 2024, the number of 5G subscriptions reached 2.3 billion globally, equaling a penetration of around 27 percent. The highest 5G subscriptions penetration was in North America at 71 percent, followed by North East Asia at 52 percent, the Gulf Cooperation Council (GCC) countries at 45 percent and Western Europe at 41 percent. 5G is anticipated to overtake 4G as the dominant mobile access technology by subscription in 2027, nine years after launch.

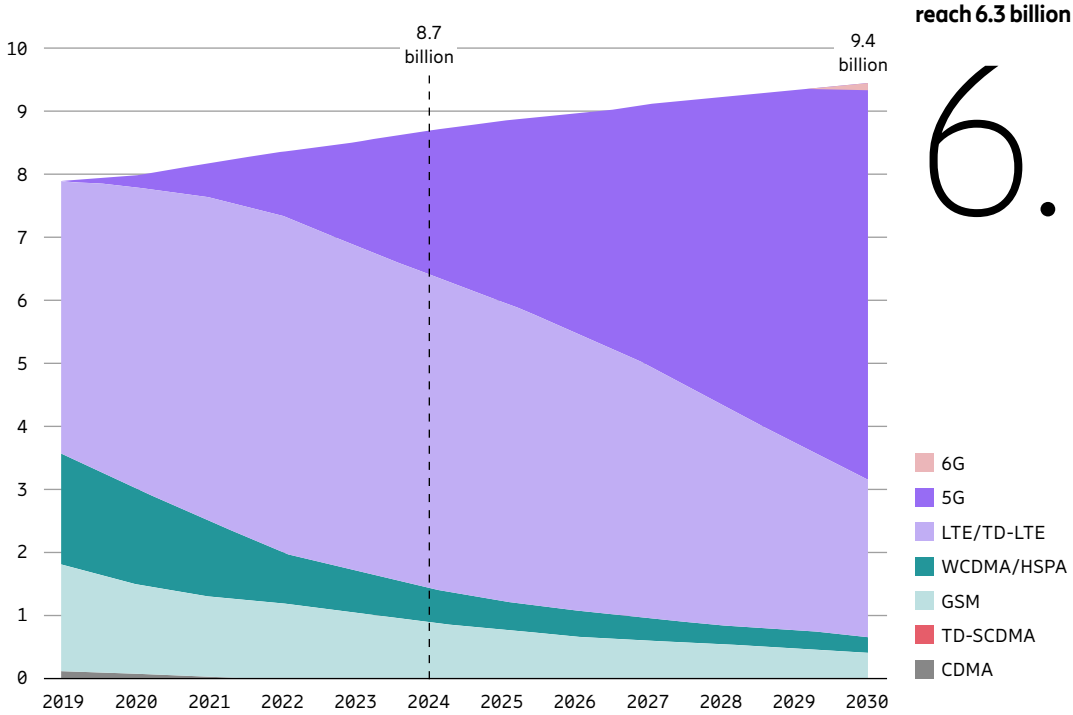
More than 340 service providers have now launched commercial 5G services, and around 70 have deployed or launched 5G standalone (SA).[1]

Two-thirds of all mobile subscriptions expected to be 5G at the end of 2030

Global 5G subscriptions are forecast to reach 6.3 billion in 2030, and will make up two-thirds of all mobile subscriptions. Leading service providers continue to deploy SA networks, and 5G SA subscriptions are projected to account for close to 3.7 billion in 2030.

It is projected that Western Europe will have the highest 5G subscription penetration in 2030 at 93 percent, followed closely by North America at 91 percent and the GCC at 90 percent.

Figure 1: Mobile subscriptions by technology (billion)



5G subscriptions are forecast to reach 6.3 billion by the end of 2030.

6.3bn

[1] GSA and Ericsson (May 2025).

GenAI devices drive development despite market difficulties

As generative AI (GenAI) devices proliferate and AI apps become increasingly complex, both application service providers and communication service providers will need to focus more on uplink capabilities and latency.

2025 began with positive traction in the market, with 1.5 percent quarterly growth in smartphone shipments.[1] However, recent tariff volatility has created market concern. Smartphone growth is now predicted to be flat, or even negative, for the year. The renewal cycle is expected to increase in length, despite hopes for the AI super-renewal cycle.

A long-anticipated new chipset

After six years of development, a new in-house smartphone chipset has emerged. The chipset power balance is up for a reset where the four major suppliers battle for market share. In China, the incumbent chipset suppliers are increasing their market share domestically and aspire to expand internationally.

GenAI in smartphones, year two

GenAI continues to be a significant selling point for smartphones. Efforts are being made to expand AI beyond the high-end segment to enable the services for a broader market. With the growth of AI applications and model complexity, tasks will be computed both on the device and in the network. This will put uplink capabilities and latency more into the focus of both application service providers and communication service providers. The final success of AI will be determined by its perceived value by users.

In addition to GenAI, there is also the potential that a device can make better use of network resources and vice versa. This area is being explored by the 3GPP Release 19 study item for AI/machine learning mobility.

AI and smart glasses

AI is also being integrated into extended reality (XR) and augmented reality (AR) glasses. Lightweight AR glasses with AI support must resemble regular glasses, judging by the top-selling AR glasses in the market.

The usefulness of AR glasses in wide area networks powered by AI is increasing, using audio interaction with the user. The next step is adding simpler screens to the glasses, used for everyday applications like text messaging or navigation. The use of a companion device, such as a smartphone, connectivity puck or dongle, is expected to continue. 5G standalone (SA) – or even reduced capability (RedCap) – will allow for versatile slices for different consumer needs.

Commercial traction for RedCap

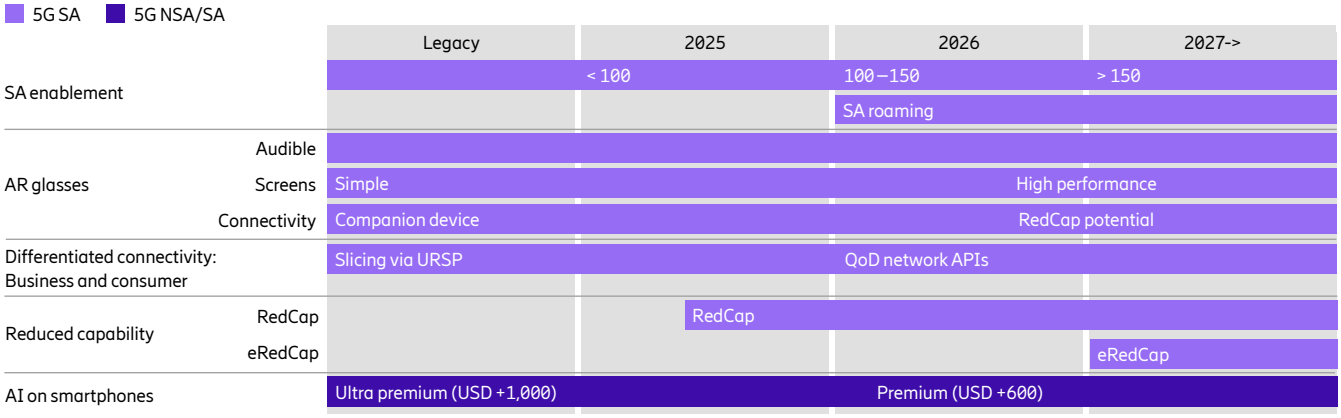
RedCap device availability is increasing, with dongle and pocket router form factors currently dominating. Multiple suppliers have announced launches of RedCap-powered cameras and wearables later in 2025. Competition between chipset vendors is driving substantial device cost reductions.

In the future, enhanced RedCap (eRedCap), a 5G IoT offering, will enable use cases that today rely on LTE Cat-1 technologies or even LTE Cat-M. This technology is expected to reach a price point under USD 10 and become available from 2027, becoming an important stepping stone to move subscribers from 4G to 5G networks before 6G begins taking off.

Vendors preparing for differentiated connectivity

Progress on differentiated connectivity using User equipment Route Selection Policy (URSP) is notable. Major smartphone vendors have advanced their network slicing capabilities to take advantage of slices offered by service providers. 5G SA growth will provide an even larger foundation for adoption and additional use cases for both enterprises and consumers.

Figure 2: 5G SA technology area readiness on device



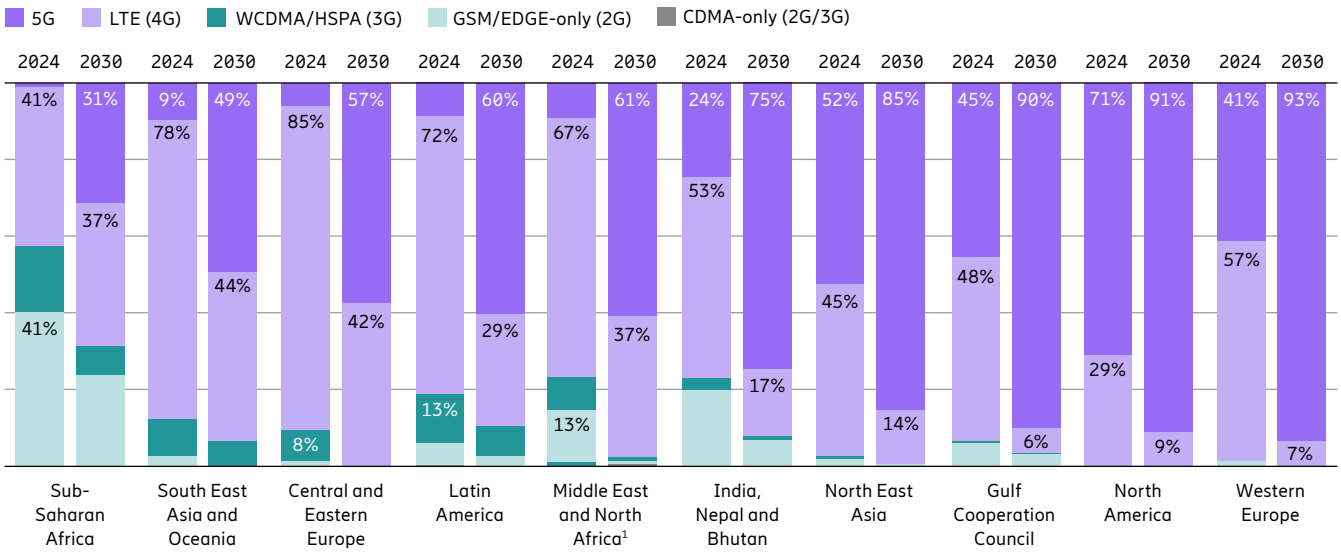
Note: This is not Ericsson's roadmap. Readiness means more than one infrastructure and device vendor is ready. This can include competitors to Ericsson and devices.

[1] IDC (April 2025).

Growth in 5G subscriptions seen globally

In both North America and North East Asia, the 5G subscription penetration rate has exceeded 50 percent.

Figure 3: Mobile subscriptions by region and technology (percent)



Sub-Saharan Africa

The economy in Sub-Saharan Africa is forecast to expand by 3 to 5 percent annually over the next 5 years,[2] even as it continues to navigate macroeconomic challenges. The telecoms sector continues to drive growth, fueled by a young population, wider access to affordable smartphones, and a rising demand for mobile data and digital services.

The ongoing rollout of 4G and the early stages of 5G deployment are expected to gradually phase out legacy technologies. 2G and 3G subscriptions are anticipated to decline annually by 5 and 10 percent respectively over the forecast period. In 2030, 4G is set to account for 37 percent of all mobile subscriptions, while 5G is expected to grow significantly to around 400 million subscriptions.

Smartphone adoption continues to accelerate, with subscriptions projected to rise to 890 million in 2030. Notably, around 40 percent of these are expected to be 5G subscriptions, reflecting the growing consumer demand and the evolving mobile ecosystem.

Service providers are increasingly diversifying their offerings, with a strong focus on fintech — mobile money services in particular — and Fixed Wireless Access (FWA), aimed at boosting connectivity for both households and businesses. The sector's resilience and long-term momentum will hinge on ongoing infrastructure developments and supportive regulatory environments.

South East Asia and Oceania

5G subscriptions in the region are forecast to reach around 630 million in 2030. This has been adjusted from the figure reported six months ago to account for delayed 5G spectrum in Indonesia, which accounts for the biggest mobile subscriber base regionally.

Singapore and Australia continue to stand out as advanced 5G markets. In Singapore, differentiated connectivity is moving from proof-of-concept to commercial consumer offerings — positioning Singapore as a leading market for monetizing 5G experiences. In Australia, FWA on 5G standalone (SA) is now available across all major service providers, but other consumer applications are still emerging.

In Thailand, 5G has become a significant driver of data consumption and increased ARPU. Vietnam is steadily advancing, having launched services in October 2024, with three service providers now providing 5G. Subscription growth in Malaysia has been aided by 5G network expansion to rural areas, increasing availability of 5G devices, and growing consumer demand for faster and more reliable mobile connectivity.

[1] All Middle East and North Africa figures include GCC countries.
[2] IMF, "World Economic Outlook" (April 2025).

Central and Eastern Europe
Technology adoption and subscription uptake has historically been slower here than in Western Europe. 5G deployment varies by country, partly due to slower spectrum allocation processes. However, the region has seen several accelerated 5G deployments, driven by growing demand. For example, Croatia leverages 5G for tourism and smart cities, while 5G in Hungary is going beyond the smartphone to the automotive sector and other use cases. 5G subscriptions grew by 70 percent to reach 31 million during 2024.

4G is currently the dominant technology and accounted for 85 percent of all subscriptions at the end of 2024. It is estimated this share will decline after a peak in 2025 as subscribers migrate to 5G.

Latin America
4G is still the dominant technology, although it has started to decline as subscribers migrate to 5G. At the end of 2024, 4G accounted for 72 percent of all subscriptions.

5G spectrum auctions continue across Latin America. In January 2025, Costa Rica concluded its 5G tender, with seven service providers participating. Countries such as El Salvador and Paraguay are expected to launch their bidding process in the third quarter of 2025, with Mexico postponing until the end of 2025. Peru also expects to conclude its 5G auction in 2025.

During 2024, the number of 5G subscriptions almost doubled, reaching around 63 million at the end of the year. By the end of 2030, the number of 5G subscriptions is expected to reach 480 million and account for 60 percent of all mobile subscriptions.

Middle East and North Africa
The telecom sector across the region continues to show resilience in the face of ongoing global economic uncertainty and geopolitical complexities. Regional efforts to diversify economies and drive digital transformation are helping to stabilize the sector and sustain investment momentum. Mobile subscriptions are projected to grow at an annual rate of 2 percent up to 2030, reaching a total of 820 million. Notably, 5G subscriptions are forecast to rise with a CAGR of around 40 percent over the period, signaling a major shift in how users engage with digital services — from mobile financial tools to telehealth platforms and e-learning ecosystems.

In 2030, 4G is anticipated to make up 37 percent of mobile connections, while 5G is set to dominate with 61 percent of the total connections. 5G FWA is also gaining traction as a key enabler of next-generation connectivity, complementing traditional broadband offerings. Service providers are continuously working to enhance network capacity while minimizing energy consumption and their carbon footprint — where modernization is key to meeting business goals and reducing energy costs for net zero ambitions.

India, Nepal and Bhutan
5G adoption in India is growing rapidly. This growth is fueled by growing demand for data, 5G population coverage of over 90 percent, and large 5G FWA deployments. Strong need for accessible broadband in rural and semi-urban areas is driving Indian service providers to expand their 5G FWA footprints. Availability of affordable 5G FWA customer premises equipment (CPE) is also driving growth of 5G FWA, which will help bridge the digital divide. Regionally, 5G subscriptions reached 290 million at the end of 2024, accounting for 24 percent of total mobile subscriptions. 5G subscriptions are expected to reach around 980 million by the end of 2030, accounting for 75 percent of mobile subscriptions. 4G is currently the dominant subscription type, accounting for around 53 percent of total mobile subscriptions. 4G subscriptions are forecast to decline from 620 million in 2024 to 230 million in 2030, as subscribers migrate to 5G.

North East Asia
Globally, the region had the second-highest 5G subscription penetration at 52 percent at the end of 2024. In mainland China, the number of 5G subscriptions now exceeds 1 billion. 5G Advanced is becoming more widely available, including functionalities such as reduced capability (RedCap) and high-order carrier aggregation. In Japan, service providers are expanding investments in areas such as AI to drive future monetization. In South Korea, even with very high average 5G throughput already, there are ongoing efforts by service providers to improve user satisfaction by addressing regional speed disparities and enhancing quality in crowded areas. In Hong Kong, the implementation of FWA has had a positive impact on service providers' financial performances. In Taiwan, service providers have begun testing differentiated connectivity offerings in specific segments (such as live entertainment), with commercial 5G SA services expected to launch within the next 1–2 years.

