


Report:
Net Neutrality Report
2018/2019

Report to the European Commission and
BEREC according to regulation (EU)
2015/2120



Net Neutrality Report 2018/2019

Report Number

PTS-ER-2019:15

Reference Number

19-6132

ISSN

1650-9862

Author

Market Regulation Department

Swedish Post and Telecom Authority

Box 5398

102 49 Stockholm

08-678 55 00

pts@pts.se

www.pts.se

PTS hereby provides an unofficial translation of its Net Neutrality Report 2018/2019
--

Table of Content

- 1 Background and summary of the reporting period 5**
 - 1.1 Background..... 5**
 - 1.2 Summary of the report period..... 5**
- 2 Description of the Swedish market..... 6**
 - 2.1 The market for internet access services..... 6**
 - 2.2 Market shares 6**
 - 2.3 Investments 6**
 - 2.4 Technology 8**
 - 2.5 Offers on the Swedish market..... 9**
- 3 Supervision and activities during the reporting period..... 11**
 - 3.1 Supervision according to article 3..... 11**
 - 3.1.1 Supervision according to article 3.3 – Telia 11**
 - 3.1.2 Supervision according to article 3.2 – Telia 11**
 - 3.1.3 Supervision according to article 3.3 – Bahnhof..... 11**
 - 3.1.4 Supervision according to article 3.3 – Telia 12**
 - 3.2 Activities..... 12**
 - 3.2.1 Measurement of internet access 12**
 - 3.2.2 Development of average up- and download speeds 13**
 - 3.2.3 The Agency’s work with 5G..... 14**
 - 3.2.4 The Agency’s work in Berec..... 14**

Figures

Figure 1 Market shares - total broadband subscriptions 6

Figure 2 Investments in fixed and mobile broadband infrastructure 7

Figure 3 The operators shares of investments in fixed and mobile broadband
infrastructure 2018 8

Figure 4 Geographic coverage of 4G networks allowing 10 Mbit/s 8

Figure 5 Househols with broadband subscriptions via fiber 9

Figure 6 Development of subscriptions of broadband 9

Figure 7 Average speed (Mbit/s) to receive data per technology 13

Figure 8 Average speed (Mbit/s) to send data per technology 13

Figure 9 Average speed (Mbit/s) to send and receive data per technology with
command line interface tool 13

1 Background and summary of the reporting period

1.1 Background

According to article 5.1, second paragraph of the Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union, hereinafter the TSM Regulation, the national regulatory authorities shall on an annual basis report their monitoring of open internet/net neutrality. The report shall be published annually and be provided to the Body of European Regulators for Electronic Communications (BEREC) and the European Commission by June 30, covering the period from May 1, to April 30.

This report is the third net neutrality report to be published by PTS since the TSM Regulation entered into force.

This report describes the supervision and activities that PTS has conducted during the period May 1, 2018 to April 30, 2019 in order to monitor and ensure that Swedish end users have access to an open internet access in accordance with the rules of the TSM Regulation

1.2 Summary of the report period

In the first net neutrality report¹ PTS described in detail its views on the Swedish market and that PTS' perception was that a well-functioning competition on the market for internet access services reduces the risk of operators acting in violation of the rules of an open internet.

A significant event during the period is the fusion between Tele2 AB (publ) and Com Hem Holding AB.

The fixed broadband market is still more geographically fragmented than the mobile broadband market. Several operators offer mobile subscriptions with unlimited data. There are also subscriptions entailing that certain services can be used without deduction of data, so called zero-rating. In addition to the zero-rating offers described below under section 3.1 (supervisions) there are also other zero-rating offers on the Swedish market.

During the reporting period, PTS continued to supervise and monitor the market.

PTS continuously tracks the statistics published by the independent measurement tool "Bredbandskollen".² The figures for the reporting period have not yet, at the time of the dispatch of this report, been published.

