

CZECH TELECOMMUNICATION OFFICE REPORT

on results of monitoring of compliance with
Regulation (EU) 2015/2120 of the European Parliament and of
the Council of 25 November 2015 laying down measures
concerning open Internet access and retail prices for regulated
communications within the Union and amending
Directive 2002/22/EC ES and Regulation (EU) No. 531/2012

carried out between 1 May 2022 and 30 April 2023

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1. INTRODUCTION

The Czech Telecommunication Office (hereinafter referred to as the “Office” or “CTU”), as the national regulatory authority for electronic communications in the Czech Republic, has prepared, in accordance with Article 5(1) of Regulation (EU) 2015/2120¹ of the European Parliament and of the Council (hereinafter referred to as “Regulation (EU) 2015/2120” or the “Regulation”), a report on the results of monitoring of compliance with the Regulation for the period from 1 May 2022 to 30 April 2023.

The total number of providers offering internet access service was 1,823, a slight decrease from the previous reporting period. One of the factors to which this decline was attributable was, among other things, the termination of business activities of some providers of electronic communications services as a result of the inspection of compliance with the obligations arising from General Authorisation [VO-S/1/08.2020-9](#) (hereinafter referred to as “General Authorisation” or “VOS1”) carried out by the Office in the period 2021-2022. The decrease in the number of providers was recorded not only in the category of providers offering internet access service at a fixed location, where there was a decrease from the original number of 1,854 to the current 1,813 providers, but also in the category of providers offering mobile internet access service, where the number of providers was 130. A total of 120 providers offered internet access services using both methods.

The total number of users using mobile data services increased by 4.6% over the period in question to 10,773,363 users.² Similarly, the number of subscriptions to the internet access service at a fixed location increased to 4,013,628.³ This figure also includes the number of subscriptions to the internet access service at a fixed location via mobile networks (fixed LTE), which in turn decreased slightly to 451,096 subscriptions.

As part of the compliance with the obligations under Article 5(3) of Regulation (EU) 2015/2120, Phase III of the extensive inspection of the compliance with the general authorisation was completed in this reporting period, in which the quality of service parameters for internet access service were clearly defined by the Office. As a result of this inspection activity, which ran from 1 January 2021 to 30 November 2022, the Office was able to ensure that the QoS parameters were implemented in the contractual terms and conditions of internet access service providers. This activity of the Office has not only ensured that 99% of end users of the internet access service are clearly and intelligibly informed by the provider about the parameters of their service, but in conjunction with targeted education aimed at end users, a change in their previous, mostly passive, attitude has been achieved. End users were informed, and learned how to actively exercise their rights related to the provision of a defective internet access service and to use for complaint purposes the CTU NetTest tool (hereinafter referred to as “NetTest”), which enables certified measurement to verify the performance of the service not only for internet access service at a fixed location, but also to obtain information on the current quality of mobile internet access service.

¹ 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.

² The category of mobile services included data on the number of active SIM cards for an internet access service provided together with a voice service (a service normally used in mobile phones) or separately without a voice service (a service normally used in tablet PCs, laptops, etc., e.g. as part of a USB modem).

³ The service at a fixed location includes the number of subscriptions (active connection lines) to the internet at a fixed location in aggregate for all monitored technologies (xDSL, wireless access in non-licensed and licensed bands, CATV, FTTH, FTTB, satellite connection, PLC and other).

The transposition of the European Electronic Communications Code⁴ (hereinafter referred to as the “EECC”), which, among other things, extended the consumer protection aspects of Directive 2002/22/EC,⁵ into Czech legislation by Act No. 374/2021 Coll., amending Act No. 127/2005 Coll. on Electronic Communications and on Amendment to Certain Related Acts (Electronic Communications Act), as amended, and certain other Acts (hereinafter referred to as “Transposition Amendment or Act No. 374/2021 Coll.”) has introduced new obligations for providers of electronic communications services. The provision of clear and transparent information, including information on internet access service speeds in the pre-contractual information in the contract summary, enables end users to make an informed choice between providers offering their services on the electronic communications market and to select the most appropriate internet access service. To take advantage of the competitive environment, end subscribers can also use the newly introduced option to change their internet access service provider.

2. DESCRIPTION OF THE ACTIVITIES OF THE OFFICE IN MONITORING COMPLIANCE WITH REGULATION (EU) 2015/2120 IN THE PERIOD FROM 1 MAY 2022 TO 30 APRIL 2023 AND THE CHARACTERISTICS OF COMPLAINTS RELATING TO THE REGULATION

Following the issue of VOS1, the Office completed a Phase III of the inspection of the implementation of this General Authorisation in the contractual terms and conditions of internet access service providers. In the period under review, the Office inspected the provision of pre-contractual information by selected providers in connection with the transposition amendment, which transposed the EECC into Czech legislation. The changes resulting from the amendments to Act No. 127/2005 Coll., on Electronic Communications and on Amendments to Certain Related Acts (Electronic Communications Act), as amended (hereinafter referred to as the “Electronic Communications Act”), were regularly presented by the Office to the professional public in workshops it organized, and it also continued to systematically educate end users. In the period under review, it supervised the provision of services involving zero-rating practices by the largest providers of electronic communications services. Last but not least, the Office also continuously monitored the market situation in the application of open internet rules in the Czech Republic and carried out a number of technical control measurements. The use of the certified NetTest measurement tool by end subscribers was also extended to mobile applications (Android).

In this context, the following activities were carried out by the Office in the period under review.

2.1. ACTIVITIES OF THE OFFICE

2.1.1. Activities of the Office aimed at monitoring contract terms and limiting end user rights

As already mentioned, in the period under review, the Office completed Phase III of the inspection, which focused on 85 internet access providers. These providers were not complying with their obligations under VOS1 as of 1 August 2022, not even on the basis of the previous two phases of this inspection. In addition to compliance with the provision of QoS parameters in contractual terms and conditions according to the General Authorisation,

⁴ Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code.

⁵ Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive)

which was complied with by 89% of the inspected providers, the subject of the inspection was also extended to the inspection of compliance with the obligation to provide pre-contractual information according to the amended version of the Electronic Communications Act. Within this final phase, the Office conducted proceedings concerning administrative offences with 62 inspected entities and penalties were imposed in these proceedings for non-compliance with legal obligations.

