Nasjonal kommunikasjons-myndighet

Internet in Norway – Annual Report 2024

20 June 2024

Overall status of internet in Norway

Nkom's report "Internet in Norway" presents the annual reporting on net neutrality, which is a statutory task based on the Open Internet Regulation. The report is also an assignment given by DFD (the Norwegian Ministry of Digitalisation and Public Governance) to Nkom under Report to the Norwegian Parliament 28 (2020-2021).

Status of net neutrality in Norway

The Open Internet Regulation states that national regulatory authorities have monitoring and reporting obligations to ensure that providers of internet access services fulfil their obligations regarding open internet access. Based on dialogue meetings with the largest internet service providers and information available on the providers' websites, Nkom concludes that the status of net neutrality in Norway is still very good.

The preamble to the Regulation highlights the importance of ensuring that specialised services and the use of such services do not reduce the general quality of end-users' access to the internet. Nkom has applied BEREC's assessment method and the results show that the development of download speed, upload speed and latency for mobile internet access is at an acceptable level.

Infrastructure and traffic development

The internet infrastructure in Norway has high capacity and good quality. There is annual growth of around 20-30% in internet traffic for both fixed and mobile internet access in Norway. Streaming services are the biggest traffic driver, accounting for around 70% of network traffic. In the last year, Norwegian internet service providers have significantly increased the activation of IPv6 for their subscribers.

The interconnection trends show that traffic on NIX is now almost back at the level during the pandemic. Traffic from CDN internally in the providers' network constitutes a large share of internet interconnection. Internet service providers in Norway report that this accounts for more than half of the total interconnection traffic volume in the networks today.

Regulatory development

Over the past year, internet regulatory development has made great progress. The first wave of internet-related legislation from the EU, consisting of the *Digital Services Act* and the *Digital Markets Act,* was fully introduced for member states as from 17 February 2024. Preparations for the inclusion of this legislation in the EEA Agreement are ongoing, so that this legislation can be prepared for implementation in Norwegian law.

An agreement has also been reached within the EU on the second wave consisting of the *Data Act* and the *AI Act*. The Data Act was published in December 2023 and the AI Act is expected to be published by mid July 2024.

There are also major developments in security regulation. The *NIS2 Directive* will be implemented by EU member states by 17 October this year. It is furthermore proposed that requirements in the *Cyber Resilience Act* will replace equivalent requirements in the Radio Equipment Directive. The revised *eIDAS Regulation* is being finalised.

The internet ecosystem

The internet economy is an interaction between many different categories of players, from internet service providers to content and application providers. During the past year, WIK Consult conducted a

market survey on behalf of Nkom to map the internet ecosystem in Norway. The project report indicates a functional and mature ecosystem for the core internet functions in Norway.

The report concludes that the authorities' policy for access network, interconnection and data centres has been successful. The internet in Norway makes effective use of content distribution networks (CDN) for the benefit of all stakeholders, and Norway is well-positioned for cloud services, with short response times from the data centre establishments.

1 Status of net neutrality in Norway

The status of net neutrality in the Norwegian market is still generally good. The work on this year's report did not reveal any major changes or deviations compared with last year's assessment.

1.1 Introduction and background

Net neutrality is the principle that all internet communications must be treated equally, regardless of sender, recipient, equipment, application, service or content. A European Open Internet Regulation was introduced in 2015 and implemented in Norwegian law in 2017. The main purpose of the regulation is "establish common rules to safeguard equal and non-discriminatory treatment of traffic in the provision of internet access services and related end-users' rights. It aims to protect end-users and simultaneously to guarantee the continued functioning of the internet ecosystem as an engine of innovation."[1]

The regulatory follow-up is also based on BEREC's open internet guidelines, established pursuant to Article 5(3) of Regulation 2015/2120. According to recital 19, the national regulatory authorities must "take utmost account of" relevant guidelines from BEREC in their application of the Regulation.

This report covers the period from 1 May 2023 to 30 April 2024.

Regulatory development

During the reporting period, Nkom in particular followed up on the industry with regard to the consequences of zero-rating being declared illegal by the Court of Justice of the European Union in 2022. The "Music Freedom" zero-rating service was withdrawn from the market by Telenor and Telia during the previous reporting period, while zero-rating of own customer care services was removed before the end of the last reporting period.