Overall, the Swedish market for internet access services is characterized by good options for end-users to choose between internet service providers, which affects the access to an open internet positively. The availability of subscriptions including unlimited data, currently offered by four operators on the Swedish mobile market, further influences the access to an open internet in a positive way.

¹ Net Neutrality Report 2016/2017, Report to the European Commission and BEREC according to regulation (EU) 2015/2120, PTS-ER-2017:15, 2017-06-26

² Bredbandskollen is a free of charge tool helping internet users to evaluate their internet access either via a mobile phone or a computer.

2 Description of the Swedish market

2.1 The market for internet access services

The Swedish market for internet access services is characterized by good accessibility for end users, both in terms of fixed and mobile broadband. Furthermore, end users' access to the latest technologies and the most futureproof access forms fibre and 4G technology (LTE) is relatively good. Operators are investing in order to meet an increasing demand for higher bandwidth and transmission speed.

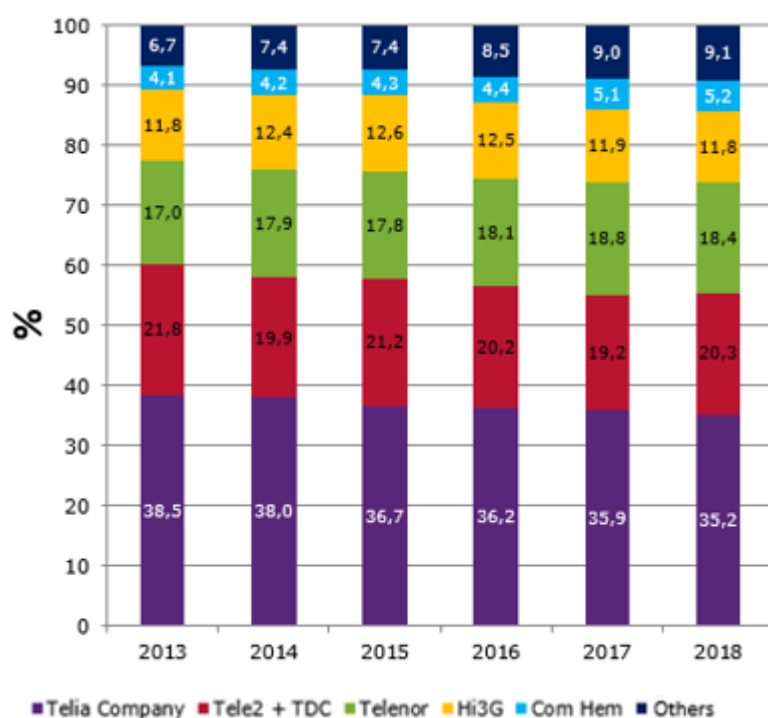
At national level, Sweden has four major operators in the total market for internet access services (fixed and mobile), with varying market shares. The mobile broadband market is more concentrated compared to the fixed broadband market, which is more characterized by local and regional operators (municipal networks).

Overall, the possibility for end users to choose internet service providers has a positive impact on the end users' access to an open internet.

2.2 Market shares

The level of market shares of the five major operators on the Swedish broadband market has been relatively stable in recent years, but after the fusion between Tele2 and Com Hem in 2018 the majors have been reduced to four. Telia, Telenor and Tele2 are active on both the fixed and mobile broadband markets while Tre (Hi3G) is active only on the market for mobile broadband.