Gulf Cooperation Council (GCC)
The region, while small in terms of subscribers, is notable for its high penetration, high levels of urbanization and robust consumer spending power. Service providers are transitioning from traditional telcos to digital service providers. This is enabled by extensive 5G deployment and the adoption of technologies such as AI, cloud computing and edge solutions. Network slicing, supported by programmable networks and open APIs, is expected to be a cornerstone in delivering customized and performance-sensitive services.

From 2024 to 2030, mobile subscriptions in GCC countries are expected to grow at an annual rate of 3 percent, reaching 95 million. Subscriptions for legacy network generations will decline sharply as users migrate to next-generation connectivity. By the end of the decade, 5G subscriptions are expected to comprise 90 percent of all mobile subscriptions, totaling 86 million.

FWA adoption is driven by demand for high-speed alternatives to fixed broadband and national initiatives aimed at reaching underserved areas and supporting smart city ambitions.

North America
During 2025, 5G adoption is expected to continue to grow robustly, with an anticipated additional 42 million subscriptions during the year leading to a total of 358 million. In 2030, 5G subscriptions are expected to reach 440 million, accounting for 91 percent of all mobile subscriptions at that time. Leading service providers in the US anticipate continued growth for FWA and are introducing new capabilities with network slicing and 5G Advanced. Mid-band 5G network coverage has now reached a point at which consumers, enterprises, and government innovations across the broader tech ecosystem can accelerate. The innovations are created at the intersection of mobile, cloud and AI.

Western Europe
5G subscription growth is strong, rising from 142 million in 2023 to 227 million at the end of 2024, equaling a penetration of 41 percent, but this varies between countries. Markets such as the UK and Finland, which launched 5G early, have already achieved high penetration relative to other markets. 4G is expected to decline in favor of 5G going forward. 5G subscriptions are anticipated to reach around 530 million at the end of 2030, representing 93 percent penetration at that time, in line with other leading 5G markets. 5G mid-band and SA are gaining traction in the region, with leading service providers exploring new offerings based on differentiated connectivity in areas such as payment terminals, live broadcasting and photojournalism.

Quarterly mobile network data traffic update

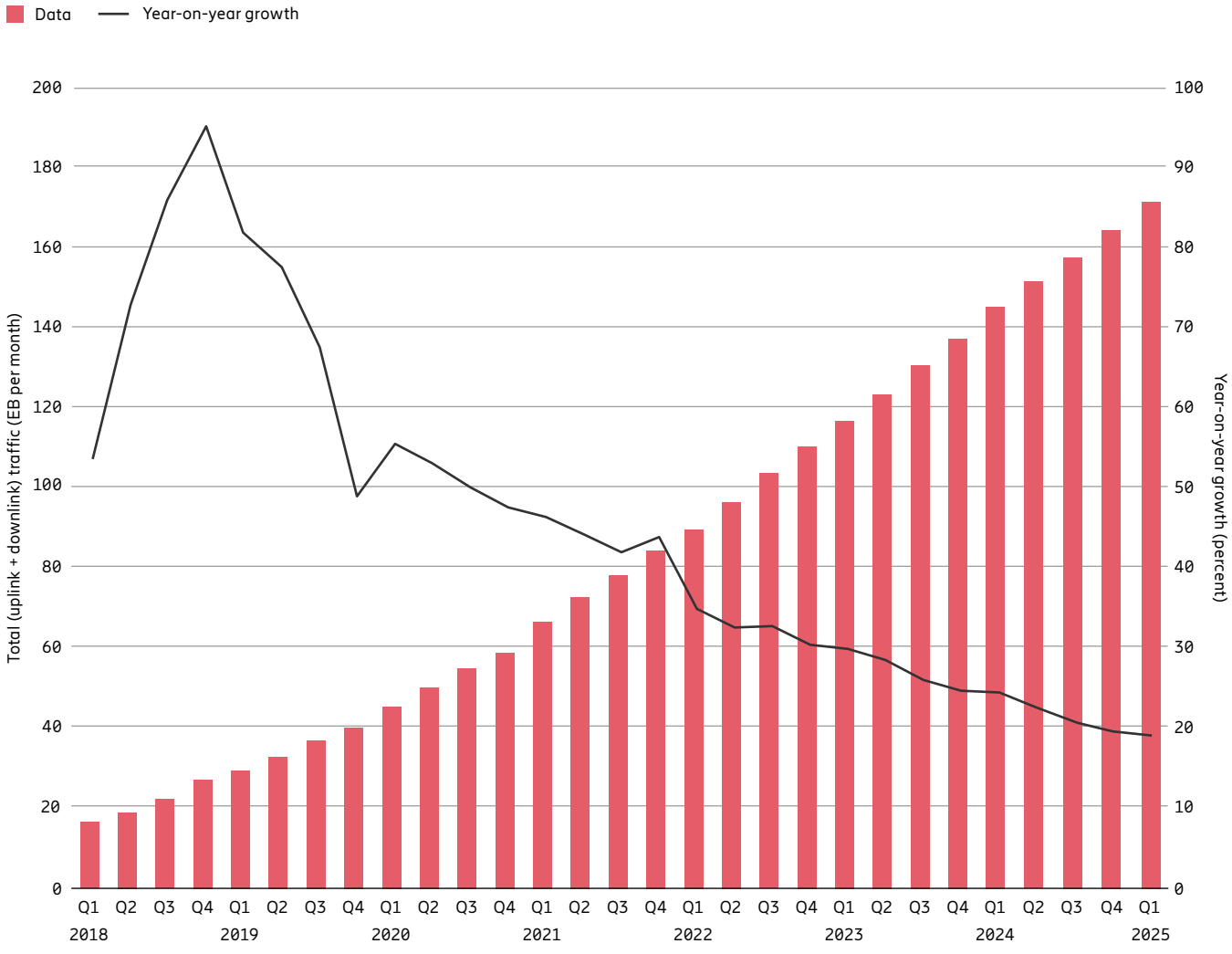
Mobile network data traffic grew 19 percent between Q1 2024 and Q1 2025.

The quarter-on-quarter mobile network data traffic growth between Q4 2024 and Q1 2025 was around 5 percent. Total monthly global mobile network data traffic reached 172 EB.

Mobile data traffic growth is being driven by both rising smartphone subscriptions and increasing average data volume per subscription, fueled primarily by increased viewing of video content. At the end of 2024, video traffic accounted for 74 percent of all mobile data traffic.

Figure 4 shows the total global monthly network data traffic from Q1 2018 to Q1 2025, along with year-on-year percentage growth for mobile network data traffic.

Figure 4: Global mobile network data traffic and year-on-year growth



Note: Mobile network data traffic also includes traffic generated by Fixed Wireless Access services.

Growth of mobile network data traffic persists

Mobile network data traffic continues to grow, but with a declining year-on-year growth rate to 15 percent in 2030. This results in a CAGR of 17 percent over the full forecast period.

Total global mobile data traffic – excluding traffic generated by Fixed Wireless Access (FWA) – is expected to grow by a factor of around 2.3 to reach 280 EB per month in 2030. When FWA is included, total mobile network data traffic is anticipated to grow by a factor of around 2.6, rising to 430 EB per month by the end of the forecast period. This is a slight reduction to our network traffic volume forecast up to 2030, compared to our estimate 6 months ago, based on new incoming data points from major markets.

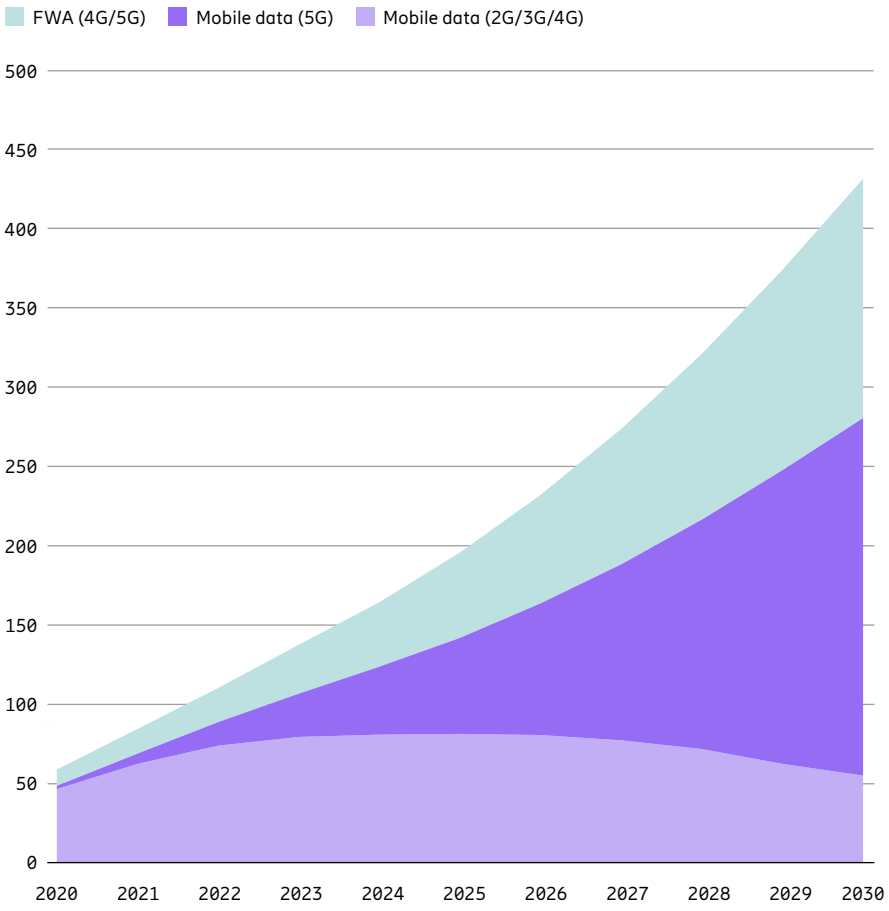
5G's share of mobile data traffic reached 35 percent at the end of 2024, increased from 26 percent at the end of 2023. This share is forecast to grow to 80 percent in 2030.

Factors that can impact the traffic

Mobile data traffic growth can be highly volatile and vary significantly between years, regions, markets and service providers, depending on local market dynamics. Factors that could impact traffic growth include:

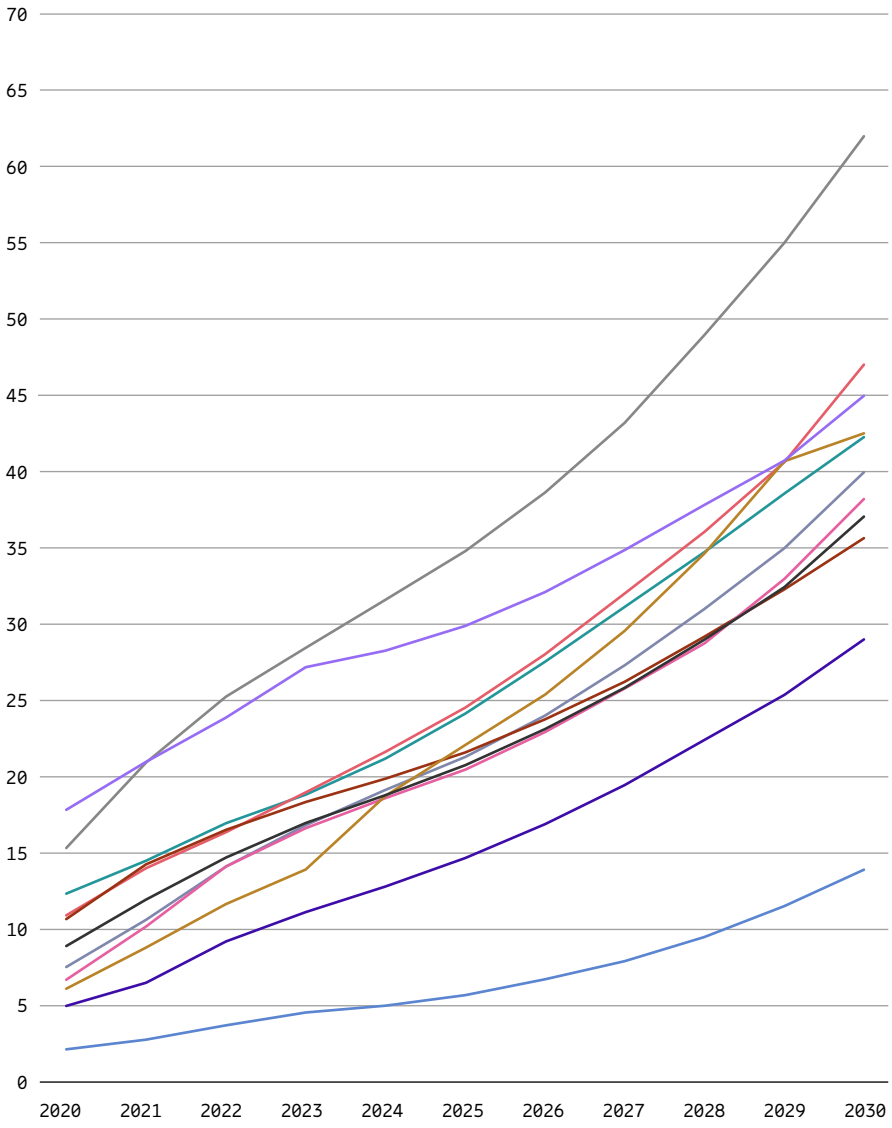
- The pace of subscriber migration to later generations in populous markets like India, Latin America, South East Asia and Africa.
- The uptake rate of new devices, such as those built for augmented reality (AR), and scalable, multimodal generative AI (GenAI) applications.[1] The current predicted traffic growth up to 2030 includes an assumption that an initial uptake of extended reality (XR) services, including AR, VR and mixed reality (MR), will happen in the latter part of the forecast period. However, if adoption is accelerated, data traffic could significantly surpass our current traffic outlook at the end of the forecast period.
- Changes to the split between FWA and mobile data traffic when FWA connections grow. With continued strong FWA uptake in parts of the world where fixed broadband connections have been limited, it is likely that household-based traffic will move from smartphones to FWA – especially for streaming services.
- Tariff plans and available services.
- Continued improvements in the performance of deployed networks.
- Smartphone shipment development.
- Global macroeconomic changes such as inflation and interest rates, causing a significant impact on consumer willingness to pay for mobile services and affecting mobile data usage.

Figure 5: Global mobile network data traffic (EB per month)



[1] Quantifying the future impact of GenAI, page 17.

Figure 6: Mobile data traffic per active smartphone[2] (GB per month)



Regions	2024	2030	CAGR 2024–2030
India, Nepal and Bhutan	32	62	11%
Western Europe	22	47	13%
Gulf Cooperation Council	29	45	8%
Middle East and North Africa[3]	19	43	15%
North America	22	43	12%
Central and Eastern Europe	20	40	13%
South East Asia and Oceania	19	38	12%
Global average	19	37	11%
North East Asia	20	36	10%
Latin America	13	29	14%
Sub-Saharan Africa	5	14	19%

The growth in mobile data traffic per smartphone can be attributed to several drivers: improved device capabilities, affordable service plans, increased time spent consuming services, an increase in data-intensive content and growth in data consumption due to continued improvements in deployed network performance.

There are significant variations in monthly data consumption within all regions, with some individual countries and service providers having considerably higher or lower consumption than the regional averages.

As traffic demand varies across regions and over time, it is important to keep in mind that average monthly data traffic growth in a region cannot be used to estimate daily peak traffic growth in a local area, or to support network evolution strategies there.

Traffic patterns differ by location

Insights from an analysis of data traffic growth and patterns across different location types in some North American and European networks can be found in the previously published article, "Exploring how traffic patterns drive network evolution".[4] The key findings include:

- Traffic growth is not universal across locations within a service provider's network. For example, in a dense urban location traffic demands can be up to 1,000 times larger relative to rural areas.
- More services now require uplink performance to be considered, which typically makes up a larger portion of the traffic in dense urban locations. This will become even more critical for new uplink-demanding services like AI and XR.

5G accounted for 35 percent of mobile data traffic at the end of 2024.

35%

[2] Traffic per active smartphone refers to all traffic generated by that device, regardless of number of subscriptions attached.
[3] All Middle East and North Africa figures include the Gulf Cooperation Council countries.
[4] Ericsson Mobility Report, "Exploring how traffic patterns drive network evolution" (June 2023).

Europe makes progress in 5G mid-band coverage

Further deployments are needed in Europe to achieve coverage levels comparable to those of North America and India.

There are currently 835 4G networks deployed worldwide, with 346 upgraded to LTE-Advanced and 160 Gigabit enabled.[1] 4G population coverage outside of mainland China reached 90 percent globally at the end of 2024 and is projected to reach over 95 percent in 2030.