In dialogue meetings with Norwegian internet service providers (Telenor, Telia and Lyse), Nkom also addressed the regulatory basis for offering DNS-based security filters, cf. Article 3(3)(b) of the Regulation. The background to the discussion is Nkom's memorandum of principle on DNS-based security measures from November 2021, and the BEREC workshop on the topic in June 2024.

[1] Recital 1 of Regulation 2015/2120.

1.2 Access to an open internet

Nkom's follow-up of Norwegian internet service providers shows that Norwegian internet users benefit from open access to the internet via their subscriptions to fixed and mobile internet access services. The internet service providers' reports indicate that the traffic management used is in line with the Open Internet Regulation.

1.2.1 The right to an open internet access service

End-users have the right to an open internet access service, where they can determine for themselves what the access is used for, in terms of which content is retrieved or delivered, and which applications are used or offered, based on Article 3(1) of the Regulation. The internet service provider must transmit traffic in the network on a non-discriminatory basis, but has the opportunity for certain forms of traffic management, such as blocking traffic for security reasons.

Internet service providers may also offer specialised services, such as voice over IP and IPTV, in parallel with the internet access service, if these are subject to quality requirements that cannot be offered via the internet. Furthermore, specialised services may only be provided if the network capacity is sufficient to avoid compromising the availability and general quality of internet access services for end-users (see Chapter 1.4).

1.2.2 Traffic management of internet access

As part of the data collection for the annual electronic communications statistics, Nkom obtained information from Norwegian internet service providers concerning the traffic management of internet access services. The results for this year do not differ significantly from the results for last year.

According to the information obtained, typical traffic management measures include the blocking of domain names in DNS pursuant to a judicial order, the Kripos Child Abuse Filter, and blocking of TCP/UDP ports in connection with specific security measures (for example, to prevent DDoS (Distributed Denial of Service) attacks and other types of cyber-attacks).

In the Norwegian market, speed-differentiated mobile internet access is offered. In its guidelines, BEREC describes how such subscriptions are in line with the Regulation for as long as the subscriptions are application-agnostic, which means that all applications are treated with equal traffic management.

1.2.3 Specialised services

Nkom has also obtained information about specialised services, i.e. other services offered in parallel with the internet access service and that fulfil specific criteria in the regulation. The most typical specialised service in fixed networks is voice over IP. Similarly, VoLTE is commonly offered as a specialised service in mobile networks.

Nkom also asked how the providers ensure that the network capacity is sufficient to ensure that the specialised services are not to the detriment of the general quality of the internet access service for end-users. The general response to this is that the traffic at the connections in the network is monitored continuously, and that capacity is expanded as needed.

Nkom has not undertaken more detailed surveys of the reported traffic management measures and specialised services, but assumes that these are provided in accordance with the Regulation. In the future, Nkom will be able to initiate more detailed surveys of the measures.

1.3 Information about the internet access service

Nkom's review of the Internet service providers' websites shows that the providers generally provide satisfactory information about traffic management measures and speed parameters. On a few websites, it can, however, be challenging to find relevant information.

1.3.1 Information requirements

Requirements concerning information about the internet access service that providers are to make available to their end-users are set out in Article 4 of the Regulation. Article 4(1) sets out requirements for transparency of agreements between provider and end-user, while Article 4(2) regulates the provider's obligation to ensure transparent, simple and effective complaints handling procedures.

Nkom has conducted a review of relevant providers' websites and assessed compliance with Article 4 of the Regulation. Below are some comments concerning the review.

1.3.2 Traffic management information

Providers of internet access services are obliged to notify which traffic management measures are used.

Current traffic management measures are described further in subchapter 1.2. According to the Regulation, providers must include information about the measures in the agreement terms and make these publicly available, typically on the provider's website. Even if the providers can document that the information is made public, it is also relevant to assess the content and quality of the information.

Nkom's review shows that providers have a varying, but generally satisfactory, representation of traffic management measures. It can be challenging to find the relevant information on some websites. Some providers have dedicated net neutrality pages, where traffic management is one of several topics. Other providers inform more directly about traffic management in terms and conditions, and on their websites. Dedicated thematic sites provide end-users with more comprehensive information about net neutrality, but in Nkom's view both solutions are consistent with the Regulation.

1.3.3 Speed information

Fixed internet access services

It follows from Article 4(1)(d) of the Regulation that the end-user must be informed of the speed which the provider is realistically capable of delivering.