FIGURE 1 Market shares – total broadband subscriptions



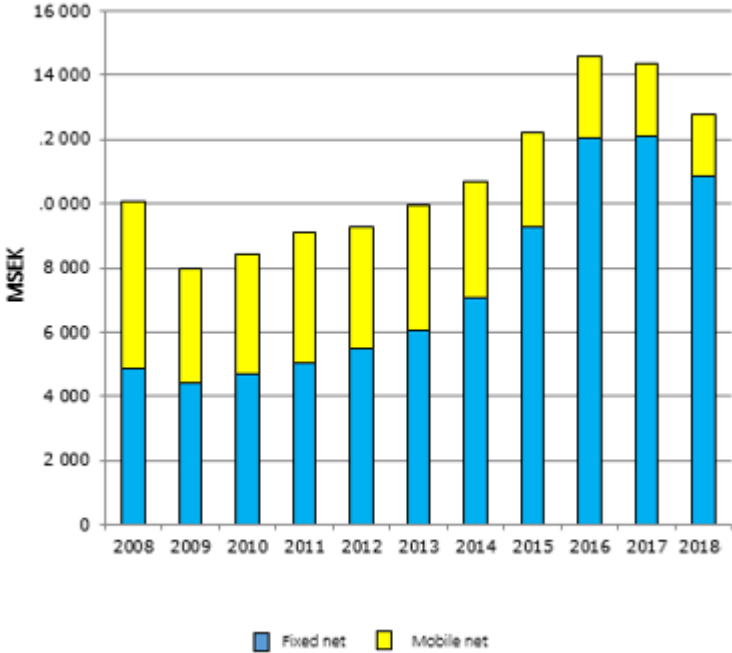
Source: Svensk Telekommarknad, PTS-ER-2019:13 with appurtenant figures

2.3 Investments

To meet the end users' demand for increased bandwidth, many operators invest in infrastructure in large scale. Figure 2 below shows that the investments in fixed broadband infrastructure increased between 2009 and 2017. The increase was primarily driven by a major roll-out of fibre. According to PTS' estimation the investment in fixed broadband decreased with about 10 percent between 2017 and 2018. Investments in mobile broadband infrastructure has decreased since 2011, which is largely explained by

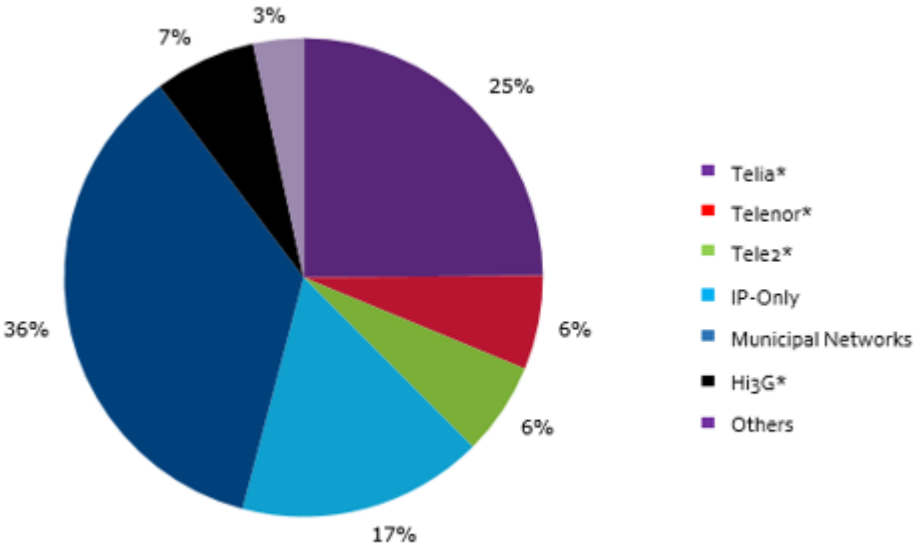
the fact that the roll-out of 4G (LTE) has resulted in a good geographic coverage and almost a full population coverage.