The build-out of 5G continues, with more than 340 networks launched worldwide. Global 5G population coverage reached 55 percent at the end of 2024. Outside mainland China, it is projected to increase from 45 percent in 2024 to about 85 percent in 2030.

5G mid-band, with either time division duplex (TDD) or frequency division duplex (FDD) modes of operation, combines high capacity with good coverage. This makes it an ideal choice for delivering the full 5G experience. Combined with a low-band FDD 5G carrier, it can provide full coverage and mobility.

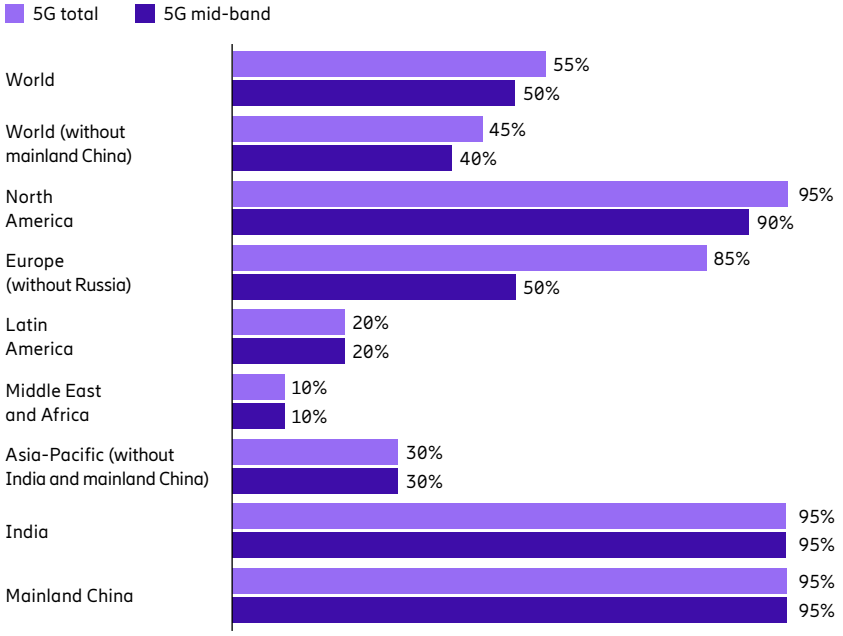
Large regional variations in 5G coverage

By the end of 2024, 5G mid-band population coverage outside of mainland China reached 40 percent, but coverage varies between regions. The Middle East and Africa, as well as Latin America, are the two regions with the lowest total and mid-band coverage, having reached around 10 and 20 percent coverage respectively at the end of 2024. The Asia-Pacific region, outside of China and India, reached 30 percent total and mid-band coverage at the end of 2024. Europe reached 85 percent total 5G population coverage at the end of 2024. Although Europe is now in line with the global average of 50 percent in 5G mid-band coverage, further deployments are needed to achieve coverage levels comparable to those in North America and India.

India has made large-scale mid-band deployments and reached around 95 percent population coverage in 2024. Meanwhile, North American service providers have deployed 5G across low-, mid- and high-band frequencies, and total coverage is now at 95 percent, with mid-band coverage at 90 percent.

Despite coverage advancements, globally only around 30 percent of sites outside of mainland China have been upgraded to 5G mid-band.

Figure 7: World population and mid-band coverage split by region (end of 2024)

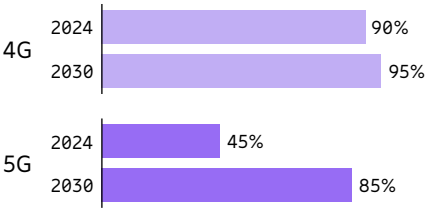


Note: The figures in these graphs are rounded and refer to the coverage of each technology.
The ability to utilize the technology is subject to factors such as access to devices and subscriptions.

Globally, 5G population coverage outside of mainland China is set to reach around 85 percent at the end of 2030.

85%

Figure 8: World population coverage outside mainland China, by technology



[1] Ericsson and GSA (May 2025).

Majority offer speed-based FWA

The proportion of Fixed Wireless Access (FWA) service providers offering speed-based tariff plans has increased to 51 percent, up from 40 percent a year ago, thereby expanding monetization opportunities.

FWA is continuing to grow solidly in terms of the:

- **Adoption:** proportion of service providers offering it over 5G
- **Monetization:** share of service providers with speed-based tariff plans
- **Scale:** number of connections and the traffic volume per connection

Continued global FWA momentum

An updated Ericsson study[1] of retail tariff plans offered by mobile service providers reveals that 80 percent have an FWA offering. There are 141 service providers offering FWA services over 5G, representing 57 percent of all FWA service providers.

Figure 9: Global FWA service provider adoption 2022–2025

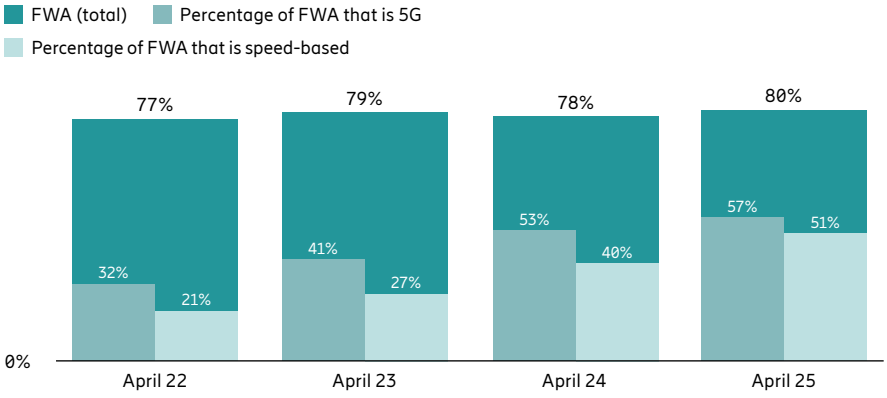
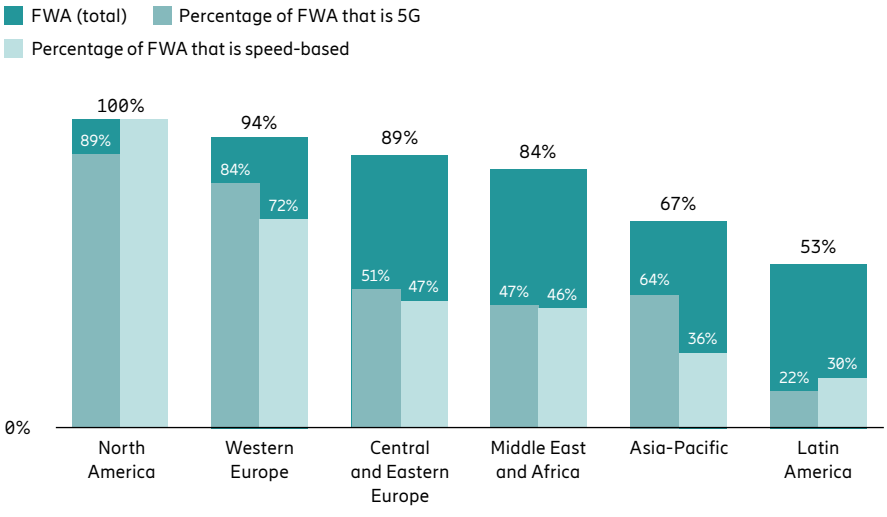


Figure 10: Regional FWA service provider adoption 2025



Majority of FWA service providers offer speed-based plans

Speed-based tariff plans are commonly offered for fixed broadband services, such as those delivered over fiber or cable. Consumers understand this type of plan well, which enables service providers to monetize FWA as a broadband alternative. Speed-based tariff plans are now offered by 51 percent of FWA service providers, up from 40 percent a year ago. This increase highlights how providers can capitalize on consumer preferences for fast and reliable services to drive growth. The remaining 49 percent offer volume-based tariff plans (buckets of GB per month).

When considering only the service providers that offer 5G FWA services, an even higher number offer speed-based tariff plans, at 70 percent compared to 51 percent.

Large regional variations

There are large regional variations in the proportion of service providers adopting FWA:

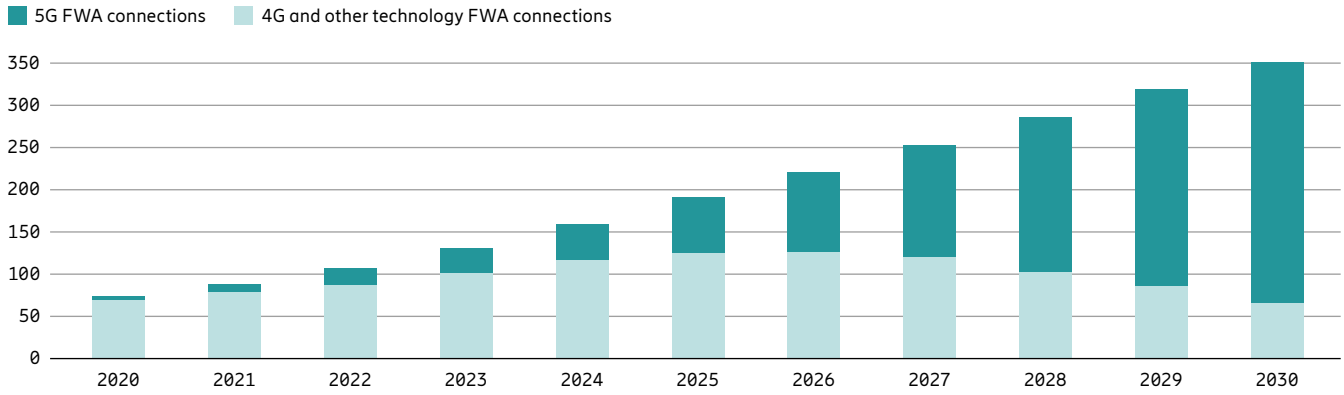
- FWA adoption is widespread globally. In 4 out of 6 regions, 84 percent or more service providers are offering FWA.
- In the past year, there has been substantial growth in speed-based offerings, driven primarily by three regions: Western Europe, Central and Eastern Europe, and the Middle East and Africa.
- Latin America and parts of South East Asia have the potential to increase the adoption of service providers that offer speed-based services and FWA over 5G.
- Currently, all service providers in the Gulf Cooperation Council region offer 5G FWA services.

Global market update[2]

- Reliance Jio reported an eightfold increase in 5G FWA connections from March 2024 to March 2025, reaching a total of 5.6 million connections, targeting 100 million connected homes in India.

[1] 310 service providers, representing around 90 percent of global mobile revenues.
[2] All FWA service provider data comes from the latest company official quarterly financial reports.

Figure 11: FWA connections (millions)



- As yet another example of utilizing 5G standalone (SA), network slicing and partitioning to drive mobile data monetization, Cosmote, Greece, has launched 5G FWA based on differentiated connectivity.
- The Q1 2025 reports from major US broadband providers – AT&T, Verizon, T-Mobile, Comcast, Charter Communications and Altice – mark the 11th consecutive quarter in which FWA has accounted for nearly all broadband net additions in the US, highlighting its growing role in the nation's connectivity landscape. During this quarter, AT&T, Verizon, and T-Mobile collectively added 913,000 new connections, bringing the total number of 5G FWA connections to 12.5 million.
- In the US, DSL replacement is accelerating due to initiatives by the new Federal Communications Commission (FCC) chairperson that facilitate the decommissioning of legacy networks, paving the way for the expansion of FWA and fiber connections.

CPE choices support a speed-based strategy

The aforementioned Ericsson study, which examines 141 global mobile service providers offering 5G FWA services, provides insights into the types of customer premises equipment (CPE) they offer. Among the 44 service providers with a best-effort offering, 91 percent only offer indoor CPE units, while 9 percent provide outdoor or flexi self-install CPE options (that can be placed indoors or outdoors). By contrast, for the 97 service providers with speed-based offerings, the percentage of indoor-only CPE drops to 59 percent, with a significantly higher portion, at 41 percent, offering outdoor or self-install options.

350 million FWA connections in 2030

Global FWA connections are expected to grow from 160 million at the end of 2024 to 350 million by the end of 2030. This would represent 18 percent of all fixed broadband connections. Of the 350 million projected connections, more than 80 percent are expected to be over 5G. 4G FWA connections are predicted to peak in 2026.

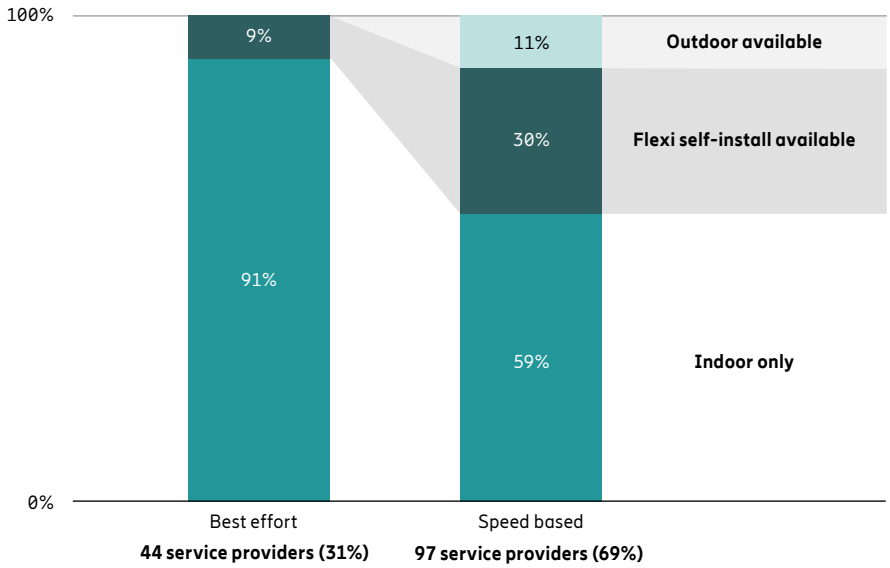
Half of global FWA connections in Asia-Pacific in 2030

Higher volumes of 5G FWA in populous, high-growth countries can drive economies of scale for the overall 5G FWA ecosystem, resulting in even more affordable CPE. Asia-Pacific's share of global FWA connections is expected to increase from 40 percent in 2024 to 51 percent in 2030.

FWA impact on global mobile network data traffic

As a result of the change in regional mix, with a higher share of FWA connections in APAC, as well as lower consumption of GB per connection, the predicted FWA traffic up to 2030 has been slightly reduced. Nevertheless, at the end of 2024, FWA data traffic represented 25 percent of global mobile data traffic and is projected to grow by a factor of close to 4 to reach around 151 EB per month by the end of 2030. This will represent 35 percent of the total mobile network data traffic.

Figure 12: 5G FWA CPE form factor by service-provider offering



Of the 350 million FWA connections projected globally by the end of 2030, 80 percent are expected to be over 5G.

80%

5G FWA and fiber to capture most growth through 2030

The global fixed broadband market is set for growth, driven by demand for high-speed internet. 5G Fixed Wireless Access (FWA) and fiber are anticipated to account for the majority of the growth.

The growth projection for global fixed broadband connections is that 1.6 billion broadband connections will increase to 2 billion by 2030, with 550 million additional new connections in fiber, FWA and satellite. Notably, more than a quarter of this increase is expected to stem from legacy modernization as consumers transition from DSL and cable to faster broadband options, resulting in a decline of approximately 150 million DSL and cable connections. The remaining three-quarters are anticipated to come from new connections, fueled by population expansion and initiatives to connect previously unconnected households. There is a projected decline for unconnected households, to roughly 550 million, which represents approximately 25 percent of global households.

FWA capturing over one-third of connections

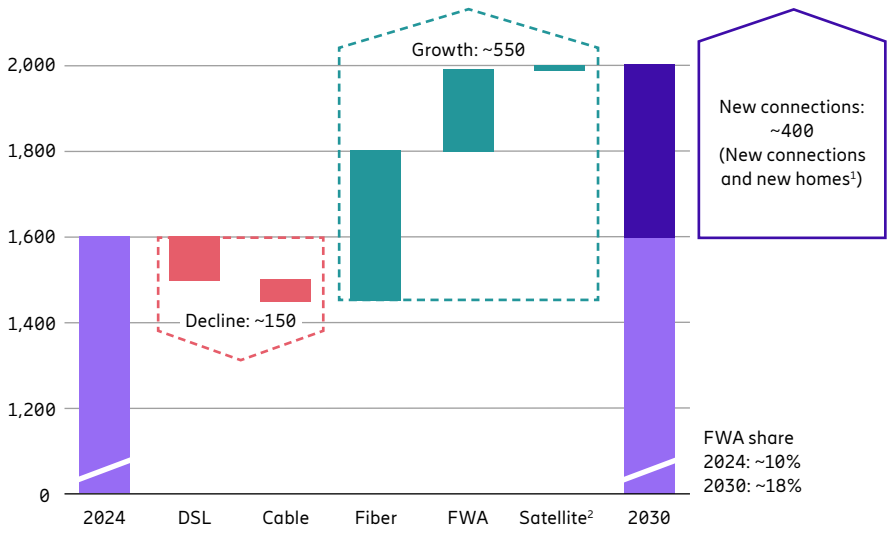
FWA is projected to account for more than 35 percent of new connections, with an expected increase to 350 million by 2030 as mentioned in the FWA forecast, representing more than double the current connections.