After the end of the transitional period (after 30 June 2022) provided for by Act No. 374/2021 Coll., the Office launched another planned inspection of selected 15 largest providers of electronic communications services, which focused, among other things, on compliance with the obligation to provide pre-contractual information pursuant to Article 4(1)(d) and (e) of the Regulation.

Again, the Office paid attention to selected business practices of providers of internet access services, including zero-rating practices, among other methods by monitoring the published contractual terms and conditions of providers that have offered this service to date.

As part of its activities, the Office also dealt with the issue of content blocking. In the period under review, compliance with EU sanctions regulations adopted in response to Russian aggression in Ukraine was ensured. In this context, it is also necessary to mention the prevention of access to certain websites on the basis of national legislation on selected agendas. Updated information on the issue of content blocking was continuously published by the Office on its website.

The Office regularly monitored complaints and enquiries from end users regarding the internet access service.

2.1.2. Activities of the Office focusing on technical monitoring of quality and assessment of the performance of the internet access service

In the period under review, the Measuring System of Electronic Communications (hereinafter referred to as “MSEK”), of which the NetTest⁶ tool is an integral part, was used for the purpose of technical monitoring of the quality of data services in mobile and fixed networks. One year after the launch of its own publicly available measurement tool NetTest, the Office launched the NetTest mobile application in December 2022, which is available so far only for Android mobile devices. The NetTest tool, which is operated as a certified monitoring mechanism for the quality of internet access services, provides the general public with the opportunity not only to test the quality of their internet connection once or repeatedly, but also to carry out a certified measurement process in the event that the speed actually achieved in the download or upload direction of the internet connection does not correspond to the contractually specified speeds. In the context of the NetTest tool, a study of its measurement properties development was carried out between 2021 and 2022. The study was based on the results of measurements obtained by user devices from technical universities students on the NetTest measurement system within the testing polygon.

In order to assess the performance of the internet access service, the Office analysed the results measured by NetTest with hundreds of thousands of measurements and available statistical tools. Given the validity of VOS1 from January 2021 onwards, data from the launch of the tool outside the reporting period (4Q/2021 and 1Q/2022) has also been included for the purposes of visualising trends and predicting the evolution of the general quality of internet access service. The most important finding was based on an analysis of the change in average speed as a function of time of day, with a period of 60 minutes, for the specific reporting period. This statistical monitoring of the evolution of service performance showed a variation of values

⁶ <https://nettest.cz/en/>

around 40% of its daily maximum value, especially in the download direction, and this value was not statistically significantly exceeded (3Q/2022), rather the decline in performance was below 40%. This variation of values, when compared with the definition of the normally available speed for internet access services provided at a fixed location, corresponded to the requirement that the normally available speed, on which large discrepancies are based, should be at least 60% of the advertised speed. In other words, that the drop in performance of internet access services provided at a fixed location be no more than 40%.

As part of the monitoring of mobile networks in terms of data transmission, CTU measured data transmission speeds in municipalities, on motorways and on railway corridors. For internal measurement purposes, the F-Tester is used. F-Tester is a professional measurement platform for detecting mobile network parameters. The benefit of the unique F-tester set is the simultaneous measurement of data parameters in the mobile networks of three different mobile operators. It is currently used for regular verification of data parameters of mobile networks on railway corridors and all motorways in the Czech Republic. Upon request, it is also used to measure the signal coverage of individual municipalities, especially in the case of mass complaints about the quality of coverage of a municipality. The results of measurements of radio and data quality parameters in mobile networks were again made available to the public on the Office's Visualization Portal.⁷

To raise awareness of the existence of the NetTest mobile application, information about the possibilities of its use is being included in the answers to questions from individuals or organisations about the quality of signal coverage from different parts of the Czech Republic.

In January 2023, a new document entitled Methodology for assessment of the impact of electronic communications networks capacity on the performance of internet access services⁸ was published and is being applied by the Office as part of its own inspection activities. The purpose of this methodology document is to describe and standardise the procedure for assessing the impact of the capacity of electronic communications networks, specifically in the distribution or connection segment of the electronic communications network, on the performance of internet access services or the impact on the actually achieved speed.

2.1.3. Activities of the Office aimed at the professional and general public

Following the new obligation of providers of electronic communications services to provide clear and intelligible pre-contractual information to end subscribers, including a contract summary which, among other things, shall contain information on the speed of the internet access service and remedies, the Office focused on activities aimed at educating providers of these services. During the transitional period provided by the Act for bringing contracts for the provision of electronic communications services into compliance with the amended wording of the Act, the Office held a roundtable discussion in June 2022, the topic of which was "Preparation of model contractual documentation for use by providers of publicly available electronic communications services". In order to ensure the correct application of these changes provided for by the law, the Office has prepared for providers of electronic communications services and published on its website a non-binding document of a general nature entitled "Manual for Contract Summary" containing detailed instructions for drafting and completing the contract summary document, including a completed contract summary template. The providers must duly fill in the required information in the contract summary template and provide it to the consumers free of charge before the conclusion of the contract, even for remotely concluded contracts. The contract summary shall become an integral part of the contract to be concluded.

⁷ <https://vportal.ctu.cz/intro?l=en>

⁸ <https://www.ctu.eu/assessment-impact-ecn-capacity-performance-ias>

Other activities of the Office aimed at the professional public included presenting the experience with the operation of the new NetTest measurement tool at the “MIKROEXPO 2023” professional conference held in July 2022. The NetTest mobile application designed to monitor the quality of mobile internet access services for the general public was presented in August 2022 at a workshop organised by the Office. Furthermore, in December 2022, the Office organised a workshop to settle comments from the professional public on the new methodological procedure for assessment of the impact of electronic communications networks capacity on the performance of internet access services.

The general public was kept informed of all new developments and changes in the area of access to the open internet that occurred during the period under review through press monitoring reports and information published on the Office's website and on social media. This included, for example, provision of information on the new obligation of providers of electronic communications services to provide pre-contractual information before concluding a subscriber contract, the possibility of changing the provider of internet access services within a short period of time while ensuring continuity of the services provided, or the newly introduced obligation of four providers of electronic communications services from January 2023 to provide special prices (provide a discount) for any voice or internet access services to persons not only with disabilities, but also for persons with low incomes (meeting the criteria under the law).