Fixed internet access service providers must specify the following parameters for both download and upload speeds:

- Minimum speed
- Normally available speed
- Maximum speed
- Advertised speed

"Normally available speed" is the speed that an end-user can expect to achieve for most of the time that they use the service. It is probably this parameter that provides the end-user with the most relevant information about the performance of the internet access service. With regard to the Regulation's requirements of transparency, BEREC considers certain types of fixed wireless access to be fixed internet access. This is, for example, the case where wireless technology (including mobile) is

used for internet access at a fixed location with dedicated equipment, and uses either capacity reservation or dedicated frequency bands. In such cases, requirements concerning the availability of information in contracts and on the provider's website should be in accordance with the requirements that apply to fixed internet access services.

Concerning fixed internet access services, Nkom observes that providers generally disclose the various speed parameters required under the regulation.

Mobile internet access services

In mobile networks, the speed normally available in a given cell is difficult to predict, due to the varying number of active users. For this reason, only fixed internet access service providers are required to provide information about this speed parameter.

However, the regulation requires providers of mobile internet access services to specify the following parameters concerning speed:

- Estimated maximum speed
- Advertised speed

Mobile internet access services include both ordinary mobile subscriptions and dedicated internet subscriptions, since both are services that provide access to the internet. Ordinary mobile subscriptions support both internet access and telephony/text messages, while dedicated internet subscriptions solely support internet access. The former is often used via mobile phone, while the latter is often used via a router.

With regard to dedicated internet subscriptions in the mobile network, a distinction is often made between "fixed wireless internet access" (FWA) offered at a fixed geographical location, often with a fixed outdoor antenna, and "dedicated mobile internet access" that can be used freely at different geographical locations within the coverage area. These differences can lead to varying conditions for the internet access speed achieved for the subscriptions.

For mobile internet access services, Nkom observes that providers generally disclose the various speed parameters required under the regulation.

Conclusion

Nkom's review shows that, to varying degrees, providers present the information about the internet access service on an easy-to-understand basis. On some websites, it can be challenging to find the relevant information . End-users should therefore be aware of what information they are looking for, or contact their provider for specific instructions on where the information is available.

1.4 Quality of the internet access service

The speed of fixed internet access services continues the favourable trend from the previous reporting period. The average download and upload speeds for fixed internet access in 2024 are 151 Mbit/s and 131 Mbit/s, respectively.

The average download speed, upload speed and latency for the 5G networks in Norway in 2024 were 245 Mbit/s, 43 Mbit/s and 37 milliseconds (ms), respectively.

1.4.1 Requirements of the quality of the internet access service

Article 5 of the Regulation states that national regulatory authorities have monitoring and reporting obligations to ensure that providers of internet access services fulfil their obligations regarding open internet access. Furthermore, the regulator must promote non-discriminatory internet access with a quality level that reflects the technological development.

Recital 17 highlights the importance of ensuring that specialised services and the use of such services do not reduce the general quality of end-users' access to the internet. Concerning internet access via mobile networks, some of the requirements are eased due to the particular circumstances associated with varying numbers of active users per cell, as well as non-homogeneous coverage. Yet over time, in this case too it is expected that the general quality of the internet access will be maintained.

1.4.2 Regulatory follow-up

A regulatory measure to follow up on Article 5(1) of the Regulation is to monitor the development in the quality of their internet access service measured by end-users. In this report, Nkom has assessed the results from Nkom's Nettfart measurement tool, which can be used via web browser and/or mobile application. Nettfart is based on crowd-sourcing whereby the users themselves actively perform measurements and thereby produce the data basis that Nkom analyses.

As for all forms of crowd-sourcing, the statistical basis may not be fully representative. The measurement results nonetheless provide an indication of the quality of the internet access service experienced by the end-users. Review of the underlying data also shows that, over time, information is collected from a very large proportion of the Norwegian providers.

1.4.3 Measurement results

Measurement results from nettfart.no

In this subchapter, results from measurements made via nettfart.no are presented. For fixed internet access, the development in average speed across various subscriptions is presented.