FIGURE 2 Investments in fixed and mobile broadband infrastructure



Source: PTS and annual reports from the operators

FIGURE 3 The operators' shares of investments in fixed and mobile broadband infrastructure 2018



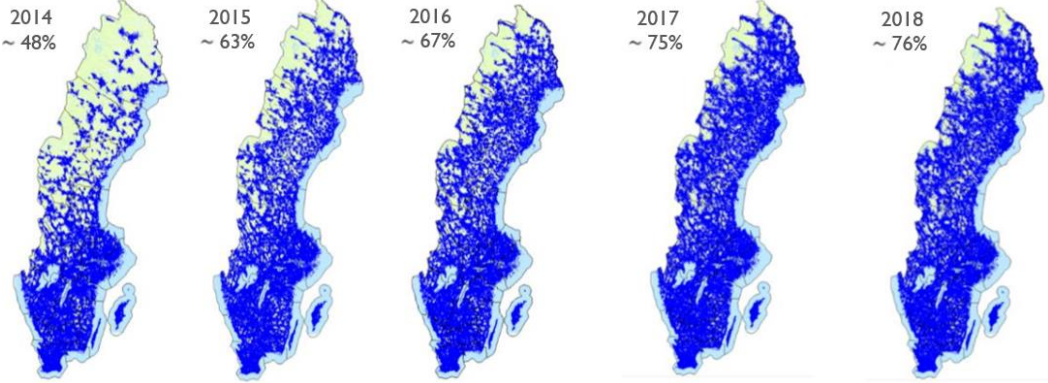
Source: PTS and annual reports of the operators

*Investments in common net companies split from ownership

2.4 Technology

The roll-out of the latest technologies for both fixed and mobile broadband infrastructure (4G and fibre) across the country is far advanced in Sweden. By the end of 2018, Sweden had a 76 percent geographical coverage of 4G networks, almost a full population coverage allowing a 10 Mbit/s surf speed.

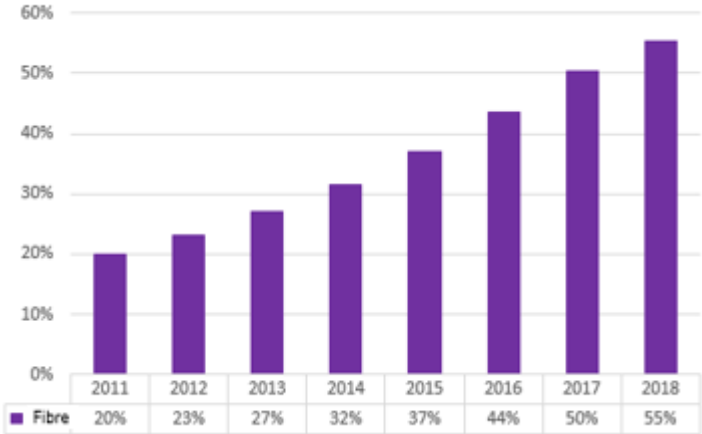
FIGURE 4 Geographic coverage of 4G networks allowing 10 Mbit/s



Source: Data from PTS mobiltäcknings- och bredbandskartläggning 2018, PTS-ER-2019:5

There is a continuous increase in the number of fibre subscriptions and today 55 percent of all households in Sweden have a broadband subscription via fibre.

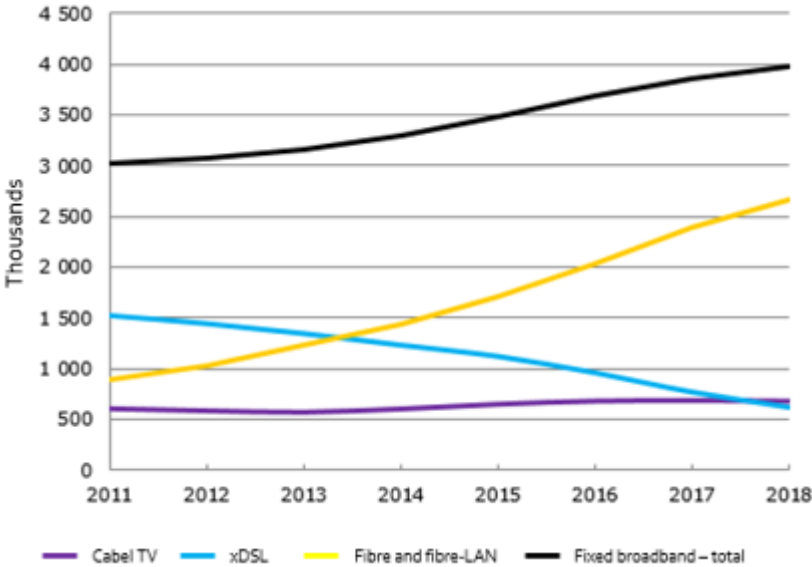
FIGURE 5 Households with broadband subscriptions via fibre