The Office continued to develop the new concept of the Telecommunication Academy project. Presentations for elderly citizens and retirement centres have been the core of the Academy's activities so far. In the period under review, there was a significant increase in interest in these presentations. In 2022, the largest number of presentations since the start of the activity was carried out, with a total of 74 presentations, in which a total of 1,657 participants were trained. In 2023, by the end of the period under review, 42 presentations had already been delivered with the participation of 1,090 people. It is not only the elderly people who are interested in topics such as how to navigate safely on the internet and how to cope with threats and risks arising from the use of social media. This issue particularly affects particularly vulnerable consumers, such as the elderly or people with disabilities or minors. The Telecommunication Academy monitors and highlights new types of fraud that end subscribers may encounter in the online environment. In 2023, the programme of the Telecommunication Academy newly included special presentations for young people in socially excluded neighbourhoods focusing on the risks associated with the use of social media platforms and the issue of cyberbullying, which have already been held.

2.2. CHARACTERISTICS AND NUMBER OF COMPLAINTS RELATED TO REGULATION (EU) 2015/2120

During the period under review, the Office continued to record and monitor the number and type of complaints and enquiries from end subscribers on an ongoing basis. Although the number of complaints was again only in the high tens, there was an increase of almost one half. This increasing trend in the number of complaints and enquiries fully reflects a situation where end users have information on what remedies are available to them and are actively using them.

The Office's targeted activities aimed at providing transparent information, both pre-contractual information and information to be included in the contract pursuant to Article 4 of the Regulation and pursuant to VOS1, as well as educational activities aimed at end subscribers regarding the possibility of using the results of certified measurements for a possible claim about a defect in the internet access service, were reflected in the structure of submissions received by the Office in the period under review. Of the total number, 90% of the complaints concerned mainly non-compliance with the quality parameters of the internet

access service agreed in the contract, non-functionality of the internet access service or reduced quality of the specialised services offered (IPTV, services of communication between devices) or the availability and effectiveness of remedies.

Another group of complaints and enquiries from end subscribers, amounting to several tens, related to the internet access service and concerned the newly introduced possibility of changing the provider of the internet access service while maintaining the continuity of the provision of these services. In this context, the Office has recorded only in few cases complaints about non-compliance with the technical or organisational conditions for the implementation of the change regulated by the Decree.⁹ The majority of these cases involved enquiries and complaints about the failure to provide or unavailability of the verification code issued by the transferring provider (the OKU number is used to identify the end subscriber and is necessary to change the internet access service provider), the change of the internet access service provider due to the termination of the provision of electronic communications services, the billing of payment for the early termination of a fixed-term contract, or the charging of fees for the internet access service by the service provider being abandoned even after the change process has been completed.

It can be assumed that the more favourable offers from providers emerging in the context of competition in the electronic communications market and the ability to switch easily and quickly between providers of internet access services will result in a higher take-up of this option by end users, which is likely to lead to an increase in the number of complaints in this area.

3. MAIN RESULTS OF SURVEYS AND INSPECTIONS CARRIED OUT IN THE CONTEXT OF SUPERVISION AND ENFORCEMENT OF REGULATION (EU) 2015/2120

Already in the previous reporting period, the Office reported on the results of the first two stages of a large-scale nationwide inspection, which affected a total of 1,500 internet access service providers out of a total of 2,620 inspected entities and which focused on the fulfilment of information obligations under Article 4(1)(d) of the Regulation and the disclosure of information on the remedies available to end users in the event of a continuous or regularly recurring discrepancy from the actual performance of the internet access service within the meaning of Article 4(1)(e) of the Regulation, as well as on compliance with the obligations arising from the general authorisation specifying the method of designating individual speeds and their discrepancies.

During this reporting period, Phase III which ran from August 2022 to November 2022 was completed. The Office's inspection activity focused on the remaining 85 small providers offering internet access services at a fixed location (i.e., up to two thousand subscriptions) that had not complied with all their legal obligations by the end of Phase II. At the same time, in view of the effect of certain provisions of the amendment to the Electronic Communications Act and the end of the transitional period (lasting until 30 June 2022), the subject of the inspection was also extended to include the obligation to provide a pre-contractual summary of the contract, which contains, in accordance with Article 102(3)(f) of the EECC, the information required under Article 4(1)(d) and (e) of Regulation (EU) 2015/2120. During this phase of the inspection, 9 of the 85 inspected entities ceased their activities and 62 providers were again found to have deficiencies or non-compliance of their contractual terms and conditions with the Electronic Communications Act and VOS1. The Office therefore proceeded to initiate new administrative offence proceedings in which penalties in total amount of almost CZK 1.5 million were imposed

⁹ Decree No. 58/2022 Coll., on the Conditions for Number Portability and the Change of Internet Service Provider

on 62 entities. The results of all three stages of this inspection are presented in detail in Table 1 and subsequent Figures 1-3.

Table 1 - Results of the individual stages of the inspection

	Period	Number of inspected entities	Number of penalized entities	Total amount of imposed penalties in CZK
Phase I	01/2021 - 11/2021	1 500	313	2 553 000
Phase II	09/2021 - 12/2021	393	44	1 227 500
Phase III	08/2022 - 11/2022	85	62	1 498 500

Fig. 1: Number of inspected entities during the inspection



Fig. 2: Number of entities fined according to stages of inspection (percentage)

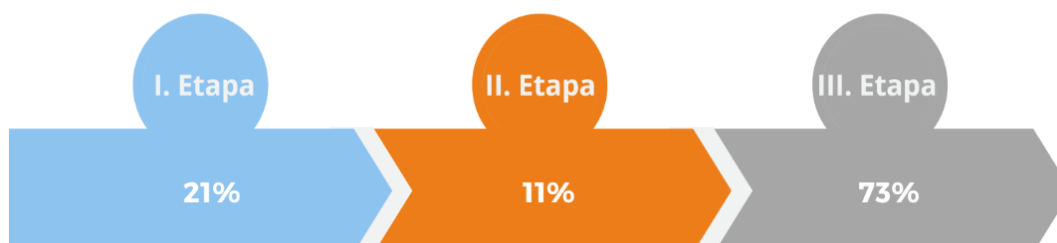


Fig. 3: Total amount of fines imposed in CZK during the inspection



As regards the evaluation of this activity of the Office, which was the largest inspection activity of the Office in terms of its scope, it can be declared that the objective pursued was achieved, i.e. not only to ensure increased legal awareness among mainly small providers of internet access services, but also to ensure that the contracts of all end users contain information on the quality parameters of the internet access service. While in the initial stage of Phase I of the inspection it was found that only less than 4% of the providers of the internet access service complied with the requirements for determining individual speeds and their deviations according to the basic QoS parameters mandatorily defined by the Office, at the

end of this last phase, 99% of the end users of the internet access service were already clearly and intelligibly informed by the provider about the parameters of their internet access service.