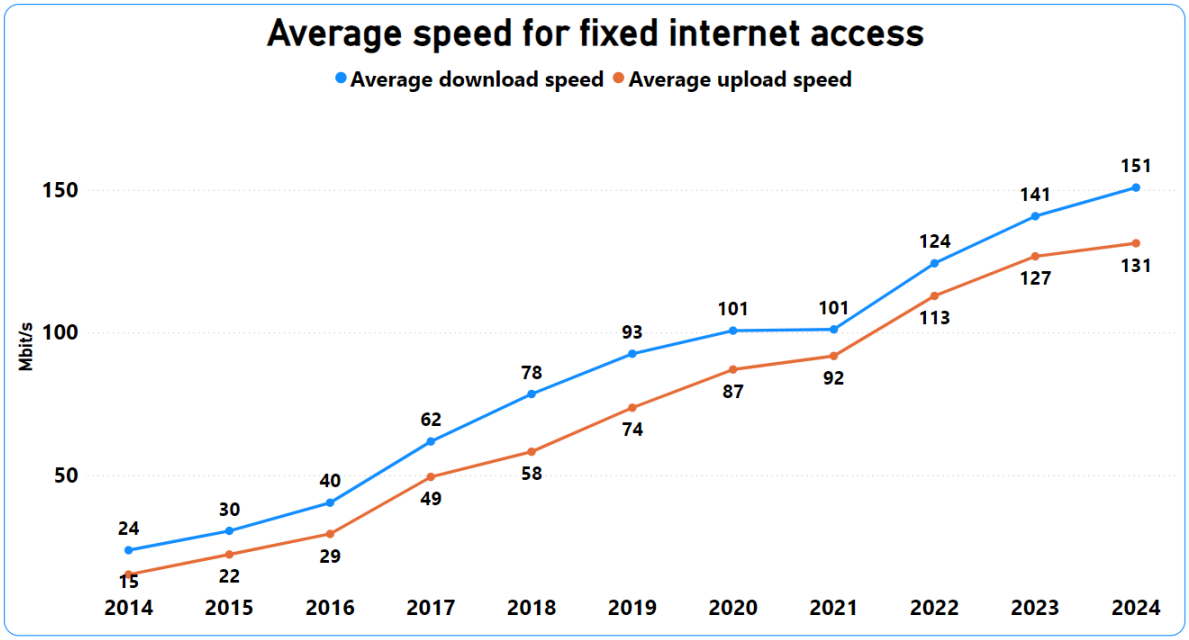

Figure 1 – Average speed for fixed internet access (source: nettfart.no)

Figure 1 shows that, so far in 2024, the average download speed measured across the end-users' various subscriptions is around twice as high as in 2018[4]. The growth appears to be continuing, and stands at around 10-20 Mbit/s per year.

Measurement results from the Nettfart mobile app

Here, results measured via the Nettfart mobile app are presented: first as average speed per technology (4G, 5G and WLAN), and then as key figures for measurements via 5G performed by customers in the mobile networks in 2024.

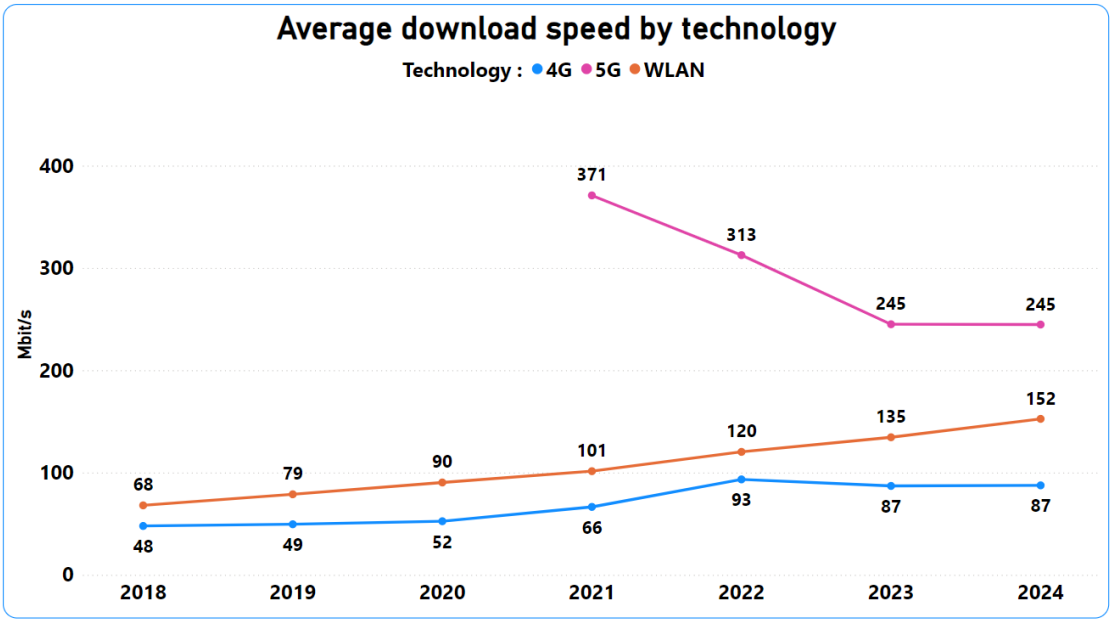

Figure 2 – Average download speed per technology (source: nettfart mobile app)