5G FWA plays a crucial role in expanding broadband access, especially in areas where traditional wired infrastructure may be less feasible. 5G FWA offers a rapid deployment advantage compared to other technologies by utilizing existing mobile infrastructure, which already covers 90 percent of the world's population.

Need for investments

The projected increase in global fixed broadband connections reflects ongoing technological development and investment. As we approach 2030, the mix of fiber, 5G FWA and satellite technologies will be crucial in meeting the connectivity needs of an increasingly digital world. Continued investment and innovation, along with technology-agnostic support from governments and regulators, is essential for ensuring that global infrastructure can support this anticipated demand, while fostering economic growth, closing the digital divide, and improving quality of life. The growth potential extends beyond these numbers, encompassing additional secondary homes and small-to-medium-sized businesses, underscoring the continuous demand for fast and reliable broadband connectivity. By 2030, there will still be opportunities for modernization and to connect the remaining unconnected.

Figure 13: Global fixed broadband connections (millions) by technology, 2024–2030



FWA is projected to account for over 35 percent of the new fixed broadband connections through 2030.

35%

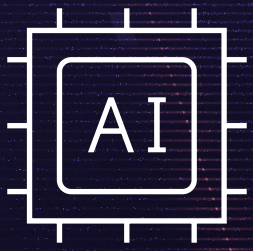
[1] New homes driven by population growth. Unconnected decline to 550 million in the period. Source: Ericsson analysis.
[2] ABI research.

Articles

5G has the power to provide enhanced experiences for both consumers and enterprises. Our articles explore: a customer-centric 5G standalone rollout with BT Group; the power of network APIs for live media production over 5G with Sony; the current and future impact of generative AI (GenAI) applications on network traffic; smartphone video conferencing user experience; trends around service packaging and differentiated connectivity; and the shifting mobile traffic trends as subscriber clusters change their behaviors.

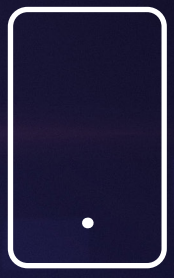
BT Group chose a customer-centric 5G standalone rollout strategy, ensuring customers around the UK immediately felt the difference in their 5G experiences.

With Sony, we explore how 5G and network APIs are enhancing service experiences, using differentiated connectivity to enable live media production over mobile networks.

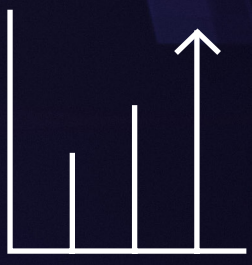


The emergence of GenAI is one factor that will affect network traffic in the coming years, and understanding its impact will be key for future network planning.

We explore the different ways that service providers can move beyond best effort and offer differentiated connectivity services to both enterprise and consumer segments.



Video conferencing on smartphones requires stable connections, especially in the uplink, in order to provide great user experiences.



Subscriber clusters are changing their behavior as they embrace new applications and services, driving tangible changes in mobile traffic trends.

GenAI's impact on network data traffic today

In a mature market dominated by high-end smartphones, generative AI (GenAI) traffic was found to be relatively small, but with 26 percent of it attributed to uplink traffic.

The global mobile AI app market is growing robustly, with 115 million app downloads in December 2024 alone, marking an impressive 81 percent year-on-year increase. The App Store and Google Play now offer over 29,000 mobile AI apps, of which, 14,000 were released in 2024.[1]

Currently, a significantly larger proportion of GenAI app users own high-end smartphones compared to the general user base in the measured network. However, GenAI traffic represents only 0.06 percent of the total network data traffic. In most mobile networks, the typical traffic distribution is heavily skewed, with a 90-to-10 percent downlink-to-uplink ratio. However, AI traffic exhibits a higher uplink distribution, with 74 percent downlink and 26 percent uplink traffic.

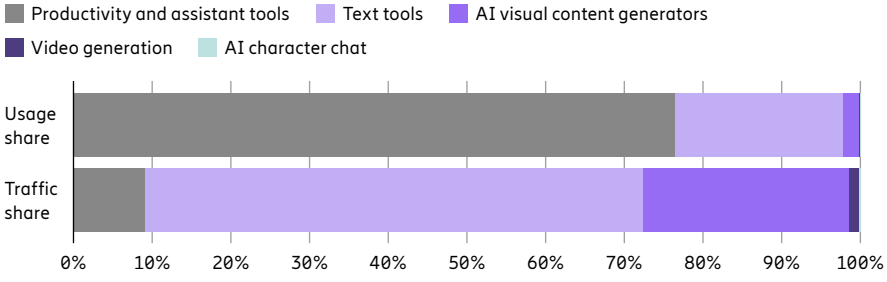
ChatGPT was the most downloaded mobile AI app in 2024, with 250 million installs and 546 million active monthly users worldwide as of April 2025. This user base is 3.6 times larger than that of the second most widely used mobile AI app (Quark).[2] In the measured network, ChatGPT accounts for 60 percent of total AI traffic and 70 percent of all AI traffic in the uplink. For this app, the traffic distribution is 71 percent in downlink and 29 percent in uplink. In other apps, the distribution of uplink and downlink traffic is more symmetrical compared to the general traffic distribution. For instance, DeepSeek and Microsoft Copilot exhibit a roughly equal 50/50 uplink/downlink ratio. On the other hand, some applications, such as Invideo AI, are heavily skewed toward downlink traffic, with downlink comprising 99 percent of the total.

Canva holds the largest traffic share after ChatGPT, accounting for 25 percent of the total, followed by Gemini AI with 7 percent and Galaxy AI with 2 percent.

Gemini AI has the most users, with 21 percent of total subscribers and 56 percent of AI app usage. However, estimated monthly data consumption per user is only around 2 MB, with the top 10 percent most intense users consuming around 9 MB and very few extreme users exceeding 10 GB. Gemini AI is pre-installed on Android devices, boosting the user base even though average monthly data consumption remains modest compared to other AI tools.

Invideo AI, although used by a smaller number of users, has the highest estimated monthly data consumption per user at 504 MB due to its role in video generation and editing, which significantly boosts traffic share, particularly in downloads. Similarly, other apps focused on generating visual content also exhibit higher monthly consumption per user, averaging around 200 MB.

Figure 14: Share of AI app usage and traffic volume per AI app category



Note: Regular mobile apps that have AI features integrated are not included in the measurements.

Future GenAI impact on network traffic

Today's GenAI content is predominantly produced by AI-apps based on interactive voice and text chats. This is expected to evolve with the advent of increasingly capable GenAI smartphones, new XR devices and the proliferation of bandwidth-intensive new media formats in the coming years. This could significantly impact future mobile network traffic volumes and characteristics, particularly through increased video consumption and changing uplink requirements.[3]

Methodology

The study examined 21 of the most prominent mobile AI apps available as of early 2025, analyzing one week of traffic data collected from a service provider's network in April 2025 and extrapolating it to reflect monthly usage. Not all AI-related traffic from regular mobile apps with integrated AI features is included in the measurements. Only traffic that can be clearly identified is covered. The apps are categorized by functionality and purpose: the **text tools** OpenAI ChatGPT, DeepSeek AI, Perplexity AI, Claude AI and Grok AI; the **AI visual content generators** Canva AI, Adobe Firefly, Midjourney AI, Davinci AI, Stable Diffusion AI, Starry AI, Dream AI; the **productivity and assistant tools** Gemini AI, Galaxy AI, Microsoft Copilot; the **video generation tools** Invideo AI, HeyGen AI, Synthesia AI, Animaker AI and Steve AI; and **AI character chat** Talkie AI.

[1] Appfigures, Rise of AI Apps: Trends Shaping 2025.
[2] Backlinko, Most Popular AI Apps (May 2025).
[3] For more details, see the companion article "Quantifying the future impact of GenAI" on page 17.

Quantifying the future impact of GenAI

New traffic growth in mobile networks is set to be driven by high-performing 5G networks serving new devices, such as AR glasses, together with scalable, multimodal generative AI (GenAI) applications.

Key insights

- While GenAI will be pervasive across device hardware, operating systems and applications, only applications with high adoption and high data rate requirements will impact mobile network traffic growth globally.
- Projected net-new traffic growth will likely require careful network planning, as well as additional mid- and centimetric-band spectrum to accommodate increasing uplink requirements.
- Differentiated connectivity will be key in enabling a high-quality user experience for personalized AI agents and other conversational applications.

Emergence of AI-native multimodal use cases

AI and GenAI are rapidly transforming both consumer and enterprise domains, enabling entirely new classes of AI-native, multimodal applications, which process multiple types of data input simultaneously.

AI is driving hyper-personalized experiences through GenAI-powered smartphones. Users are benefiting from faster access to relevant information or easier content creation. As a result, the technology can boost user engagement and retention. Smart and AR glasses – requiring the offloading of compute-intensive tasks such as large language models (LLMs) or Gaussian splatting[1] to the cloud – enable rich AR experiences. Significantly, the emergence of AI agents and multimodal LLMs is ushering in a new era of intelligent assistants that rely on uplink-heavy video and voice processing to deliver real-time, context-aware interactions.

Together, these innovations are causing a foundational shift toward AI-native platforms and ecosystems, where intelligent, multimodal interfaces redefine how humans and machines interact. All of these emerging use cases require high-performance connectivity.

Rise of personalized AI agents

At the intersection of these emerging use cases, a new class of highly personalized virtual and physical AI agents is gaining momentum. These AI agents – consumed on smartphones, via AR glasses and other wearables, or embodied through a companion droid – represent a fundamental shift in human-computer interaction.

An AI agent can serve as a highly personalized assistant for consumers, offering services like proactive scheduling, real-time language translation, immersive navigation, adaptive learning and content curation across devices such as smartphones, AR glasses, or laptops. In the enterprise context, AI agents can automate workflows, manage routine communications, assist with knowledge retrieval and support frontline employees with real-time recommendations, effectively acting as a smart interface between those employees and complex systems.

On the other hand, a physical AI agent, such as a service robot or an autonomous droid, can assist in enterprise environments. They can take on roles in logistics, surveillance, warehouse operations, or even customer services, where they can handle repetitive, dangerous, or time-sensitive tasks while continuously learning from and adapting to these environments. For consumers, they can provide physical support paired with sentient behavior for various tasks.

A critical distinction is emerging between on-demand AI agents (which are invoked by the user) and always-on AI agents (that proactively assist autonomously). The personalized AI agent of 2030 will have a pervasive presence, embedded in our devices, environments, and interactions. Different types of AI agents present unique challenges in terms of compute demands, latency sensitivity and network resource consumption. Importantly, proactive AI agents will consume more resources and also need to be carefully managed to ensure user privacy and safety.

Convergence of networks, devices and content

The rise of AI agents and AI-native applications is driven by the commercial alignment of three core enablers: networks, devices and content.

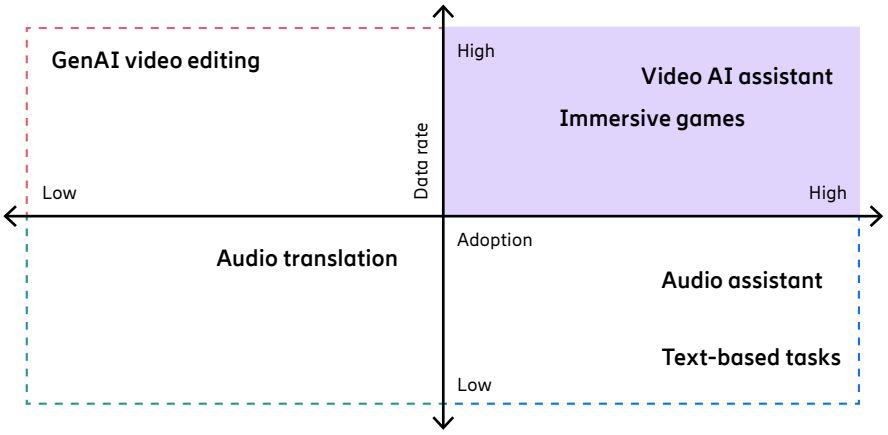
Modern 5G networks are evolving beyond mobile broadband to deliver differentiated capabilities, such as deterministic latency, high uplink performance, improved handovers and ultra-reliable edge access. APIs now enable developers to tap into these capabilities.

Devices have also matured to support AI-native experiences. Smartphones are evolving into multimodal AI terminals with enhanced sensors and dedicated AI accelerators. Meanwhile, AR devices are advancing along two distinct paths: Sleek camera-enabled smart glasses for casual consumption, or more immersive, full-stack systems designed for rich, continuous interaction. These devices act as sensor ingestion hubs and delivery endpoints for AI agents, enabling contextual, always-available assistance.

[1] Gaussian splatting: A 3D rendering technique that uses millions of tiny, translucent ellipsoids (or "splats") to represent a scene.

Finally, the surge in GenAI capabilities allows content – whether text, images, or immersive environments – to be generated at unprecedented scale and quality. Multimodal media, including 2D, 3D and volumetric content (via, for example, techniques for rendering 3D imagery such as neural radiance fields[2] or Gaussian splatting), are unlocking new engagement formats. These formats are particularly suited for immersive AR environments and physical AI agents, allowing them to reason about and operate within complex, spatially rich contexts.

Figure 15: GenAI applications, adoption vs. data rates



Shifting traffic characteristics

As AI and GenAI become increasingly integrated into personalized and immersive experiences, the nature of network traffic is undergoing a fundamental transformation. AI-native workloads are introducing new traffic dynamics that are more bidirectional, context-sensitive, and therefore uplink-intensive:

- **Personalized content with mainly downlink-centric growth:** GenAI enables at-scale creation of hyper-personalized content – from entertainment to education – to be tailored in real time for each user. This increases engagement, retention and consumption, something already seen today. However, despite increasing the load on downlink, the traffic impact is manageable with the current 5G spectrum.
- **Immersive interactions with mainly uplink-centric growth:** Where AI truly starts to reshape traffic is in real-time, immersive interactions, especially those involving multimodal assistants or AI agents embedded in AR experiences. These systems rely on a constant uplink for video streams, sensor data, and conversational cues, followed by contextual inference and real-time adaptation. The shift from cloud-based AI to on-device or edge-executed GenAI amplifies this trend by lowering latency, but it still requires continuous uplink for personalization and environmental awareness. AI agents may also pull additional information from various other sources, which also increases traffic toward the AI agents.
- **Semantic compression technologies:** Emerging avatar-based communication represents a new approach to traffic optimization by transmitting high-level semantic data instead of video. If done on a device, this can result in significantly reduced data rates, particularly in controlled environments. However, their broader traffic impact is expected to remain limited in the near term as adoption will likely be confined to closed ecosystems and enterprise use cases.

These emerging classes of bidirectional traffic include real-time queries, streamed context, inference inputs and outputs, as well as orchestration commands. This leads to a new traffic profile that differs sharply from traditional patterns, in terms of volume, peak versus average characteristics, latency requirements, as well as packet size and frequency.