During this period under review, the Office continued its strategy of carrying out thematically targeted inspections. It was a follow-up to the analysis of the contract terms and conditions of the selected top 60 providers of electronic communications services with nationwide coverage in the previous reporting period. While these analyses examined whether the statutory transition period (from 1 January 2022 to 30 June 2022) saw an update of the contract terms and conditions and compliance with the obligation to provide a pre-contractual summary of the contract containing, in accordance with Article 102(3)(f) of the EECC, the information required under Article 4(1)(d) and (e) of Regulation (EU) 2015/2120, after 30 June 2022, the Office initiated another scheduled inspection of a selection of the 15 largest providers of electronic communications services. The subject of the inspection was compliance with the obligation under Article 63(5) and (6) of Act No 374/2021 Coll. to provide consumers with a concise and easy-to-read contract summary that complies with the contract summary template under the directly applicable European Union regulation.¹⁰ This contract template in the section Speed and internet access services and remedies is based on Article 4(1)(d) and (e) of Regulation (EU) 2015/2120, which sets out the information that must be provided for internet access services at a fixed location and mobile internet access services. The information in this section must also be provided in accordance with the general authorisation. The results of this inspection showed in some cases systemic errors (e.g. failure to provide the required information in an intelligible and clear form, failure to provide information on remedies, etc.), which were brought to the attention of the providers by this inspection, and steps were taken immediately to eliminate them. It can be summarized from the inspection findings that the largest number of irregularities concerned deficiencies in the formalities laid down in the template. In cases where a violation of the law has been indicated by the Office, the Office will proceed to initiate administrative offence proceedings.

The Office continued to monitor regularly whether or not the rights of end users to use the terminal equipment of their choice within the meaning of Article 3(1) of Regulation (EU) 2015/2120 are being restricted, through regular inspections of contract terms, targeted requests for information and monitoring the nature of complaints. In the period under review, 2 cases of suspected restrictions on the free choice of terminal equipment were recorded. In one case, the inspection revealed that there was a restriction on the choice and use of the terminal device of one's choice, regardless of the location of the end user or provider or the location, origin or destination of the information, content, application or service. The provider who violated Article 3(1) of the Regulation in this manner was subject to an aggregate penalty in the form of a fine in the joint administrative proceedings. In the other case, the investigation is still pending.

Furthermore, within the scope of its monitoring activities, the Office recorded a suspected breach of Article 3(3) of Regulation (EU) 2015/2120 in the period under review, whereby all traffic must be treated equally in the provision of internet access services, without discrimination, restriction or interference, and irrespective of the content accessed or distributed, the applications or services used or provided. In this context, the Office examines whether the traffic management measure introduced by the provider was reasonable in the case at hand, i.e. transparent, non-discriminatory and proportionate, whether it was not based on commercial objectives but rather on objectively different requirements of certain categories of traffic for the technical quality of service, whether it did not pursue specific content and

¹⁰ Commission Implementing Regulation (EU) 2019/2243 of 17 December 2019 establishing a template for the contract summary to be used by providers of publicly available electronic communications services pursuant to Directive (EU) 2018/1972 of the European Parliament and of the Council.

whether it was applied for a strictly necessary period of time. This investigation has not yet been closed by the end of the period under review.

As part of its activities, the Office also addressed the issue of content blocking. Following the Russian aggression in Ukraine and in the context of preventing the spread of disinformation, further regulations were adopted at EU level during the period under review amending Council Regulation (EU) No. 833/2014 of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine and laying down obligations with a view to imposing restrictive measures against specific persons. The prohibition on the dissemination of content by legal persons, entities or bodies listed in Annex XV to this Council Regulation (EU) No. 833/2014 also applies, inter alia, to providers of electronic communications services. The list of entities spreading disinformation that have had their broadcasting and licences suspended in the EU has been expanded to include additional entities. The restrictive measures were applied to all means of transmission and distribution in EU Member States, including cable and satellite television, internet protocol television, online platforms, websites and applications.

The Office, as the authority supervising compliance with the obligations arising from Regulation (EU) 2015/2120 and as the authority authorised to inspect pursuant to Act No. 69/2006 Coll., on the implementation of international sanctions, as amended (hereinafter referred to as "Act on the Implementation of International Sanctions"), does not have the power to issue any lists of specific sites to be blocked. The above-mentioned EU legislative acts constitute an exception to the equal treatment of traffic within the meaning of Article 3(3), third subparagraph, point (a) of Regulation (EU) 2015/2120, on the basis of which the blocking of specific content is possible. In connection with the above, it is also necessary to mention that with regard to the need of a single approach across all Member States, there was no single list of websites (harmful content) to be blocked available on the EU level what, for the purpose of informing the European Commission, the Office announced also to the Financial Analytical Office, which is responsible for the enforcement of sanctions arising from Council Regulation (EU) No. 833/2014 in the Czech Republic according to the Act on the Implementation of International Sanctions and plays the role of administrator and coordinator in this scope of activities.

In this context, on 25 February 2022, after consultations with the security services of the state and in accordance with the call of the Government of the Czech Republic, the Czech national domain administrator, association CZ.NIC, also proceeded to block certain domains. It proceeded on the basis of the domain name registration rules. The national domain administrator declared that this was an exceptional and unprecedented measure, which was reviewed on a monthly basis in accordance with the domain name registration rules. The availability of the blocked websites was restored in May 2022 in accordance with the domain registration rules.