Source: PTS-ER-2019:13 with appurtenant figures.

Fibre connections accounted for 65 percent of the total number of fixed broadband subscriptions in 2017. The trend shows that the number of fibre connections continues to increase at the expense of xDSL subscriptions, which are decreasing in number. The number of subscriptions via cable TV has been relatively constant in recent years.

FIGURE 6 Development of subscriptions of broadband



Source: PTS-ER-2019:13 with appurtenant figures

2.5 Offers on the Swedish market

Operators on the Swedish market for fixed broadband services provide subscriptions with different bandwidth. It is common for fixed broadband services to be bundled with other services such as TV and telephony. It is common for operators to provide mobile broadband services bundled with SMS, MMS and voice calls as well as the cost of terminal equipment. End users can often choose between different price plans and subscriptions for different combinations of data volume, SMS, MMS, voice call and cost of terminal equipment.

There is an overall trend with increasing data usage. To meet the trend some operators on the Swedish market for mobile broadband services have launched subscriptions including a higher amount of data. There are also zero-rating offers. See below under section 3.

3 Supervision and activities during the reporting period

3.1 Supervision according to article 3

On the mobile market in Sweden, ongoing supervisions of zero-rating have continued. One case has been subject to appeal. There are no zero-rating offers on the fixed internet access market. PTS has not initiated any supervisions regarding the fixed broadband market during the period.

The supervisions of PTS are described below.

3.1.1 Supervision according to article 3.3 – Telia

Telia launched two mobile offers on April 18, 2016, “Free surf on social media” (Sociala) and “Free surf Listening” (Lyssna)

The zero-rating offer on social media allows subscribers to use a number of social media applications and services (initially Facebook, Instagram, Messenger, Whatsapp, Twitter and Kik) without deduction of data. The subscriber has unlimited use of the selected social media services without the data usage affecting the volume of data included in the subscription. The social media services included in Sociala were always accessible, even after the end user has consumed the data volume included in the subscription. Applications such as Pinterest, Viber, LINE, Welcome App and Snapchat were later included in the offer.

The mobile offer Lyssna allows the subscriber free streaming of selected services and applications for music, radio and audio books. Lyssna is offered with two of Telia’s mobile subscriptions. For 59 SEK per month the subscriber is free to stream music, radio or audio books up to 100 GB, without deduction from the data volume included in the subscription. The services included in Lyssna are always accessible, although the end user has consumed the data volume included in the subscription. The applications included in Lyssna are Spotify, Storytel, Sveriges Radio and Radio Play.

In summary, PTS found in its supervision that Telia, in connection with the two offers, applied traffic management measures in violation of Article 3.3 of the TSM Regulation. Telia was instructed by PTS to discontinue the traffic management which Telia implemented when the end user could still use the specified services and applications included in each of the offers, whilst other data usage was blocked.

Telia appealed PTS’ decision to the Administrative Court of Stockholm, which on September 28 2018 rejected the appeal. The ruling has taken legal effect.

After the ruling of the court Telia changed the offer in such a way that all applications were treated equally when the data in the subscription is consumed. It can also be mentioned that Tre, regarding their service 3Musiksurf, also made changes after the ruling.