Not all GenAI traffic is equal

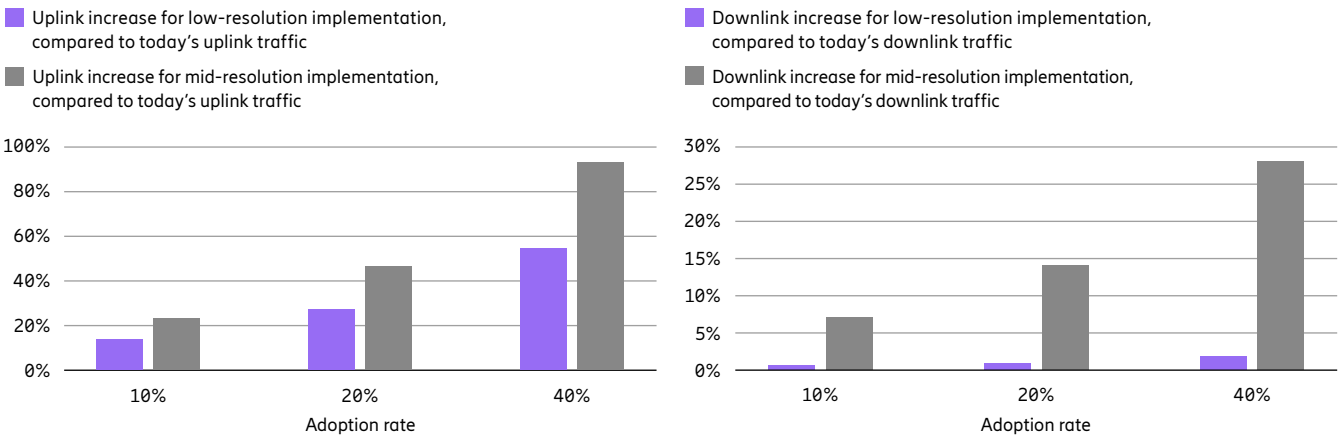
As GenAI continues its rapid integration into everyday applications, it's important to recognize that not all GenAI-powered experiences will have a meaningful impact on network traffic. While nearly all future apps, from productivity tools to creative platforms, will incorporate GenAI in some form either on the device or in the cloud, only a subset will drive mobile traffic growth: Namely, those that enjoy a wide-scale adoption and require access to the cloud or content at high data rates. To understand impact, it is safe to disregard:

- High-rate but low-adoption applications, such as professional video editing or cloud-based 3D rendering. These are bandwidth-intensive but niche in usage, and therefore capable of being absorbed by peak-dimensioning of networks.
- High-adoption but low-rate GenAI applications, such as text-based chatbots that are ubiquitous but lightweight in their data demands.
- Low-adoption and low-rate applications, for example, occasional real-time audio translation.

Significant network impact will stem from applications that are both data-intensive and widely adopted, including:

- Video-based AI assistants that use real-time video feeds for interaction, requiring constant uplink/downlink flow and semantic understanding which can unlikely be provided by a GenAI model on the device.

Figure 16: Traffic impact of personalized AI assistants in smart glasses and AR devices



[2] Neural radiance fields: A deep learning method for creating 3D representations of scenes from 2D images.

- Immersive gaming or gamified environments powered by sophisticated GenAI-driven characters and environments, potentially combining multi-user streaming with dynamic, procedural and volumetric content generation.

These categories stand out as potential drivers of net-new traffic, particularly when experienced through AR devices with always-on assistants. Their data intensity comes from content rendering as well as from continuous AI inference and environment interaction, creating persistent uplink and downlink demands.

These new high-rate, high-adoption applications are likely to define the next wave of traffic drivers and subsequently impact spectrum requirements, network planning, investment, and ecosystem alignment.

Although uplink-heavy video calls and downlink-heavy media streaming might be consumed on AR glasses in the future, it is not clear yet if it will constitute net-new traffic or substitution and so it is not considered here.

Uplink, downlink and future spectrum implications

To obtain the actual global averages of usage minutes, and thus uplink and downlink rate requirements, Pareto and power distribution laws are applied. Specifically, it is assumed that of the population that will own a smart or AR headset in the future, 20 percent are power users, such as developers, heavy gamers or influencers, and 80 percent are median users with light usage for navigation and occasional use of an AI assistant. Furthermore, it is assumed that power users are using the device for 100 minutes per day over 5G, while the median users use them for 10 minutes per day.

Based on the assumption that at some time in the future, adoption of AR headsets will reach 20 percent, average usage will amount to approximately 5.6 minutes per day. A medium-quality AI agent implementation at 0.7 Mbps uplink and 2 Mbps downlink would cause an approximate increase in uplink by 47 percent and downlink by 14 percent. This increase will require proper network dimensioning and optimization, uplink improvements and more spectrum.

AR device uptake is predicted to grow at pace, though predictions still differ significantly. The most optimistic predictions indicate that about 20 percent of the US adult population will likely own an AR device by 2028, while other predictions put this some years later. Is it important to note that the growth is predicted to continue for years to come, meaning a 20 percent population uptake is a rather modest prediction long term.

The traffic impact analysis looks at adoption rates of 10, 20 and 40 percent.

The resulting growth in uplink and downlink requirements for different quality AI assistants are shown in Figure 16. Projected growth in requirements is substantial; however, differentiated connectivity with slicing has the potential to improve spectral efficiency, enabling high-quality connectivity for these and other high-bandwidth, conversational applications.

AR is likely to incentivize hands-free and mobile usage – therefore, it may happen that more traffic will be consumed over 5G compared to indoor only Wi-Fi.

In summary, the quantified uplink and downlink traffic increases due to the example application of an AI assistant application running on AR glasses using 5G. Note that the analysis provided focuses on the average rate increase, rather than deriving detailed distributions or specific regional variations. It is also based on the population average, rather than peak requirements.

Video quality implementations

The following quantification exemplifies the average data and network demands of AI agent applications, depending on implementation quality and distinguishing between uplink and downlink requirements:

- **Uplink:** AI agent implementations can get surprisingly good results even with a fairly low-resolution, low-frame-rate video or frame-by-frame picture with audio. Assuming a transmission of 480p (640 x 480 pixels) at 1 frame per second (FPS), and a frame-by-frame encoding using JPEG at a compression of about 1 bit per pixel, this yields roughly 300 Kbps. Adding 128 Kbps audio, the total average uplink is a little over 0.4 Mbps.

To capture more dynamic scenes, this baseline will likely increase to 2 FPS, yielding an increased uplink of approximately 0.7 Mbps. The frame rates and/or resolution may further increase to cater for scenarios with some movements and/or requirements for higher image quality. It is assumed that data rates above 1 Mbps feed are likely. It is worth noting that frame rates and compression rates could be dynamically adjusted to suit the situation. The use of higher efficiency codecs beyond JPEG can further reduce the rates or enable higher resolutions at the same rate.

- **Downlink:** An audio-only implementation will require a mere 128 Kbps in the downlink. In the case of AR glasses, a video or animation could be transmitted in the downlink at 720p and 30 FPS, requiring at least 2 Mbps using a highly efficient lossy video codec.

These approximate rates for uplink and downlink are used to derive the minimum requirements for different device classes:

- Ultra-low-power wearables with no visual output, such as those found in smart glasses on the market today, will enable real-time translations or audio-guided assistant interactions. The uplink will be in the order of 0.4 Mbps and the downlink about 0.1 Mbps.
- Emerging AR glasses with visuals would enable richer interactions such as real-time visual overlays, animated avatars, or guided navigation. Communication needs are likely to be increased. The analysis assumes uplink will initially be around 0.7 Mbps – but may grow to above 1 Mbps later – and the downlink is around 2 Mbps.

Not every user will require such capabilities in the future, but – if averaged across the entire mobile user base – even small average usage, such as 1 minute per day, can increase uplink noticeably: An AI agent implementation with the above-mentioned 0.4 Mbps uplink increases the monthly uplink by 5 percent. These numbers do not take regional differences into account and rather assume the global baseline consumption of 20 GB per person per month, at 90 percent downlink and 10 percent uplink.

5G standalone launch strategy: More than a network upgrade

BT Group leveraged its unique network assets to deliver a user experience-centric launch of 5G standalone, enhancing user experience and changing its go-to-market strategy.

Key insights

- A focus on an experience-centric launch, with 95 percent 5G standalone coverage linked with carrier aggregation across mid- and low-bands, ensured customers felt the difference.
- Applying new capabilities like network slicing is empowering businesses with dependable connectivity, from seamless payments to digital transformation projects.
- Enhanced connectivity in stadiums saw a greater consumption of data as well as the introduction of new and enhanced user experiences.

BT Group sought to take advantage of its strong market position and unique network assets in the UK, leading outdoor coverage with 5G standalone (SA), and leading indoor connectivity with Wi-Fi 7 providing millions of public-Wi-Fi hotspots nationwide. It is no longer good enough simply to have a connection; BT Group's customers want high-quality and reliable connectivity that empowers them to live, work and play the way they want. This mindset of always focusing on building the best network experiences is reflected in BT Group's mobile network brand, EE, being ranked first in the UK based on external benchmarks by a third party for the last 11 years.[1]

BT Group had clear expectations for the performance benefits it wanted to deliver for its customers with the launch of 5G SA. These included improved latency and voice quality, enhanced reliability and capacity, stronger indoor coverage in specific locations, and enhanced network security. Beyond combined fixed and mobile packages, BT Group is exploring new ways to utilize 5G SA, Wi-Fi 7 and public hotspots to create a smarter and more seamless connected experience for its customers.

Experience-centric launch strategy

With customer experience at the heart of this launch, demanding performance benchmarks were set to ensure a consistent, reliable and enhanced network experience from day one. This threshold was to deliver more than 95 percent outdoor coverage in every 5G SA location before announcing the launch. To deliver on this ambition – building a 5G SA network capable of delivering a meaningful experience for BT Group's customers and showing the true value of 5G – there have been several key steps beyond just the establishment of the core network. Building a converged cloud core, which enables the flexibility and scalability needed to deliver new 5G SA use cases, was the starting point. This was complemented with carrier aggregation across mid- and low-bands running on the majority of sites. By the end of March 2025, the 5G SA network was live and available to over 28 million people across 50 major towns and cities in the UK, covering more than 40 percent of the population. This met the goal of delivering over 95 percent outdoor coverage, ensuring the benefits of 5G SA could be experienced consistently and reliably.

BT Group

This article was written in cooperation with BT Group, the UK's leading fixed and mobile communications provider.

Measurable improvements

As part of the strategy to deliver measurable improvements, six frequency carriers were made available in locations where 5G SA was launched, and carrier aggregation was utilized across most sites. The launch was purposely timed to coincide with wider availability of 5G SA-enabled devices, to ensure increased accessibility to the network upgrades. This ensured more users' next-generation handsets experienced a notable performance improvement, even in busy locations like train stations and major stadiums. In advance of the launch, BT Group secured strong partnerships with major brands so that its customers would get the best network experience on leading, high-end devices and applications.

Carrier aggregation is an important technique for ensuring reliability and high performance as upload demand continues to increase. Trials to deliver two-carrier uplink on a live 5G SA network are now bearing fruit in the real world, and customers using the latest devices are benefiting from better mobile experiences. Ultimately, 5G SA in combination with carrier aggregation will deliver on the true potential of 5G, by offering greater security, reliability and capacity. This is especially true in busy areas and during peak times, so consumers can get the quality of experience they want.

[1] RootMetrics, "UK Mobile Performance and 5G in Review" (August 2024).

Figure 17: Launch cities where 5G SA is available, as of March 31, 2025

"With this being the 20th year for our festive beer tent, Lavery's is as synonymous with Belfast's Christmas Market as it is with the city itself. In that time, the need to enable fast and reliable mobile payments has only grown thanks to the growing trend toward cashless transactions. BT Group's network slicing capability therefore gives us so much peace of mind, not only in enabling transactions to be completed faster than ever, but also in delivering the dedicated mobile capacity needed to keep our customers happy and queues moving, even at the busiest times."

Bernard Lavery, Director, Lavery's

As illustrated in Figure 17, BT Group's phase one 5G SA deployments were in 15 of the UK's most populous cities. These cities have large numbers of potential customers who could be provided with high-end devices and a variety of high-quality services, enhanced by the dense 5G SA network. Subsequently, a clustering strategy has been used in phases two and three to build out into the surrounding cities and towns, with the goal to drive uptake of 5G SA and high-end devices to improve the user experience. The 5G SA network has reached over 40 percent population coverage as of March 2025.

Following the network investments, 5G SA is now marketed within EE's service packages with the latest devices, including advertised speeds of up to 10 times faster than 4G. However, this has not been the positioning with the launch strategy; the focus has been on improved user experiences in crowded places and highlighting the uplink benefits alongside faster speeds.

EE wanted to learn from the industry challenges experienced during the initial 5G launches, where consumer expectations were not met due to spotty coverage. The network deployment based on the 95 percent population coverage in launch cities, linked with the experience-centric go-to-market strategy, ensured that customer expectations and network capabilities were aligned. The network was monitored closely in the months following the launch, and showed it was able to maintain a high and stable Net Promoter Score (NPS) of around 8 out of 10, for both reliability and speed.

Enhancing experience

Demand for faster uplink speeds is growing in importance as more people want to live-stream content, game online, have video calls and use real-time applications. The network is not only enhancing experiences for consumers, but also supporting businesses with dependable connectivity and empowering them with digital transformation projects.

These benefits are enabled by both the performance gains in the network and new capabilities like network slicing, where service providers can create multiple levels of connectivity services using the same infrastructure, to provide deterministic connectivity matched to application requirements.

During the festive period in Northern Ireland, network slicing was utilized for Belfast's Christmas Market to provide predictable and reliable connectivity for payment terminals. As Belfast's oldest family-owned pub, Lavery's has been at the heart of the city's social life for over 100 years, and the Belfast Christmas Market has been one of the most important dates in its diary for two decades. The Lavery's beer tent is among the most popular attractions, and with 1.2 million yearly visitors to the market, reliable, fast mobile payments are crucial.

The connected stadium

The cup final weekend in May is the conclusion of the English football season for both the men's and women's game. This year, the connectivity in Wembley stadium was taken to a new level with 5G SA. Supported by enhanced connectivity, the network saw an increase in 5G traffic of around 31 percent in 2025 compared to 2024, reaching in excess of 2.3 TB of data. The proportion of uplink traffic was around 23 percent across both games, with uplink traffic growing by around 46 percent. This illustrates the growing importance of uplink and the need to dimension networks differently to cater for the changing needs to ensure an enhanced consumer experience is delivered. Beyond the enhanced user experience, network slicing was also explored at the venue to test its capabilities, such as cameras on the mascot children that walk out with the players, which provided the parents with connectivity for a closer experience. These tests and activities are part of a bigger picture for being able to apply the necessary connectivity to support the operations of events and enhance the visitor experience.

Enabling new experience

Building the 5G SA network is not only about enhancing user experience today, but it is also about building a foundation of BT Group's next-generation, AI-powered network to ensure greater responsiveness and help future devices deliver the best performance. 5G SA will be the bedrock of the next generation of connected experiences. Its ultra-low latency, increased capacity and enhanced security is delivering a more reliable performance for customers today, but it is also serving as a platform for new services and capabilities, to meet the needs of future services and applications.

Network investment is critical for BT Group, because it believes the future will be about more than just providing the fastest and most reliable connectivity experiences. It will be about delivering network performance that empowers its customers to do more with the next generation of devices and applications. One example is Gen AI, with major device manufacturers launching new smartphones with built-in AI applications and smart glasses being on the horizon. As these services evolve, the network will be what underpins the superfast and seamless connections to the cloud for enabling the best personal AI experiences. The ambition is to build a network that is programmable with the ability to ensure network resources can be allocated where and when they are needed on-demand, to respond to the needs of new and emerging applications. Network APIs will play a role in exposing the network capabilities to customers via APIs to support the development and enhancement of both existing and new applications.

Mobile video conferencing challenges 5G coverage

A seamless and high-quality video conferencing experience depends largely on stable uplink performance during video calls, which is more demanding than for downlink-centric apps.

Key insights

- Great video conferencing experiences on smartphones require a consistent uplink throughput of at least 4 Mbps.
- The root cause behind poor video conferencing experiences is often a lack of uplink coverage when a radio base station can no longer "hear" the smartphone well enough.
- Improved uplink coverage can be achieved by widely deploying low-band spectrum, deploying radios with four receivers in low-band, introducing advanced RAN software features, and reducing the distance between radio base stations.

With a more mobile workforce and the rise of hybrid work models, video conferencing via smartphones becomes indispensable for remote collaboration and communication.

Video conferencing user experience

A previous study[1] conducted by Ericsson SmartphoneLab demonstrated that a downlink throughput "at click" of 20 Mbps and an uplink throughput "at click" of 1 Mbps are required for a great smartphone user experience, when consuming today's most popular web and video streaming content. Beyond these speeds, user experience improves only marginally. However, for video conferencing the uplink requirements are higher than for web and video streaming.

Video conferencing with a high-definition video resolution (1080p) offers the greatest user experience. At this resolution, smartphone apps, such as the Microsoft Teams[2] app and the Google Meet app[3] require a stable 4 Mbps in both uplink and downlink directions. The word "stable" is important, meaning that the 4 Mbps needs to be available every second of a video call.

To assess the capability of deployed 5G networks to provide a stable uplink of 4 Mbps, uplink throughput measurements were collected in live 5G networks. Every user activity for all users connected to the networks in the sampled areas was measured for one week. The analysis is based on several billion data samples collected in the RAN covering multiple major urban areas. Video conferencing experience is rated based on achievable video quality for a certain uplink throughput that ranges from "great" (>4 Mbps) to "poor" (<0.5 Mbps). The results in Figure 18 show that 5G networks in Europe had substantially fewer samples rated "poor" compared to 5G networks in North America, where up to 15 percent of the samples measured less than 0.5 Mbps in uplink.