In addition to the above-mentioned rules at EU level, the obligation to prevent access to certain websites is also imposed on providers of internet access services by national legislation,¹¹ which falls under the exception of Article 3(3), third subparagraph, point (a) of Regulation (EU) 2015/2120.

As in the previous reporting period, the Office focused on the issue of zero-rating, which was also discussed within BEREC as a result of the decision of the Court of Justice of the EU (September 2021) concerning three German cases related to the application of Regulation (EU) 2015/2120, which fundamentally affected the obligation of equal treatment of traffic within the meaning of Article 3(3) of the Regulation.

The cases examined in the CJEU decisions concerned offers of internet access services that include the practice of zero-rating, where traffic generated by certain applications

¹¹ Act No. 186/2016 Coll., on Gambling, as amended, Act No. 378/2007 Coll., on Medicinal Products and on Amendments to Certain Related Acts and Act No. 146/2002 Coll., on the State Agricultural and Food Inspection Authority and on Amendments to Certain Related Acts, as amended.

or categories of applications is not counted towards the data volume of the basic internet access service package. Those judgements refer to the obligation of equal treatment of traffic under Article 3(3) of Regulation (EU) 2015/2120, with equal treatment being understood to mean both technical and commercial treatment of the traffic in question. In the opinion of the CJEU, these rules were infringed in the cases under review and the main conclusion of the reasoning of the judgments is that zero-rating commercial practices are incompatible with the obligation of equal treatment of traffic as set out in Article 3(3) of Regulation (EU) 2015/2120.

The Office actively participated in the expert discussions on this issue and in the revision of the BEREC Guidelines on the Implementation of the Open Internet Regulation (hereinafter referred to as the “Guidelines”), which were adopted as a result of the decisions issued. The updated Guidelines were approved by the BEREC Plenary in June 2022. The revised text of the Guidelines is clearer than the original text, has limited exceptions and does not allow for individual assessment of zero-rating practices. Zero-rating remains possible only in cases where no distinction will be made between different types of traffic, applications, etc.

The issue of zero-rating in the Czech Republic has generally concerned mainly the largest providers of electronic communications services, which have so far included services using zero-rating practices in their offers. During the period under review, the Office held discussions with representatives of the above-mentioned major providers to discuss which tariffs and offers on the market would remain compatible with the principles of Regulation (EU) 2015/2120, as well as the impact of the above-mentioned judgements on existing end user contracts which included the prohibited practices.

As a result of these discussions, tariffs containing a zero-rating element in a form contrary to the updated version of the Guidelines were no longer offered to new customers since the summer of 2022. In the case of end subscribers whose contracts continued to include prohibited practices, their gradual migration to new tariffs, without the application of the zero-rating practice, was proceeded with until the end of March 2023. At present, only the issue of zero-rating of access to the customer self-service of providers of electronic communications services remains to be resolved, which is no longer among the permissible exceptions within the meaning of the Guidelines. The Office is carrying out further investigations in this context.

4. RESULTS OF TECHNICAL MONITORING AND MEASUREMENTS AND THEIR EVALUATION IN RELATION TO THE IMPLEMENTATION OF REGULATION (EU) 2015/2120

Technical monitoring and practical measurements for the purposes of inspecting and verifying the quality of internet access services were provided by own measuring system of electronic communications MSEK, the unique F-Tester measurement platform and the publicly available NetTest measurement tool, which was newly extended at the end of 2022 with an application for mobile devices with the Android operating system. The mobile application, like the web version, enables the performance of certified measurements, which makes it significantly easier for end users to file claims about mobile internet access services.

The NetTest measurement tool is part of the infrastructure of the MSEK information system, which has a 10 Gbit/s capacity of connectivity to the internet exchange NIX.CZ along with 10 Gbit/s capacity of transit connectivity. After the launch of the mobile application, there has been a monthly increase in the number of measurements, with 81,949 measurements made via the mobile application in December alone. In the period under review, a total of 868,638 measurements were made by 511,423 users, see Figure 4.