3.1.2 Supervision according to article 3.2 – Telia

The offer “Free surf on social media” described above in section 3.1.1 has also been subject to supervision regarding whether the commercial practice of zero-rating is compatible with article 3.2 in the TSM-regulation. PTS dismissed the case in June 2019 after having found that the offer was open to all suppliers of content and that the offer did not limit the end-users rights under the TSM-regulation.

3.1.3 Supervision according to article 3.3 – Bahnhof

The Dutch scientific publishing house Elsevier has sued the internet service provider Bahnhof with a petition that Bahnhof should be obliged to block a number of websites for file-sharing of content subject to copyright. Elsevier is the holder of the copyright. As a response to the suit Bahnhof blocked the sites listed in the suit and also Elseviers own site for end-users as well as the courts access to Bahnhofs website.

According to article 3.3 third subparagraph of the TSM-regulation, an internet service provider shall not block, slow down, alter, restrict, interfere with, degrade or discriminate between specific content,

applications or services, or specific categories thereof, unless any of the exceptions in the same subparagraph are at hand. PTS initiated the supervision on December 15 2018 and it is still ongoing.

3.1.4 Supervision according to article 3.3 – Telia

PTS initiated a supervision in January 2019 regarding a traffic management policy published on Telias website. The policy seemed to entail a limitation to certain aspects of file sharing. The limitation concerned both the speed of the file sharing and the capacity which seemed to be reduced during most of the day. Furthermore the simultaneous sessions seemed to be reduced to a maximum of five. Telia responded that such traffic management was not practiced which led to PTS dismissing the case.

3.2 Activities

3.2.1 Measurement of internet access

At present, PTS does not conduct any measurements of the performance of internet access services. PTS uses measurements³ made by consumers via a third party service called Bredbandskollen. Bredbandskollen is a tool offered to consumers free of charge, which helps internet access customers to evaluate the speed of their broadband connection. Bredbandskollen measures the speed at which the user's phone (app in iPhone or Android) or computer (web browser) can send and receive data, i.e. the actual speed available. The speed is measured from the phone or computer, to the geographically closest national focal point (IXP) run by Netnod.⁴ During 2018 Bredbandskollen also launched a command line interface tool, for measurements in an environment without browser, e.g. a server. These measurements also include latency in relation to the server.

Measurements via Bredbandskollen have been available for several years, resulting in a relatively high awareness among consumers in Sweden about the possibility to measure the speed of their internet access service. Bredbandskollen's web tool for fixed networks was launched in October 2007 and for mobile networks, an iPhone app was launched at the end of 2008 and for Android in February 2011.

By January 2018, more than 250 million measurements had been carried out, of which 170 million were carried out via the web tool and 80 million through mobile applications. Approximately 100 000 measurements are carried out by internet users in Sweden every day.

Netnod together with IIS⁵ has launched a project bringing together operators, technicians and other stakeholders to make a common definition of what an internet access service is. The purpose is to facilitate for both end users and suppliers to know and agree on what is expected of the internet access service purchased.

The project is divided into three main phases (subprojects):

1. Define internet access service.
2. Develop a measurement tool that end users and providers of internet access services can use to measure internet access services.

³ All measurements in this paragraph refer to measurements made with Bredbandskollen. The values represent measurements conducted by end users, results therefore are based on their individual connection and which subscription they hold. The measurements are hence not representative for the population of Sweden as a whole.

⁴ Netnod: Netnod Internet Exchange i Sverige AB is a subsidiary of "Stiftelsen för Telematikens utveckling (TU-stiftelsen) (the Foundation for Telematics Development). The company operates national hubs for internet traffic. In doing so, the company will work to ensure that all internet service providers have competition-neutral hubs. Furthermore, the company should develop and logically operate operator-wide internet functions and compatible business. In Sweden, the company has six hubs: Gothenburg, Malmö, Sundsvall, Luleå and two in Stockholm

⁵ Internetstiftelsen i Sverige (The Internet Foundation in Sweden), IIS, is an independent, publicly owned organization that works for the positive development of the internet. IIS is located in Sweden and is responsible for the Swedish top-level domain .se and the operation of the top-level domain .nu.