Figure 2 shows the average download speed per technology. The figure shows that users achieve significantly higher download speeds when measuring via 5G, compared to measurements via 4G and WLAN. For 5G and 4G, the figure shows a flattening download speed trend. The average download speed for 4G and 5G in 2024 is identical to the figures from 2023, which may indicate that mobile operators have not overall increased capacity in the networks in the past year, but this trend may change towards year-end. The reason for the unchanged download speed for 5G is uncertain. This may be a result of the network capacity not being expanded, and/or it may be due to the proportion of 5G phones increasing sharply, which in turn leads to increased load in the providers' 5G network.

The average speed of WLAN is still slightly increasing and within one year increased by 13%. Concerning WLAN measurements, however, it is uncertain which transmission technology is used to and from the home for the individual measurements. This may be fibre, hybrid cable or fixed wireless access (FWA).

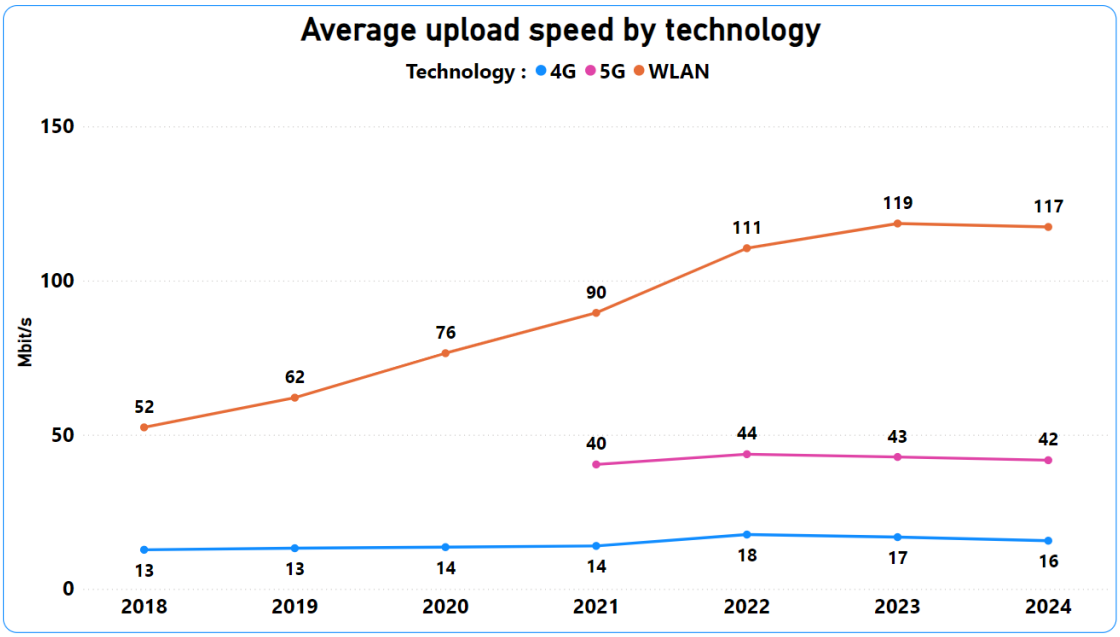

Figure 3 – Average upload speed by technology (source: nettfart mobile app)

Figure 3 shows that mobile technologies (4G and 5G) have a lower upload speed than observed for measurements made via WLAN. One possible explanation is that WLAN is more broadly connected to access lines with symmetrical properties, as offered by many fibre subscriptions.

The figure also shows that the average upload speed via the mobile networks is at a far lower level than in the case of download speeds (cf. Figure 2). The explanation is probably that the mobile networks reserve a larger proportion of the available frequency spectrum for download, since it can be assumed that this is the dominant direction of traffic between the internet and the individual customer.