Improving uplink coverage in 5G networks

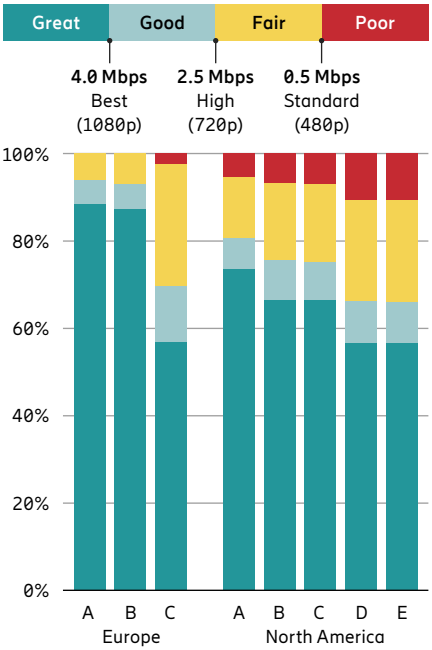
To thoroughly identify the root causes behind the samples rated as "poor" in Figure 18, a deeper analysis is necessary. However, prior experience suggests that poor uplink performance is often caused by too great a distance between radio base stations, as well as obstacles like exterior building walls and terrain.

The downlink transmission power of a radio base station is at least hundreds of times greater than the maximum power a smartphone can use when transmitting back in uplink to the radio base station. In simple terms, radio base stations can "shout" in downlink while user devices can only "whisper" in uplink. This explains why cellular communication is often uplink coverage limited.

This challenge can be addressed in multiple ways through the deployment of:

- low-band spectrum on every radio base station site, since radio waves on low-band frequencies travel longer distances and more easily penetrate obstacles such as walls
- radios with 4 receivers in low-band
- frequency division duplex (FDD) mid-band with a higher number of radio receivers (4, 8 or higher with FDD Massive MIMO) for optimal use of low-band
- advanced RAN software solutions such as uplink Coordinated Multi-point (CoMP), advanced traffic steering with multi-layer coordination to offload low-band spectrum, closed-loop power control and uplink-aware mobility
- more radio base station sites, outdoor and indoor, to reduce the distance to end-user devices

Figure 18: User experience (uplink) in European and North American networks



[1] Ericsson, "Time-to-content: Great user experience on 5G mid-band" (June 2024).
[2] Microsoft, "Prepare your organization's network for Microsoft Teams" (June 2024).
[3] Google, "Google Meet hardware requirements" (June 2025).

A new era for connected creativity and entertainment

5G and network APIs are helping creators to realize better service experiences for live and real-time entertainment.

Key insights

- 5G connected creativity changes the economic paradigm for media and content producers.
- Network APIs will be a catalyst for innovation in the creative and entertainment sectors.
- Dynamic network slicing, in combination with Quality on Demand (QoD) APIs, can enable live media production over mobile networks, delivering a great user experience in a cost-efficient way.

Sony's mission to "support the dreams of creators with the power of technology" means it continually works with new and disruptive technologies that can enhance entertainment businesses across video, music, games and pictures. Technology advancement extends from the device itself, through the network, into the datacenter and AI infrastructure. In this technological ecosystem, the end-to-end reliability offered by 5G standalone (SA) is a game changer.

The evolution of mobile network capabilities – particularly differentiated connectivity, resource allocation and collection of network insights via network APIs – allows reliable connectivity capabilities to be embedded into workflows and applications. Workflows manage how creators move, share, store, review and work on media. Network APIs can simplify and improve these flows, enabling further innovation for creativity and entertainment. It enables Sony to focus on its purpose and technology, and allows the people using Sony's products to live in the moment.

Creativity connected

Time-to-news and time-to-audience are critical for news broadcasters, photographers and video producers like influencers. 5G is enabling new and creative ways of storytelling – videographers and photographers are no longer anchored to locations and can move freely while remaining connected, without the need for bulky backpacks or satellite dishes. With the latest 5G-connected cameras they simply turn up, connect to the 5G network, request the service they need and are ready to go.

The ability to integrate 5G-enabled cameras into outdoor broadcasts and indoor studio settings is highly attractive for TV news reporters, sport and music productions, reality TV and TV studio operators. The need for cabling is greatly reduced, resulting in more flexible content creation and production, and faster time-to-audience with new and enhanced experiences.

Sony has been showcasing a range of products, solutions and workflows, along the theme of "creativity connected", designed to fulfil the goal of fueling new methods, tools and possibilities for media creators. Whether for broadcasters, photographers or private users, 5G connectivity is one of the key pillars in changing the landscape of media creation and collaboration.

Commercial 5G SA differentiated connectivity in action

Network slicing, in combination with the QoD network API, provides deterministic performance characteristics for high-quality media production. It offers the ability to allocate network resources and give priority on-demand to on-air wireless cameras, enabling much greater production agility, as well as intelligent use of limited network resources. These key aspects have been demonstrated in commercial environments.

SONY

This article was written in collaboration with Sony, a creative entertainment company.

With the latest 5G-connected cameras, videographers and photographers can simply arrive, connect to 5G, request the service they need and be ready to go.

Enhanced creative experiences

Photojournalism

Regardless of the network traffic generated by almost 30,000 fans inside the 3Arena in south Stockholm, two Bildbyrån photographers had guaranteed continuous 5G SA connectivity via a network slice on Three Sweden's network. This allowed the photographers to instantly send high-definition action shots from pitch side to the Bildbyrån offices and media outlet partners.

Photo by Simon Hastegård, Bildbyrån.

Independent broadcasters

During a major industry event this year, Fierce Networks TV leveraged a 5G connected broadcasting camera running over a slice from Telefónica's commercial 5G SA network. This allowed the content producer to share the latest industry news in real time with their viewers. The reliable mobile connection over 5G gave them the freedom and agility to deliver a better TV experience. The solution enabled simultaneous editing, providing a fast turnaround and production online, and in so doing changed the creative possibilities and economics for smaller productions.

Multi-camera broadcasters

TV2 in Denmark evaluated 5G capabilities during the production of the daily "Go' aften Live" evening show, from its studio in central Copenhagen. API-driven orchestration ensured the broadcast signal was given priority on its private 5G network. The broadcast included pictures taken via 5G-enabled cameras and provided video quality that matched the high standards required for prime-time live production. Network API-driven differentiated connectivity that provides deterministic performance characteristics creates a foundation from which it is possible to transform creativity and entertainment.

5G for media production

Setting up 5G-enabled wireless cameras and establishing a reliable and deterministic connection is challenging. Bandwidth demands are high, with broadcast-quality HD and 4K requiring 12 Gbps for raw 4K video footage. This is where encoders and decoders play a crucial role in managing video compression to reach significantly lower network throughput requirements, without reducing quality or introducing delay in the workflows. Figure 19 shows the throughput rates required to secure a reliable broadcast.

To ensure a great broadcast experience for producers, these throughput rates need to be guaranteed. Sony is able to leverage 5G differentiated connectivity with its reliable and secure connectivity, to deliver both high throughput and low-latency requirements for HD live broadcast use cases. The ability to dynamically prioritize network resources to on-air wireless cameras within the reserved network slice enables unequalled production agility without compromising broadcast quality.

For many larger productions, broadcasting requires a multi-camera setup to deliver an immersive media experience for the consumer. However, for the economics to work in terms of radio resource utilization on the network side and costs to the broadcaster, it is not desirable to have multiple cameras running simultaneous live feeds. This is where dynamic QoD programmability is required to switch between cameras as they go live, ensuring a seamless experience while allowing off-air cameras to back off and significantly reduce impact on the network. The switching needs to be driven in real time by the producer, as an integral component of the production solution. Global standard network APIs with 5G differentiated connectivity are transformational to the media industry to enable wide area software-defined media solutions. Programmable 5G networks integrated with these media orchestration platforms allow both wired and wireless cameras to be managed, as well as maintaining high-quality, uninterrupted and reliable broadcasts.

The combination of both private and public 5G networks provides flexibility and freedom for media creators and producers to explore and innovate.

Figure 19: Network throughput rates

Video quality	Raw video	Compression ratio	Compressed video
HD	1.5 Gbps	1/60	25 Mbps
4K	12 Gbps	1/200	60 Mbps

Business-enabling network capabilities

The ability of the 5G network to move from best effort to deterministic performance characteristics creates this solid foundation for innovation, bringing new possibilities for the photojournalist or videographer. Some of the key enhancements within the 5G networks that are enabling this include:

- **Uplink performance:** Recent developments within the 5G standards and future releases have focused on the ability to increase uplink performance. The ability for a network user to reliably and programmatically simplify their work, reducing costs and complexities in day-to-day tasks, establishes an immediate and tangible value. In the case of photographers, media producers or digital creators, the opportunity is here and now. As these services are made more readily available the next wave of digital enablement will emerge, with reliable uplink capacity being the cornerstone of that shift.
- **Differentiated connectivity:** This represents a game-changing opportunity. Not only can photographers and videographers be provided with a prioritized feed on the 5G network, but the value of these capabilities extends into creator and consumer sectors. Reliable and consistent mobile connectivity with deterministic characteristics is an enabler for innovation in multiple sectors.
- **Network APIs:** Allowing developers to easily access advanced 5G capabilities provided by service providers. This unlocks the opportunity to develop new enhanced applications and services. The ability to seamlessly integrate capabilities into applications and workflows brings a fundamental shift in the ways in which these capabilities can be applied. In the broadcast cases it is this integration that makes the economics of multi-camera broadcasts a reality.
- **Private 5G networks:** Private 5G networks such as those within stadiums or broadcast centers offer fully controlled bandwidth independent of usage on the public network. These networks still require the advanced 5G capabilities to manage network resource allocations and integration of capabilities into workflows via network APIs.

Collaborative innovation

The recent developments of the 5G SA network, linked with the development of 5G connected transmitters and encoders, have established an ecosystem that is ready for the transformational possibilities for connected creativity. This will change the economics and creative possibilities in media production, for both larger broadcasters with multiple cameras and smaller independent producers with a single camera. Wider adoption is dependent on the evolution of 5G networks to support the latest capabilities and the exposure of network APIs to further enhance the ease of access and integration into workflows.

While entertainment on the move is not new, with a multitude of offerings available, highly immersive online experiences have been severely limited by the networks' ability to meet the demands required to consistently deliver the user experience. Differentiated connectivity dramatically changes this situation. As these network capabilities become widely available, the ecosystem will expand to take advantage. Here, success will also be dependent on enabling dynamic and tailored charging models made possible via the integration of network APIs into platforms and applications.

Sony has high expectations from mobile network operators for exposing network APIs, enabling seamless integration of connectivity solutions into workflows, further driving innovation in creativity and entertainment.

Sony sees differentiated connectivity as a transformative opportunity, underscoring the importance of worldwide industry collaboration to achieve these advancements.

Enhancing connectivity beyond best effort

Service providers across many markets are exploring new commercial opportunities by offering differentiated connectivity services to consumers, enterprises and public authorities.

Key insights

- Service providers are leveraging the new capabilities that 5G standalone (SA) brings by offering differentiated connectivity services.
- Differentiated connectivity services are offered across various use cases, including broadcast/video production, point of sale systems, events/arenas, gaming, Fixed Wireless Access (FWA), VPN, and enterprise productivity.
- Enhancing connectivity beyond best effort necessitates a comprehensive approach to targeting use cases as well as identifying key moments and locations where deterministic and reliable performance is needed.

More than 340 service providers have launched commercial 5G services, and around 70 have deployed or launched 5G SA. Service providers are now actively promoting it, using terms like "5G+," "SA," or "standalone" in their data plans. In several markets, service providers are also going beyond traditional "generation" marketing, leveraging the new capabilities that 5G SA brings by offering new connectivity plans, typically based on network slicing.

In the context of traditional data plan offerings, approximately 99 percent of surveyed service providers[1] offer some form of data bucket plan. Meanwhile, around 56 percent provide one or more unlimited data packages to their users (see Figure 20). Regional differences are notable, with unlimited offerings most prevalent in Western Europe, where about 87 percent of service providers include unlimited options in their plan structures.

Service providers frequently adjust service plan structures, occasionally implementing significant updates to the available options. Consumers are accustomed to adapting to new service plans, which presents an opportunity to continually introduce and refine offerings to enhance their appeal and relevance for this market segment. In contrast, addressing the enterprise segment is more challenging when it comes to modifying offerings, as existing contracts and service level agreements (SLAs) can restrict flexibility.

New service opportunities based on differentiated connectivity

Until recently, there were limited ways for service providers to differentiate their connectivity service offerings beyond speed tiers and/or data volumes. With the introduction of unlimited data plans which disconnect revenue from traffic growth, speed becomes the sole available connectivity related parameter. This does not imply a lack of differentiation options, only that service providers need to rely on alternative mechanisms for service differentiation and segmentation. To date, data plans have been bundled with third-party services such as antivirus packages, music or video streaming subscriptions and other types of value-added services, enhancing the overall offering.

The subscription model, along with the bundling of extra services, has proven to be successful and is anticipated to attract consumers in the future. However, the introduction of 5G SA, and technologies such as network slicing, User equipment Route Selection Policy (URSP), network programmability and the possibility to expose network APIs, introduces new opportunities and paves the way for differentiating connectivity.

Currently, there are several areas featuring commercialized offerings that utilize network slicing.

The **broadcast and video production** industry, which includes the likes of broadcasters, journalists and influencers, needs fast and seamless transmission of images or videos, even during periods of high network traffic load. There have been 16 cases in 14 countries identified in this area, with more than one-third of them fully commercial.

Large scale **events and arenas** often create a heavy load on networks. There are many different use cases covering both consumers and enterprise customers that benefit from reliable and consistent connectivity, including event staff communication, ticket validation, on-site surveillance and fans streaming or watching premium content. Deployments have been made by eight service providers in six markets, offering one or more connectivity services targeting use cases at events, most of them commercial.

Frequent use of **point of sales** terminals is also associated with large-scale events, with many visitors eager to purchase food, drinks and coffee. The differentiated connectivity services allow payment terminals to process transactions with secure and stable connections.

Gaming is another use case that is highly sensitive to latency and the emerging offerings promise significantly reduced latency along with a more stable experience.

FWA services with minimum bandwidth guarantees have been introduced in a few markets, catering to both consumers and businesses.

Network slicing is used as an end-to-end tool to enable the fast provisioning of services like **internet security**, where all user traffic is safeguarded by a next-generation firewall within the service provider's network.

[1] Ericsson study of retail packages offered by 299 mobile communication service providers worldwide, April 2025.

Virtual private networks (VPNs) are increasingly being deployed through network slicing, where connectivity performance related (such as throughput or latency) and non-performance related (like security) enhancements are applied to the connectivity service offerings. Examples include ensuring minimum bandwidth levels to facilitate seamless video conferencing and providing local breakout capabilities for IoT services.

Provide users with the optimal experience at their most valued moments

The emergence of generic network performance boosters in some markets gives customers a choice to purchase an improved level of performance as an add-on to their existing service plans, or as a bundle on top-tier service plans. The primary risk associated with this type of offering is that, in most cases, users will not perceive any noticeable improvement in performance. This is because they might not be utilizing an application that requires a specific performance improvement, or they may not be in a situation where a performance improvement would be beneficial. As a result, users may not see any value in continuing with the service. However, a study by Ericsson ConsumerLab[2] reveals that smartphone users at big events, such as concerts and sports gatherings, regard quality of experience (QoE) while using mobile applications as the primary factor affecting their overall event experience, with a tenfold greater impact compared to network speed. This underscores the importance of delivering the right app experience to users at the moments and situations when they value it most.

There are applications and use cases that are business critical and that work fine most of the time in a well-performing network when there is no congestion. However, it is only with the tools associated with differentiated connectivity that it becomes possible to provide guaranteed-performance SLAs.