Fig. 4: NetTest traffic data for the period from 1 May 2022 to 30 April 2023

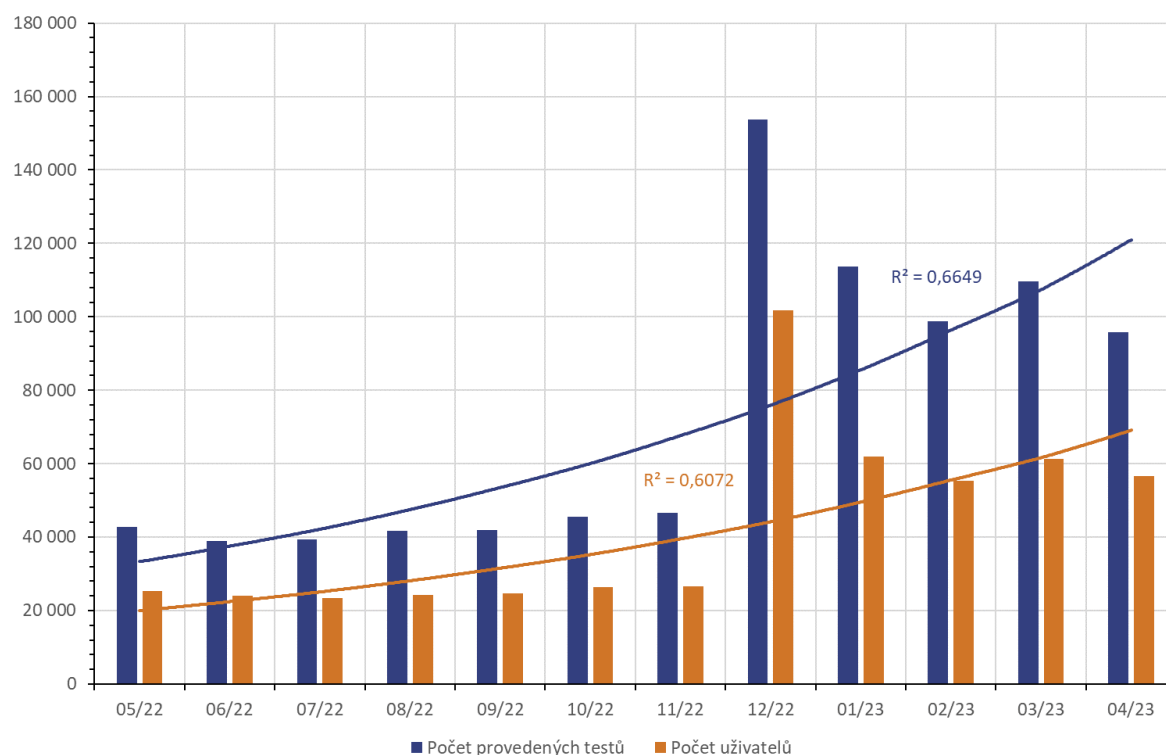


Table 2 - Statistics of measurements made with NetTest

Month/Year	Platform		Repeated Measurement		Certified Measurement	
	Web	Android	Web	Android	Web	Android
05/2022	42 746	-	1 230	-	754	-
06/2022	38 922	-	675	-	730	-
07/2022	39 422	-	912	-	687	-
08/2022	41 766	-	779	-	848	-
09/2022	41 918	-	1 350	-	655	-
10/2022	45 575	-	1 816	-	711	-
11/2022	46 688	-	2 467	-	626	-
12/2022	71 772	81 949	1 964	6 453	1 672	3 673
01/2023	69 290	44 469	3 461	2 798	1 343	544
02/2023	62 818	36 006	2 671	2 588	1 138	379
03/2023	71 688	37 884	1 383	1 926	1 130	458
04/2023	61 971	33 753	1 747	1 624	1 045	414
Celkem	634 576	234 061	20 455	15 389	11 349	5 468

Traffic data since the launch of the tool has also been analysed, namely the extent to which NetTest has been used by end users. Table 2 shows the statistics of the measurements

performed by NetTest both through the web browser and the mobile application. The number of repeated and certified measurements taken is also presented. From the measured results, it can be concluded that awareness of NetTest has increased since the launch of the mobile application, with a significant increase in the number of measurements via the web browser.

The results of the NetTest tool through the certified mode can be used by end users when submitting a claim about their internet access service, i.e. when they detect the occurrence of large discrepancies in service performance or when they detect a service outage (a drop below the minimum speed for services provided at a fixed location). In the case of investigations based on complaints about the quality of the internet access service, the Office uses calibrated measuring technologies, where the measurement is carried out by the Office staff according to the methodological procedure directly at the end user premises with a measuring device with dedicated HW against a measuring server located at the NIX.CZ internet exchange with a capacity of 10 Gbps, including transit connectivity of the same capacity.

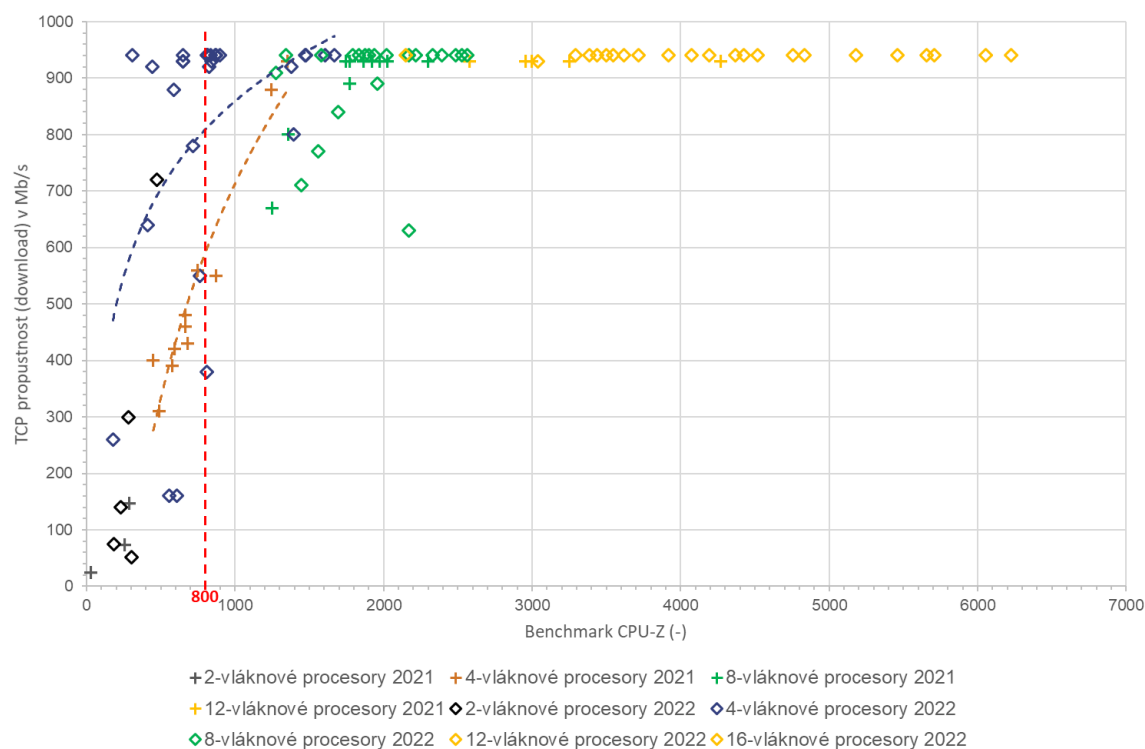
4.1. DEVELOPMENT OF THE MEASUREMENT PROPERTIES OF NETTEST

Before the official launch of the NetTest tool to the general public in 2021, a verification process of its measurement properties was carried out by the Office. The verification process showed that the performance of the user devices (PC, laptop) has a significant impact on the measurement results. On the basis of this finding, a study of the development of the measurement properties of the NetTest tool was prepared, based on the results of measurements obtained through a user device from technical universities students.