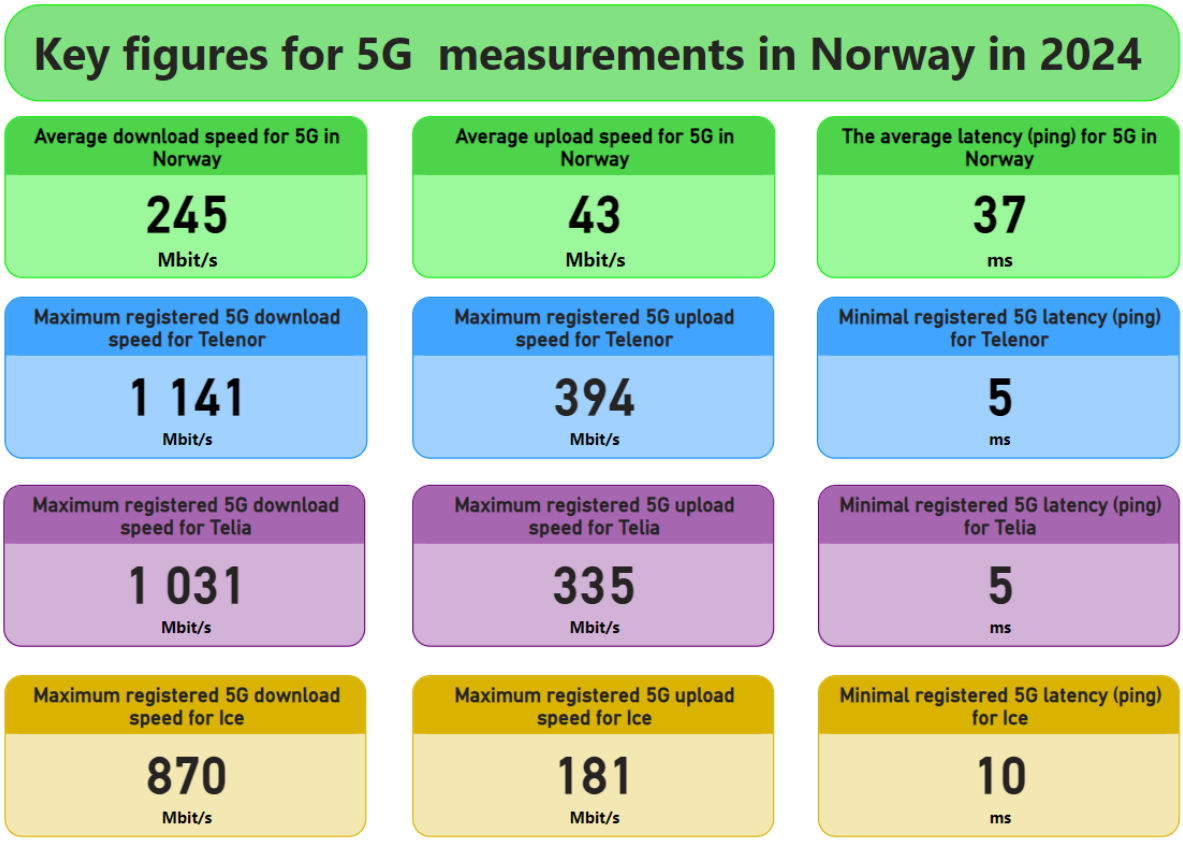

Figure 4 - Key figures for the 5G networks in Norway for 2024 (source: nettfart mobile app)

Figure 4 shows selected key figures for 5G measurements in the mobile networks in 2024. The average download speed, upload speed and latency for the 5G networks in Norway in 2024 were 245 Mbit/s, 43 Mbit/s and 37 milliseconds (ms), respectively. Measurements from the Nettfart mobile app show the 5G technology's potential to offer internet access at high speeds and with low latency.

1.4.4 General quality of the internet access service

Nkom has applied BEREC's method of evaluating the general quality of the internet access service to the measurements made in the mobile networks. The method uses a forecasting function based on average download, upload and latency from the previous years and uses these to estimate expectations for subsequent years. Estimated and measured values can then be compared to see if there are large deviations in the results.

The figures below show forecast download and upload speeds, as well as latency, for measurements made in the mobile networks in Norway, aggregated for all mobile operators. The blue line shows the measured values and the pink dashed line shows the forecast for 2023.