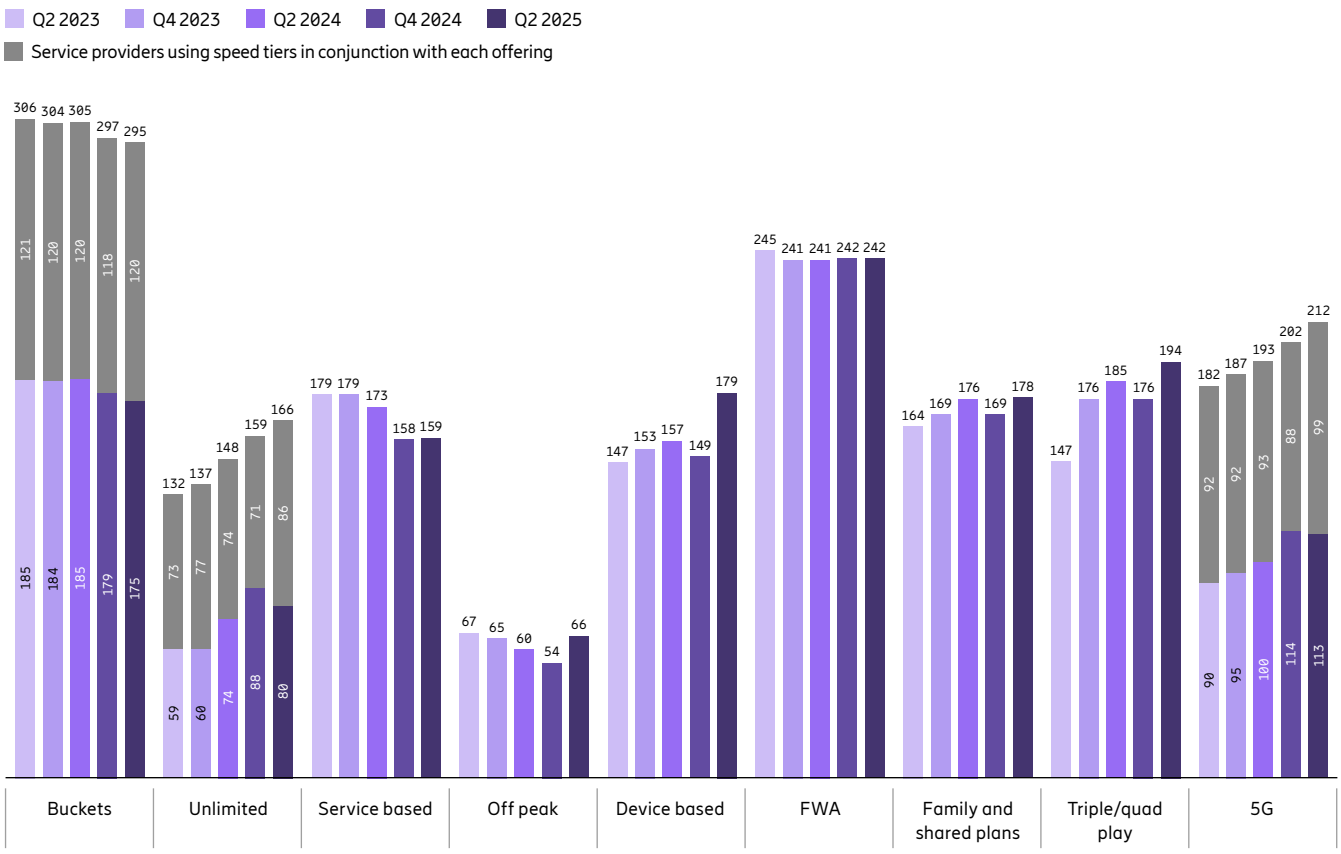
Expanding connectivity offerings beyond best effort

The market is evolving, as an expanding ecosystem and leading service providers explore innovative use cases and new monetization opportunities by offering differentiated connectivity services. Service providers are learning how to effectively market and sell these new services. This process involves identifying use cases with significant market potential and strategizing ways to transform them into mass-market offerings, as well as scaling solutions from individual customers to a broader customer base. Once the first use cases have been validated, service providers can replicate and scale their offerings. The go-to-market strategies and deployment capabilities developed for one use place can typically be adapted and reused in others.

Service providers will need time to learn how to effectively market and sell these new offerings. For example, learnings from one service provider when selling service packages "in the moment" is that when they gained the possibility to advertise a package directly on the phone via a pop-up within a partner application, their sales numbers soared. Remarkably, 95 percent of their subscribers for that solution came through that single sales channel, making it 20 times more efficient than in-store, social media, web or any of their other available sales channels.

Through interviews and discussions with various service providers, it has become clear that the shift they have undertaken — or are currently undertaking — represents a significant change in mindset. When moving beyond selling best-effort connectivity, they must determine which use cases to start with, and which application categories to target. Additionally, they must identify the specific situations and locations on which to focus.

Figure 20: Number of service providers per type of offering



[2] Ericsson, "5G: Meeting consumer demands at big events" (March 2025).

Differentiated connectivity services for enterprises and consumers

There are two main market segments for a service provider to address, enterprises and consumers, both with their own opportunities and challenges. But as can be seen by many of the cases already in the market, there are different approaches and tactics that could be considered when offering differentiated connectivity services for these segments.

The advancements in 5G SA features, combined with technologies like network slicing, URSP and network programmability, offer service providers a toolbox to deliver differentiated connectivity services, and expand their existing volume-based offerings (including data tiers, speed tiers and shared plans) with more experience-based connectivity models. These new models put the value of connectivity services at center stage.

Enterprise segment: The planned moment

Selling premium connectivity solutions to enterprises has similarities with the concept of ensuring operational success – connectivity must and should work. Examples could include a premium FWA link over 5G with a service level agreement (SLA) to a construction site, or a premium and secure cellular link for broadcast companies that equips live TV cameras with 5G modems. This is largely about supporting enterprises with secure and reliable connectivity for planned events when communication needs to work regardless of how intense data traffic in the area might be.

Introducing more stringent performance-based SLAs is also a fundamental step for service providers looking to climb the enterprise value chain and unlock opportunities beyond connectivity: Business solutions related to security, cloud and IoT. This requires a proactive, consultative sales approach where the focus is on understanding long-term needs and demonstrating how the solution ensures reliability in moments that matter.

Consumer segment: The right moment

For the consumer segment, the strategy involves presenting the offer at the exact moment the consumer is most willing to buy. This may be at big events when consumers want to video stream to family or friends, or at airports when they want to download a film just before boarding. This approach relies on visibility, timing and tapping into spontaneous purchasing behaviors.

There is a third, emerging market segment for differentiated connectivity services – the wholesale or business-to-business-to-consumer segment. Here, the main value for the consumer is the service or product purchased through different apps. This may be apps for banking, events or commuting. In this case, predictable, reliable and secure connectivity is part of the app experience itself. This means that the sales approach has more similarities to an enterprise sale, as the value lies more in application service providers' productivity improvement.

For this wholesale segment, offering differentiated connectivity through network APIs to the broader eco-system is an emerging opportunity.

Service providers can also benefit from the possibility of segmenting offerings based on geographical location:

- Local areas: In places like event venues, airports and campuses, there are opportunities to offer consistent, premium connectivity for a variety of use cases and ensure that network performance meets the demands of numerous users simultaneously.
- Cities or nationwide: Reliable, predictable connectivity is crucial for the seamless operation of enterprise services that span wide areas, such as payment terminals across locations, fleet management or public safety operations. Gamers is another consumer segment where a network slice delivering low-lag experience could be of high value.

By better understanding the needs and sales drivers from these different segments, service providers can create distinct connectivity offerings and know when the right moment is to sell them.

Differentiated connectivity allows both consumer and enterprise customers to go from knowing that their connectivity often works (best effort performance) to being assured that it works (predictable and reliable performance) when it matters.

Figure 21: Addressing different market segments with differentiated connectivity

	Enterprise segment	Consumer segment	Wholesale
			
Customer need and end-user value →	Predictable and reliable connectivity for critical tasks when and where it is needed.	Improved and new connectivity experiences.	Enhanced performance and experience for specific apps and situations.
Local area use case examples →	Broadcasting at venues, asset tracking at warehouses, virtual private networks for temporary sites etc.	Fixed Wireless Access. Passenger experiences at airports. Premium experiences at events.	Bundled app performance with event tickets, airline apps with premium content.
City or nationwide offerings →	Transport, public safety and logistical operations etc.	Mobile cloud gaming, video calling etc.	Gaming apps, commuting apps, banking apps etc.
Sales approach mindset →	"Assurance and productivity."	"Offer when willingness to buy exists."	"Ensuring premium customer experience for specific apps."

Significant shift in mobile traffic patterns

Though a large proportion of traffic is still generated by a minor share of all subscribers, application usage changed across all subscriber clusters between 2020 and 2024.

Key insights

- Traffic distribution is highly uneven across subscriber clusters with different monthly data consumption. In a sampled network, subscribers using over 20 GB per month constituted only about 10 percent of all subscribers, but accounted for 65 percent of the total traffic.
- Between 2020 and 2024, the cloud storage, video and audio traffic types saw the largest increases in their shares, while file sharing and web browsing experienced the most significant decline.
- Mobile gaming increased its traffic share by 8 percent, yet it still represents only about 1.5 percent of the total traffic.

One-tenth of subscribers generate around 65 percent of traffic

The distribution of traffic is highly uneven across subscriber clusters with varying monthly data consumption. A relatively small number of subscribers generate the majority of the total mobile traffic.

In the sampled European service provider's 4G/5G network in 2024, subscribers consuming over 20 GB per month represented only around 10 percent of all subscribers, but generated 65 percent of the total traffic. On the other hand, subscribers with a monthly data consumption of over 50 GB represented only around 3 percent of all subscribers, but generated 37 percent of the total traffic. Subscribers consuming less than 5 GB per month made up the majority of all subscribers, representing 73 percent, but generated only 10 percent of the total traffic.

A doubling of subscribers with data consumption between 20 and 50 GB per month

Looking at the traffic changes between 2020 and 2024, the share of traffic for subscribers consuming less than 10 GB per month has fallen from almost 40 percent in 2020 to around 20 percent in 2024, while the traffic share of subscribers consuming more than 20 GB per month has increased from 44 to 64 percent over the same period.

This strong traffic increase is also reflected in the growing share of subscribers consuming more than 20 GB per month, which increased from around 4 percent to 9 percent between 2020 and 2024. The strongest growth in share of subscribers was in the cluster that consumes between 20 and 50 GB per month, which more than doubled its share, rising from around 3 percent in 2020 to 6 percent in 2024. The increase in the number of subscribers consuming more than 20 GB per month is thought to be a result of more affordable service plans with increased data allowances, migrating subscribers to higher-tier data plans, as well as the increased consumption of data-intense content like video.

Between 2020 and 2024, this network experienced an annual traffic growth of approximately 50 percent, despite a relatively stable number of users. This trend suggests that the surge in data traffic is primarily fueled by existing users consuming increasingly more data, rather than an expanding user base.

Figure 22: European service provider: Subscriber and traffic volume shares of different subscriber clusters

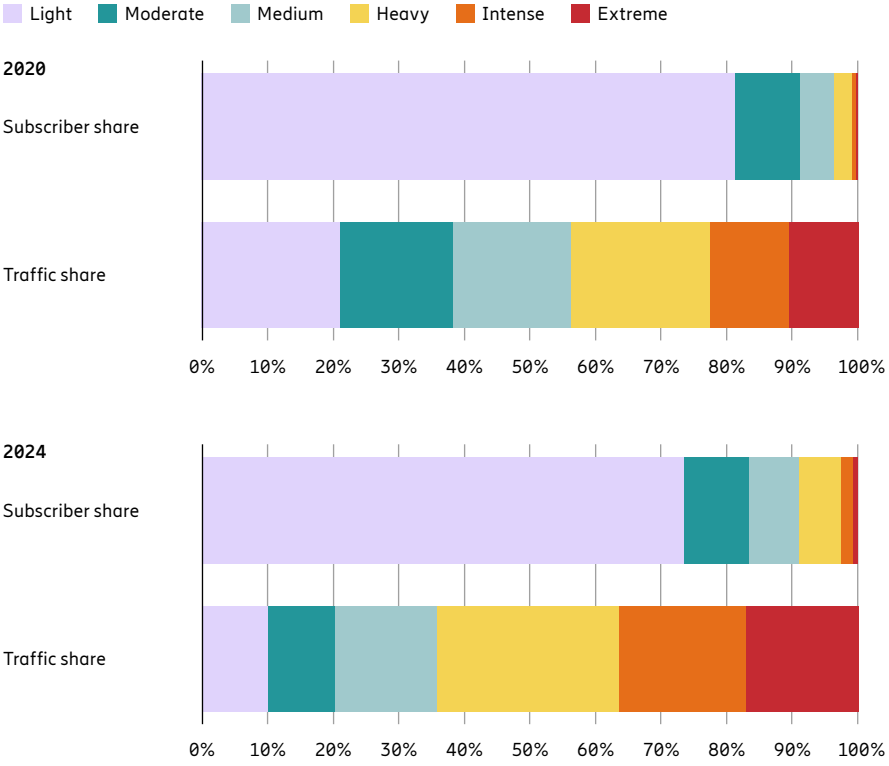
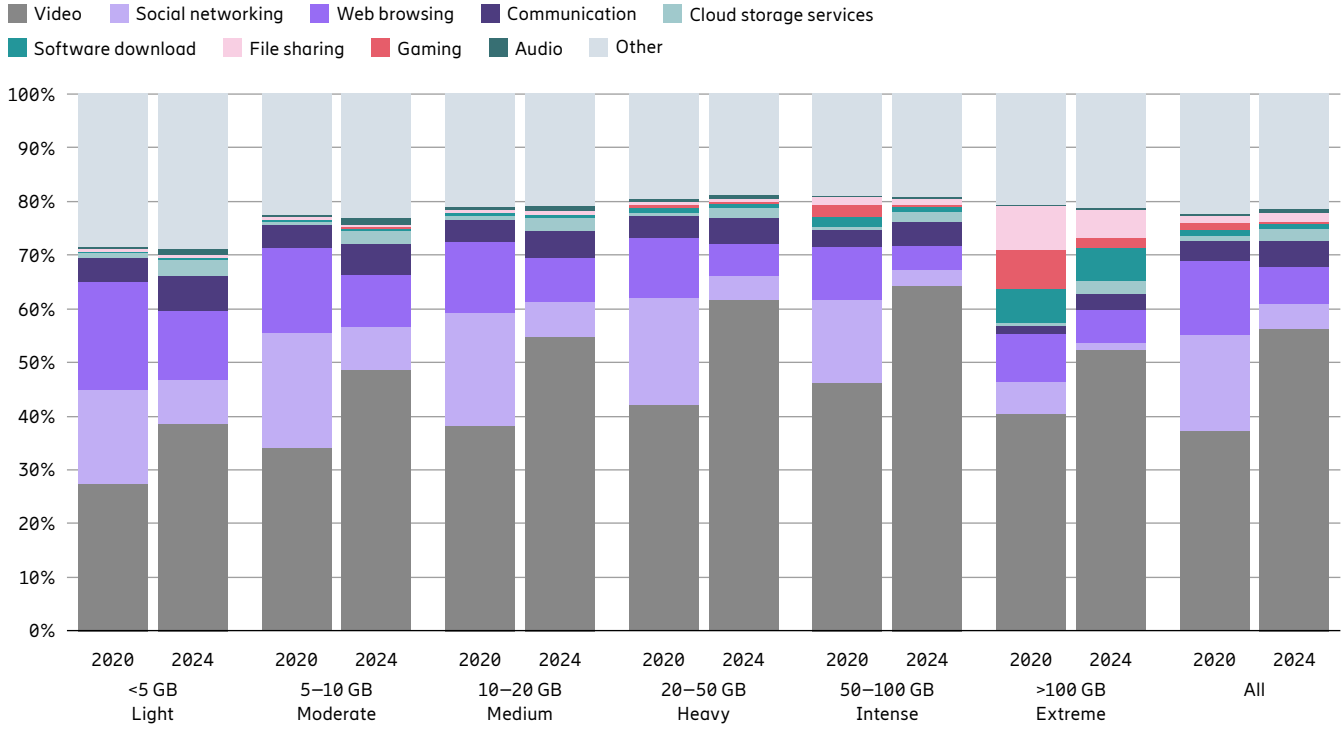


Figure 23: European service provider: Traffic volume per application type of different subscriber clusters



When analyzing the application mix and the share of traffic in the sampled European service provider´s network, it should be considered that the sample might not represent the absolute shares of the total traffic, as some traffic could not be classified. For example, the absolute share of video traffic is presumably higher across all subscriber clusters, as part of it is included in the category titled "Other".[1] However, it remains true that analyzing the relative changes in application mix across subscriber clusters provides insights into changes in application usage between 2020 and 2024.

Video traffic has become increasingly dominant, having had the strongest growth across all subscriber clusters from 2020 to 2024. The share of video traffic growth in the network was 50 percent over that period.

Aside from video, **communication** traffic, which predominantly came from Snapchat, WhatsApp, and Facebook, has seen consistent growth across all subscriber clusters, increasing its share by around 26 percent to reach about a 5 percent share of all traffic in 2024. The most significant growth is observed in the subscriber cluster that consumes more than 100 GB per month, which doubled its traffic share over the same period. However, communication traffic continues to make up a larger proportion among lower-usage subscriber clusters that consume less than 10 GB per month.