3. Introduce a quality label that can be used by providers of internet access services and for public procurement activities by the public sector.

During 2019 the participants have developed a definition of an internet access. Hereafter the work will continue with development of measuring tools and quality labelling of internet access.

PTS has only monitored the project and has had no active role. The purpose of PTS' presence has been to act as a sounding board from a regulatory perspective.

3.2.2 Development of average up- and download speeds

The average speed of receiving data through all technologies (fibre, cable TV, 3G/4G, and xDSL) in Sweden in 2017 was 71 Mbit/s and the average speed of sending data through all technologies was 47 Mbit/s.

The tables below present the average speed (Mbit/s) of the measurements carried out with Bredbandskollen for sending and receiving data distributed by technology.

Figure 7 Average speed (Mbit/s) to receive data per technology

Technology	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
xDSL	8	9	9	9	10	11	12	13	14	15	13
Cable-TV	12	21	26	38	39	49	69	84	94	99	104
Fibre	35	43	46	47	50	57	71	76	86	99	96
Mobile	2	3	4	5	9	12	16	19	17	18	15
Data not available	12	15	17	18	21	30	44	51	59	64	74
Total	12	15	17	17	21	29	44	53	59	67	71

Source: Bredbandskollen

Figure 8 Average speed (Mbit/s) to send data per technology

Technology	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
xDSL	1	1	1	1	2	2	2	3	3	4	3
Cable-TV	4	6	5	6	7	9	14	16	16	7	17
Fibre	17	21	22	23	24	30	39	44	55	67	69
Mobile	1	1	1	1	3	5	7	10	9	9	8
Data not available	5	6	6	7	10	15	24	31	41	48	52
Total	4	6	6	6	9	14	22	29	35	44	47

Source: Bredbandskollen

Below the average speed (Mbit/s) is presented for the command line interface tool. Bredbandskollen find reason to believe that those who use the new tool are the users with the fastest connections. That could possibly explain why the speed for fibre in the other measurements have gone down. Bredbandskollen has only to a limited extent information regarding specific techniques in measurements with the new tool.

Figure 9 Average speed (Mbit/s) to send and receive data per technology with command line interface tool

Technology	Receive	Send	Latency	Amount
xDSL	12	2	61	2 031
Cable-TV	259	32	14	99 404
Fibre	208	182	9	11 057
Mobile	20	12	40	32 436
Data not available	333	192	15	1 533 543
Total	321	178	16	1 678 471

Source: Bredbandskollen

3.2.3 The Agency's work with 5G

PTS wants to promote the development of 5G and takes an active part in the work on an international level, alongside meeting with national stakeholders and explicating the regulatory possibilities of 5G development in Sweden. PTS has developed a spectrum plan which inter alia enables 5G testing in Sweden as of 2017. PTS is also the driver of a 5G forum where Swedish stakeholders can meet and share information.

3.2.4 The Agency's work in Berec

PTS works actively and collaborates with other EU regulatory authorities within BEREC. PTS participates in BEREC's working group in the field of net neutrality in order to meet the established work programme for the organization. PTS participates as drafter of new guidelines in BEREC's Open Internet Work Group. Within BEREC, PTS shares experiences and issues that have come up within the net neutrality field. National regulatory authorities play an essential role in ensuring that end users are able to exercise their rights under the TSM Regulation effectively and that the rules on the safeguarding of open internet access are complied with.⁶ BEREC acts as a forum that supports national regulatory authorities in applying the TSM Regulation and its principles.⁷ BEREC facilitates regulatory authorities to exchange experiences of their net neutrality activities, which promote the consistent application of the rules on open internet in Europe.

⁶ See recital 19 of the TSM Regulation.

⁷ Body of European Regulators for Electronic Communications BEREC, Work Program 2018, p 21.