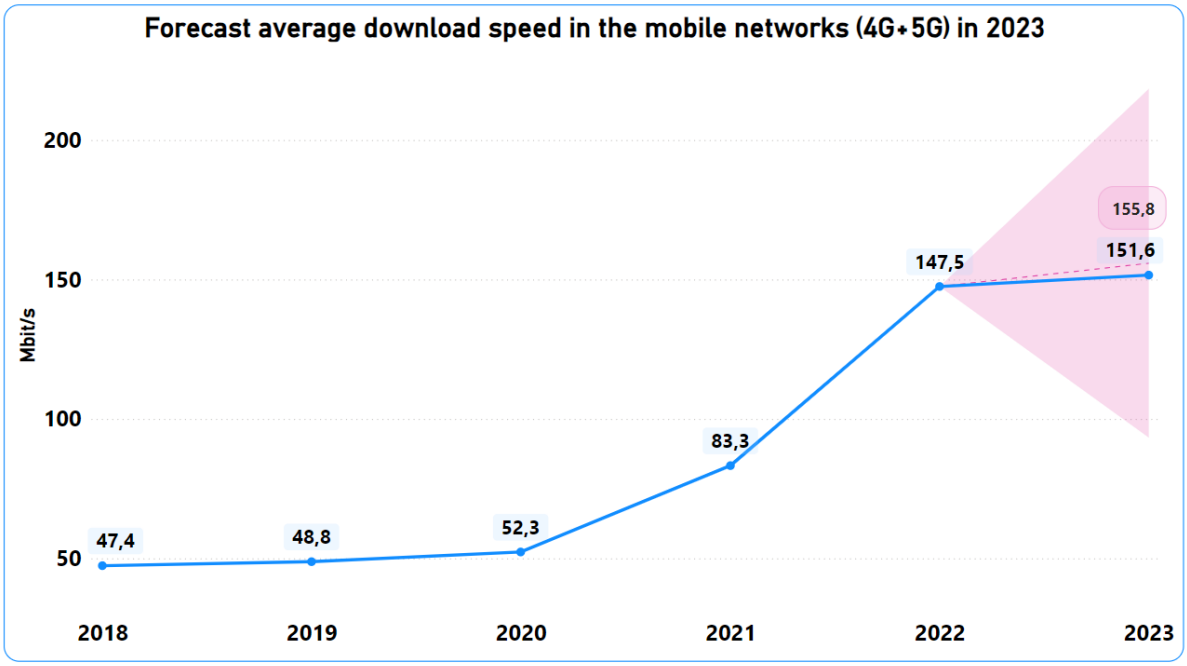

Figure 5 – Forecast average download speed in the mobile networks in 2023

Figure 5 shows the average download speed forecast for 2023 of 156 Mbit/s, while the measured average value was 152 Mbit/s. This shows that the development in download speed in the mobile networks has fallen short of the forecast for 2023, yet the deviation values is at an acceptable level. The results in this figure correspond to the findings from Figure 2 (*Average download speed per technology*) regarding the flattening average download speed for 4G and 5G.