The **social networking** share of traffic appears to have decreased, but that is mostly due to the reclassification of traffic from social networking platforms, like TikTok, Instagram and Facebook, compared to 2020. For example, short videos (Reels) viewed while scrolling in the Facebook app are categorized as social networking, whereas uploading videos from the camera or phone gallery is categorized as video. In 2024, the social networking traffic share is highest among subscriber clusters with data consumption less than 10 GB per month, where it is around 8 percent of all traffic.

Web browsing saw an overall drop of 50 percent from a 14 percent share of traffic in 2020 to 7 percent in 2024.[2] Among subscribers with data consumption less than 5 GB per month, web browsing declined from 20 percent of traffic in 2020 to just 13 percent in 2024. A similar trend can be observed across all subscriber clusters with a 30–50 percent decline in web browsing traffic share over the period.

Cloud storage services almost tripled in traffic share across all subscriber clusters, going from around 1 percent to 3 percent, with the highest shares among subscribers with data consumption less than 10 GB per month.

Audio services doubled its overall traffic share from 0.4 percent to around 0.8 percent, with the strongest growth and highest shares – just above 1 percent – among subscribers with data consumption less than 10 GB per month.

Methodology
The data consumption comparative analysis between 2020 and 2024 is based on data from traffic measurements in a commercial 4G/5G network in Europe.
The analysis is restricted to data consumption on devices over cellular networks, and subscriber groups have been clustered based on their monthly data usage.

The **software download** share of traffic has the highest share among subscribers with data consumption more than 100 GB per month, where it accounts for over 6 percent of traffic. Among subscribers with data consumption lower than 10 GB per month, the traffic share for software download is well below 1 percent, but has doubled its share since 2020.

Gaming's[3] share of traffic decreased among subscribers with data consumption more than 50 GB per month, but increased its share by more than 30 percent among subscribers with data consumption less than 10 GB per month. The overall increase of gaming's share of traffic was 8 percent, reaching a 1.5 percent share of all traffic in 2024.

File sharing has decreased its share of traffic across all subscriber clusters, with a 60 percent decrease in its share of all traffic from 1.2 to 0.5 percent in 2024.

[1] Includes uncategorized traffic and traffic types such as e-mail, advertising, location services, presence, P2P TV and unclassified traffic.
[2] Due to signature updates and actual user behavior change.
[3] Includes both app-based and cloud gaming.

Methodology

Forecast methodology
Ericsson makes forecasts on a regular basis to support internal decisions and planning, as well as market communications. The forecast time in the Ericsson Mobility Report is six years and this moves forward one year in the November report each year. All estimates in Ericsson Mobility Report are for the month of December each year. The subscription and traffic forecast baseline is established using historical data from various sources, validated with Ericsson internal data, including measurements in customer networks. Future developments are estimated based on macroeconomic trends, user trends, market maturity and technological advances. Other sources include industry analyst reports, together with internal assumptions and analyses.

Historical data may be revised if the underlying data changes – for example, if service providers report updated subscription figures.

Mobile subscriptions
Mobile subscriptions include all mobile technologies. Subscriptions are defined by the most advanced technology that the mobile phone and network are capable of. Our mobile subscriptions by technology findings divide subscriptions according to the highest-enabled technology they can be used for. LTE (4G) subscriptions, in most cases, also include the possibility for the subscription to access 3G (WCDMA/HSPA) and 2G (GSM or CDMA in some markets) networks. A 5G subscription is counted as such when associated with a device that supports New Radio as specified in 3GPP Release 15, and connected to a 5G-enabled network. Mobile broadband includes radio access technologies HSPA (3G), LTE (4G), 5G, CDMA2000 EV-DO, TD-SCDMA and Mobile WiMAX. WCDMA without HSPA and GPRS/EDGE are not included. FWA is defined as a connection that provides broadband access through mobile network enabled customer premises equipment (CPE). This includes both indoor (desktop and window-mounted) and outdoor (rooftop and wall-mounted) CPE. It does not include portable battery-based Wi-Fi routers or dongles.

Rounding of figures
As figures are rounded, summing up data may result in slight differences from the actual totals. In tables with key figures, subscriptions have been rounded to the nearest 10th of a million. However, when used in highlights in the articles, subscriptions are usually expressed in full billions or to one decimal place. Compound annual growth rate (CAGR) is calculated on the underlying, unrounded numbers and is then rounded to the nearest full percentage figure. Traffic volumes are expressed to two significant figures.

Subscribers
There is a large difference between the numbers of subscriptions and subscribers. This is because many subscribers have several subscriptions. Reasons for this could include users lowering traffic costs by using optimized subscriptions for different types of calls, maximizing coverage and having different subscriptions for mobile PCs/tablets and mobile phones. In addition, it takes time before inactive subscriptions are removed from service provider databases. Consequently, subscription penetration can be above 100 percent, which is the case in many countries today. However, in some developing regions, it is common for several people to share one subscription, for example via a family- or community-shared phone.

Mobile network traffic
Ericsson regularly performs traffic measurements in around 100 live networks covering all major regions of the world. These measurements form a representative base for calculating worldwide total mobile network traffic. Mobile network data traffic also includes traffic generated by FWA services. More detailed measurements are made in a select number of commercial networks with the purpose of understanding how mobile data traffic evolves. No subscriber data is included in these measurements. Please note that the Ericsson Mobility Report data traffic forecast, both global and regional, represents the estimated traffic volume in all networks over the duration of one month in December. Traffic (in terms of throughput) in high-traffic areas will be much higher than the average traffic.

Population coverage
Population coverage is estimated using a database of regional population and territory distribution, based on population density. This is then combined with proprietary data on the installed base of radio base stations (RBS), together with estimated coverage per RBS for each of six population density categories (from metro to wilderness). Based on this, the portion of each area that is covered by a certain technology can be estimated, as well as the percentage of the population it represents. By aggregating these areas, world population coverage per technology can be calculated.

Disclaimer
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Ericsson Mobility Visualizer
Explore actual and forecast data from the Ericsson Mobility Report in our interactive web application. It contains a range of data types, including mobile subscriptions, mobile broadband subscriptions, mobile data traffic, traffic per application type, VoLTE statistics, monthly data usage per device and an IoT connected device forecast. Data can be exported and charts generated for publication subject to the inclusion of an Ericsson source attribution.

Find out more
Scan the QR code, or visit
ericsson.com/mobility-visualizer

Glossary

2G: 2nd generation mobile networks (GSM, CDMA 1x)

3G: 3rd generation mobile networks (WCDMA/HSPA, TD-SCDMA, CDMA EV-DO, Mobile WiMAX)

3GPP: 3rd Generation Partnership Project

4G: 4th generation mobile networks (LTE, LTE-A)

4K: In video, a horizontal display resolution of approximately 4,000 pixels. A resolution of 3840 × 2160 (4K UHD) is used in television and consumer media. In the movie projection industry, 4096 × 2160 (DCI 4K) is dominant

5G: 5th generation mobile networks (IMT-2020)

AI: Artificial intelligence

AR: Augmented reality. An interactive experience of a real-world environment whereby the objects that reside in the real world are "augmented" by computer-generated information

ARPU: Average revenue per user

CAGR: Compound annual growth rate

CAMARA: An open-source project to develop APIs.

Cat-M1: A 3GPP standardized low-power wide-area (LPWA) cellular technology for IoT connectivity

CDMA: Code-division multiple access

EB: Exabyte, 10^{18} bytes

FDD: Frequency division duplex

FWA: Fixed wireless access

Gaussian splatting: A 3D rendering technique that uses millions of tiny, translucent ellipsoids (or "splats") to represent a scene

GB: Gigabyte, 10^{9} bytes

Gbps: Gigabits per second

GHz: Gigahertz, 10^{9} hertz (unit of frequency)

GSA: Global mobile Suppliers Association

GSM: Global System for Mobile Communications

GSMA: GSM Association

HSPA: High speed packet access

IoT: Internet of Things

Kbps: Kilobits per second

LTE: Long-Term Evolution

MB: Megabyte, 10^{6} bytes

Mbps: Megabits per second

MHz: Megahertz, 10^{6} hertz (unit of frequency)

MIMO: Multiple Input Multiple Output is the use of multiple transmitters and receivers (multiple antennas) on wireless devices for improved performance

mmWave: Millimeter waves are radio frequency waves in the extremely high frequency range (30–300GHz) with wavelengths between 10mm and 1mm. In a 5G context, millimeter waves refer to frequencies between 24 and 71GHz (the two frequency ranges 26GHz and 28GHz are included in millimeter range by convention)

Mobile broadband: Mobile data service using radio access technologies including 5G, LTE, HSPA, CDMA2000 EV-DO, Mobile WiMAX and TD-SCDMA

Mobile PC: Defined as laptop or desktop PC devices with built-in cellular modem or external USB dongle

Mobile router: A device with a cellular network connection to the internet and Wi-Fi or Ethernet connection to one or several clients (such as PCs or tablets)

MR: Mixed reality. Immersive technology in which elements from both the real world and a virtual environment are fully interactive with each other

NB-IoT: A 3GPP standardized low-power wide-area (LPWA) cellular technology for IoT connectivity

Net Zero: Defined in ITU standards as a future state where all emissions that can be reduced are reduced, with like-for-like or permanent removals applied by carbon-removal technologies to balance the remaining emissions

Neural radiance fields: A deep learning method for creating 3D representations of scenes from 2D images

NR: New Radio as defined by 3GPP Release 15

NR-DC: NR-NR Dual connectivity

NSA 5G: Non-standalone 5G is a 5G Radio Access Network (RAN) that operates on a legacy 4G/LTE core

PB: Petabyte, 10^{15} bytes

RedCap: Reduced capability

SA: Standalone

Short-range IoT: Segment that largely consists of devices connected by unlicensed radio technologies, with a typical range of up to 100 meters, such as Wi-Fi, Bluetooth and Zigbee

Sunsetting: The process of closing down older mobile technologies

TD-SCDMA: Time division-synchronous code-division multiple access

TDD: Time division duplex

VoIP: Voice over IP (Internet Protocol)

VoLTE: Voice over LTE as defined by GSMA IR.92 specification

VR: Virtual reality

WCDMA: Wideband code-division multiple access

Wide-area IoT: Segment made up of devices using cellular connections or unlicensed low-power technologies like Sigfox and LoRa

XR: Extended reality. An umbrella category for virtual or combined real/virtual environments, which includes AR, VR and MR

Key figures

Global key figures

Mobile subscriptions	2023	2024	Forecast 2030	CAGR* 2024–2030	Unit
Worldwide mobile subscriptions	8,510	8,660	9,430	1%	million
• Smartphone subscriptions	6,930	7,130	8,290	3%	million
• Mobile PC, tablet and mobile router subscriptions	260	290	530	11%	million
• Mobile broadband subscriptions	7,400	7,710	9,050	3%	million
• Mobile subscriptions, GSM/EDGE-only	1,010	870	390	-13%	million
• Mobile subscriptions, WCDMA/HSPA	670	550	270	-11%	million
• Mobile subscriptions, LTE	5,180	4,930	2,460	-11%	million
• Mobile subscriptions, 5G	1,620	2,300	6,290	18%	million
Mobile subscriptions, 5G standalone	920	1,270	3,660	19%	million
• Fixed Wireless Access connections	130	160	350	14%	million
Fixed broadband connections	**1,530**	**1,610**	**1,990**	**4%**	**million**
Mobile data traffic					
• Data traffic per smartphone	17	19	37	11%	GB/month
• Data traffic per mobile PC	23	26	40	8%	GB/month
• Data traffic per tablet	13	16	27	10%	GB/month
Total data traffic**					
Mobile data traffic	106	123	280	15%	EB/month
• Smartphones	104	121	274	15%	EB/month
• Mobile PCs and routers	1.0	1.2	3.0	16%	EB/month
• Tablets	0.9	1.0	2.3	15%	EB/month
Fixed Wireless Access	31	41	151	24%	EB/month
Total mobile network traffic	137	164	431	17%	EB/month
Total fixed data traffic	330	380	710	11%	EB/month

Regional key figures

Mobile subscriptions	2023	2024	Forecast 2030	CAGR* 2024–2030	Unit
North America	440	450	480	1%	million
Latin America	720	730	800	1%	million
Western Europe	550	550	570	0%	million
Central and Eastern Europe	560	560	560	0%	million
North East Asia	2,210	2,260	2,380	1%	million
China[1]	1,740	1,790	1,860	1%	million
South East Asia and Oceania	1,160	1,180	1,290	1%	million
India, Nepal and Bhutan	1,180	1,190	1,310	2%	million
Middle East and North Africa	730	740	820	2%	million
Gulf Cooperation Council (GCC)[2]	77	81	95	3%	million
Sub-Saharan Africa	950	1,000	1,270	4%	million

Smartphone subscriptions	2023	2024	Forecast 2030	CAGR* 2024–2030	Unit
North America	380	390	400	0%	million
Latin America	600	620	720	3%	million
Western Europe	490	500	490	0%	million
Central and Eastern Europe	450	480	530	1%	million
North East Asia	2,080	2,140	2,270	1%	million
China[1]	1,660	1,710	1,790	1%	million
South East Asia and Oceania	970	1,000	1,160	2%	million
India, Nepal and Bhutan	880	920	1,130	3%	million
Middle East and North Africa	630	540	700	4%	million
GCC[2]	66	70	85	3%	million
Sub-Saharan Africa	460	540	890	9%	million

Regional key figures

LTE subscriptions	2023	2024	Forecast 2030	CAGR* 2024–2030	Unit
North America	170	130	40	-16%	million
Latin America	530	530	230	-13%	million
Western Europe	380	310	40	-29%	million
Central and Eastern Europe	450	480	240	-11%	million
North East Asia	1,200	1,020	330	-17%	million
China[1]	880	720	170	-22%	million
South East Asia and Oceania	910	930	570	-8%	million
India, Nepal and Bhutan	730	620	230	-15%	million
Middle East and North Africa	470	500	300	-8%	million
GCC[2]	46	39	6	-26%	million
Sub-Saharan Africa	335	410	470	2%	million

5G subscriptions	2023	2024	Forecast 2030	CAGR* 2024–2030	Unit
North America	257	316	440	6%	million
Latin America	33	63	480	N/A	million
Western Europe	142	227	530	15%	million
Central and Eastern Europe	18	31	320	N/A	million
North East Asia	938	1,178	2,020	9%	million
China[1]	805	1,014	1,680	9%	million
South East Asia and Oceania	61	111	630	N/A	million
India, Nepal and Bhutan	135	290	980	23%	million
Middle East and North Africa	35	67	500	N/A	million
GCC[2]	26	37	86	15%	million
Sub-Saharan Africa	5	11	400	N/A	million

Data traffic per smartphone	2023	2024	Forecast 2030	CAGR* 2024–2030	Unit
North America	19	22	43	12%	GB/month
Latin America	11	13	29	14%	GB/month
Western Europe	19	22	47	13%	GB/month
Central and Eastern Europe	17	20	40	13%	GB/month
North East Asia	19	20	36	10%	GB/month
China[1]	19	21	37	10%	GB/month
South East Asia and Oceania	17	19	38	12%	GB/month
India, Nepal and Bhutan	29	32	62	11%	GB/month
Middle East and North Africa	14	19	43	15%	GB/month
GCC[2]	28	29	45	8%	GB/month
Sub-Saharan Africa	4.6	5.0	14	19%	GB/month

Total mobile data traffic	2023	2024	Forecast 2030	CAGR* 2024–2030	Unit
North America	7.4	8.6	18	13%	EB/month
Latin America	5.8	6.9	18	17%	EB/month
Western Europe	8.4	9.9	21	13%	EB/month
Central and Eastern Europe	5.9	7.2	16	14%	EB/month
North East Asia	33	37	72	12%	EB/month
China[1]	29	32	61	11%	EB/month
South East Asia and Oceania	15	17	40	15%	EB/month
India, Nepal and Bhutan	21	25	58	15%	EB/month
Middle East and North Africa	7.8	9.1	27	20%	EB/month
GCC[2]	1.5	1.6	3.1	12%	EB/month
Sub-Saharan Africa	1.9	2.3	11	29%	EB/month

[1] These figures are also included in the figures for North East Asia.
[2] These figures are also included in the figures for Middle East and North Africa.

* CAGR is calculated on unrounded figures.
** Figures are rounded (see methodology) and therefore summing up of rounded data may result in slight differences from the actual total.

About Ericsson

Ericsson's high-performing networks provide connectivity for billions of people every day. For nearly 150 years, we've been pioneers in creating technology for communication. We offer mobile communication and connectivity solutions for service providers and enterprises. Together with our customers and partners, we make the digital world of tomorrow a reality.

www.ericsson.com

Ericsson
SE-164 80 Stockholm, Sweden
Telephone +46 10 719 0000
www.ericsson.com

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