The measurements were carried out on dedicated HW in the form of the NetTest measurement system, i.e. on a separate measuring server and corresponding virtualised servers providing the necessary functionalities for the correct functioning of the NetTest measurement tool within the CTU testing polygon intended for studies and training in the case of the provision of internet access services at a fixed location. This measurement system is a direct copy of the publicly available NetTest tool. The measurement method used eliminated the influence of electronic communications networks, i.e. backbone networks including the internet access service providers' own networks (connection, distribution and access networks). The only device that could affect the measurement results was the user's own equipment (PC or laptop). A precondition for the measurements was that the device had a network interface for connection with a standard Ethernet cable with a bandwidth of 1000 Mbps, alternatively with a Thunderbolt interface with the same bandwidth (in this case verification was performed).

Based on the above measurement results on a total of 110 user devices, it can be concluded that due to the comprehensive upgrade (both on the NetTest tool side as well as on the operating systems and web browsers side), the measurement properties of the NetTest tool have been significantly improved, see Figure 5. Given that offers of internet access services at a fixed location with advertised speeds between 500 Mbps and 800 Mbps are hardly offered on the market, that services with advertised speeds of 500 Mbps are followed by services with advertised speeds of 1 Gbps, the Office maintains the current threshold for the application of the certified mode at 500/250 Mbps. However, the Office will continue to monitor and evaluate this issue so that the threshold for certified NetTest measurements can be moved to 1000/500 Mbps (download/upload). A more detailed description of the study is attached as Annex 1 to this Report.

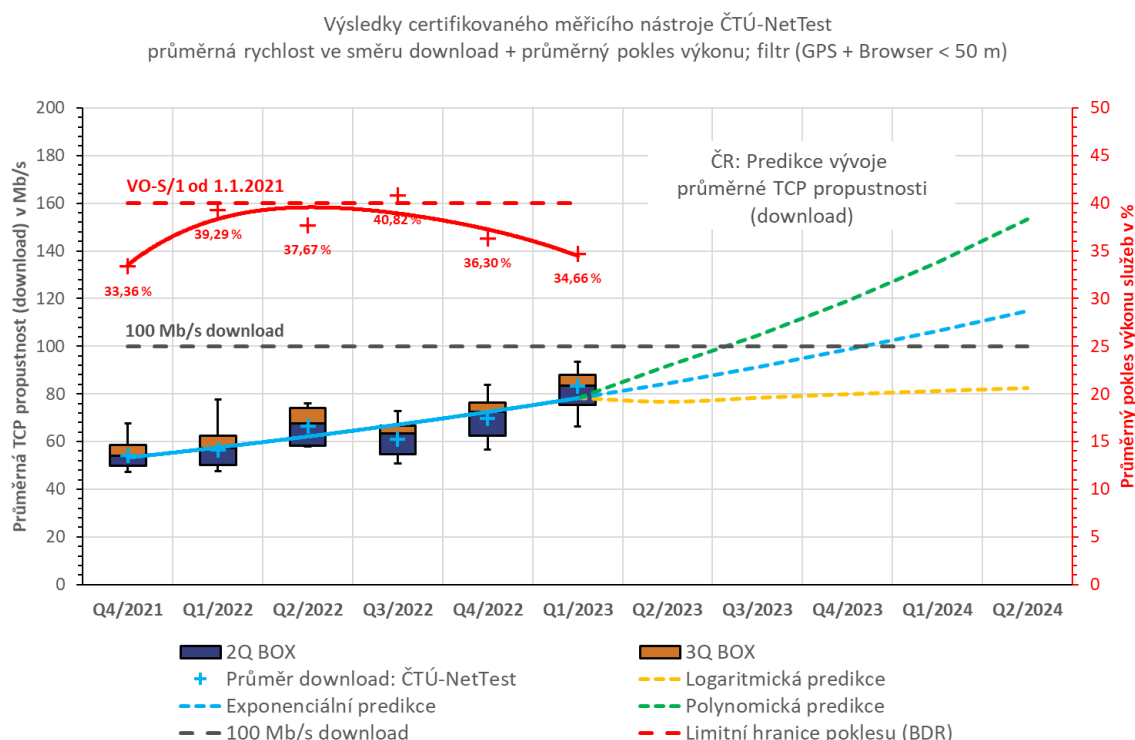
Fig. 5: Results of NetTest measurement properties



4.2. VISUALISATION OF TRENDS AND PREDICTION OF THE EVOLUTION OF THE GENERAL QUALITY OF INTERNET ACCESS SERVICE AT A FIXED LOCATION

In order to assess the performance of the internet access service, the Office analysed the results measured by NetTest with hundreds of thousands of measurements and available statistical tools. Given the effect of VOS1 as of 1 January 2021, data from 4Q/2021 and 1Q/2022 has been included in addition to the period under review for the purpose of visualising trends and predicting the evolution of the general quality of internet access service, see Figure 6. The most important finding was based on an analysis of the change in average speed depending on the time of day, with a period of 60 minutes, for the specific period of interest. This statistical monitoring of the evolution of service performance showed a variation of values around 40% of its daily maximum value, especially in the download direction, and this value was not statistically significantly exceeded (3Q/2022), rather the decline in performance was below 40%. This variation of values, when compared with the definition of the normally available speed for internet access services provided at a fixed location, corresponded to the requirement that the normally available speed, on which large discrepancies are based, should be at least 60% of the advertised speed. In other words, that the drop in performance of internet access services provided at a fixed location be no more than 40%.