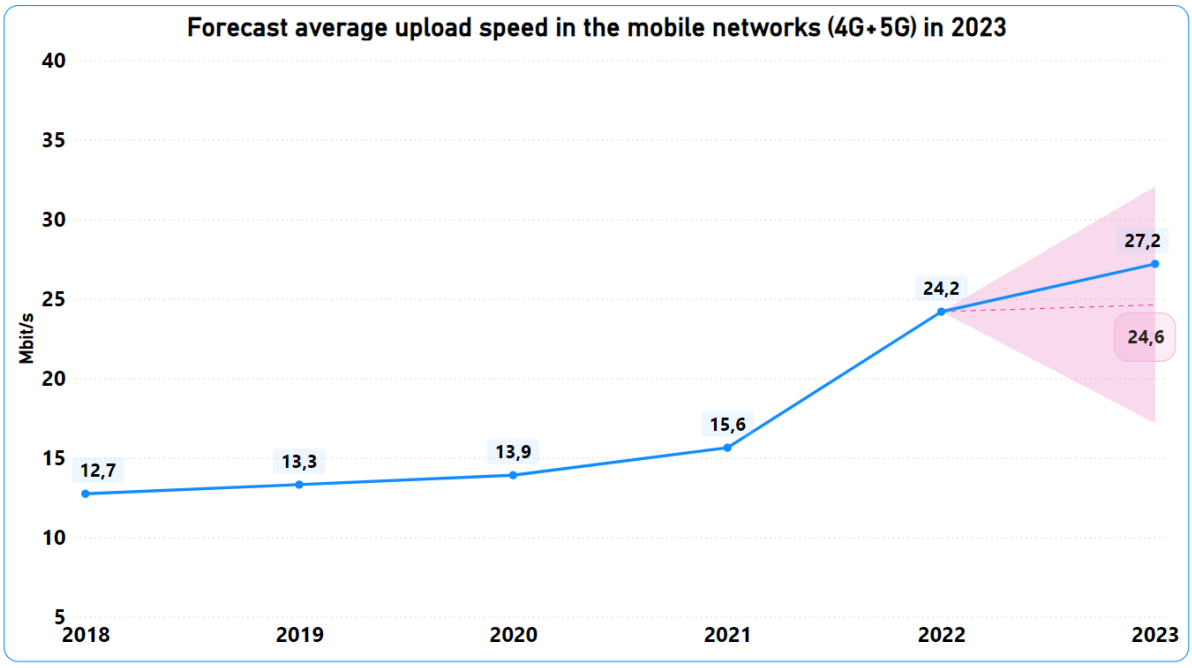

Figure 6 – Forecast average upload speed in the mobile networks in 2023

Figure 6 shows the average upload speed forecast for 2023 of 25 Mbit/s, while the measured average value was 27 Mbit/s. This shows that the development of upload speed in the mobile networks has been more positive than the forecast.

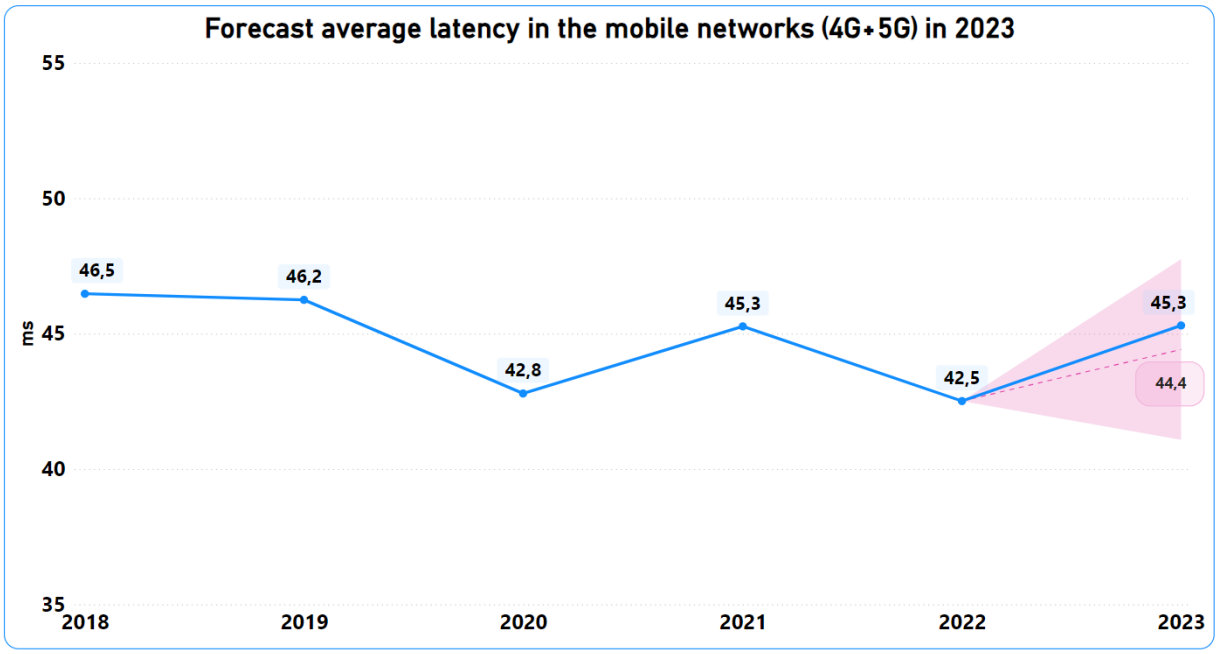

Figure 7 – Forecast average latency in the mobile networks in 2023

Figure 7 shows the forecast average latency for 2023 at 44 ms, and that the measured average value was 45 ms. This shows that the development in mobile network latency has been somewhat lower than the forecast for 2023.