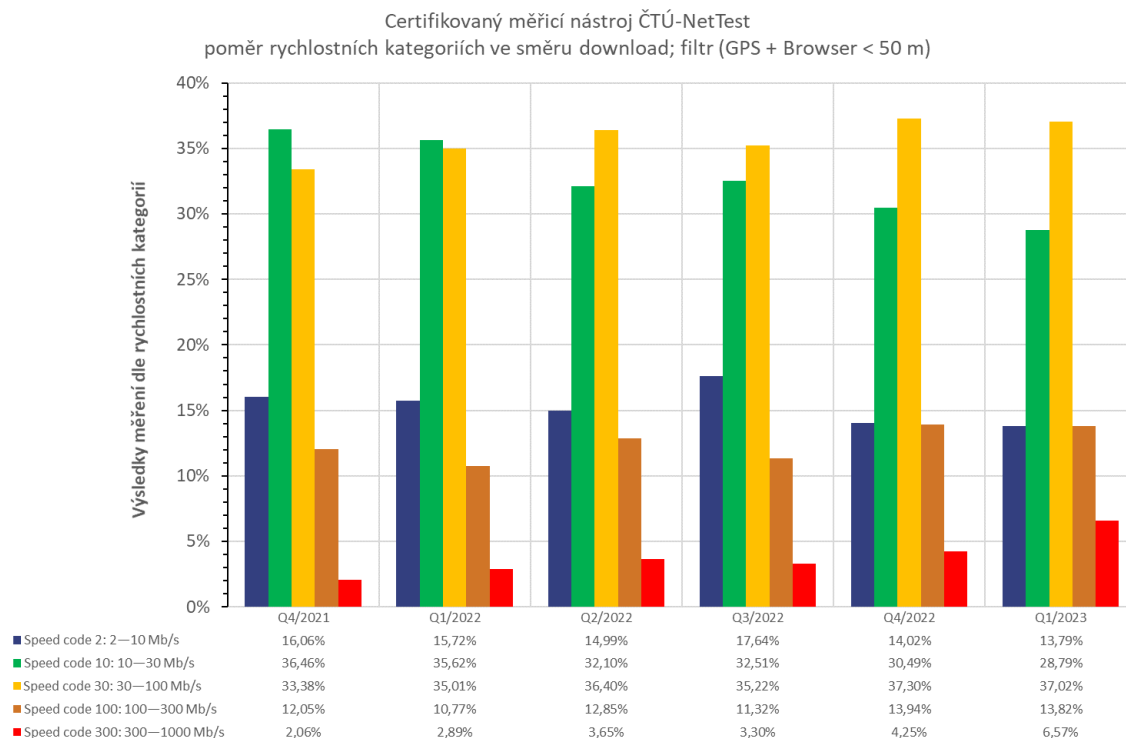
Fig. 6: Summary evolution of the quality of internet access services provided at a fixed location in the period Q4/2021 to Q1/2023



The data was filtered by a combination of GPS coordinates and the BROWSER parameter (estimated measurement location deviation up to 50 m). Another important finding is the increase in the average performance of internet access services provided at a fixed location in 1Q/2023, where the performance of services reached 83.35 Mbps in the download direction, which is an increase of about 13 Mbps compared to the previous quarter and indicates the ever-increasing quality of the provided internet access services provided at a fixed location in the Czech Republic. When forecasting the development of average TCP throughput (download) in the future, we can expect a tendency towards an increase in the quality of the services provided, also in view of the 2022 subsidy programme for the deployment of very high capacity networks (VHCN), which will enable end users to have reliable internet connections with speeds of at least 1000 Mbps in the download direction and 200 Mbps in the upload direction, with a special focus on rural areas where there is little commercial incentive to deploy such networks.

The results of the analysis presented in Figure 7 provide further insights into the pattern of service performance achieved in the download direction, assessed according to speed classes on the basis of BEREC Guidelines BoR (20) 42. From the structure of the measurement results for the period under review, it is clear that the highest percentage of the speed class is speed code 30, i.e. 30 to 100 Mbps. In 4Q/2022 and 1Q/2023, there was also a slight increase in the performance of services in the highest classes of speed code 100 (100-300 Mbps) and speed code 300 (300-1000 Mbps). This trend of change can also undoubtedly be described as an increase in the quality of internet access services provided at a fixed location in the Czech Republic.

Fig. 7: Summary evolution of the quality of internet access services provided at a fixed location between 4Q/2021 and 1Q/2023; structure of service performance by speed classes based on BEREC Guidelines BoR (20) 42

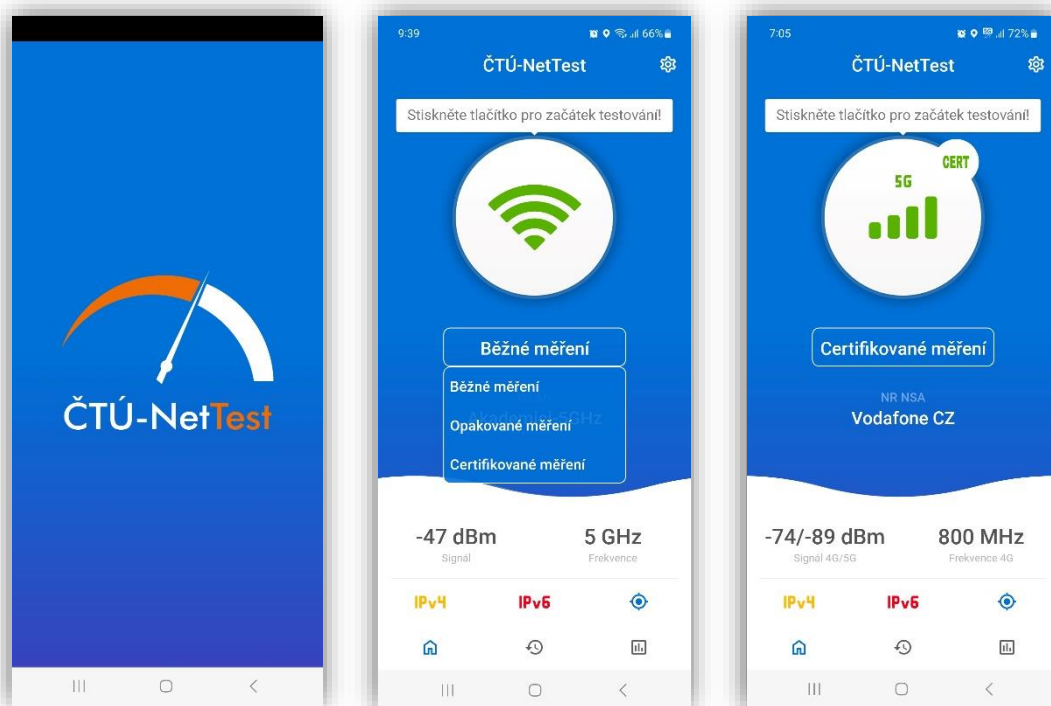


4.3. DESCRIPTION OF THE NETTEST MOBILE APPLICATION

The NetTest mobile application for Android devices was officially released by the Office in December 2022. The application is available in the Google Play store by searching for “CTU-NetTest”. The application is based on the source code of the RTR-Netztest tool operated by the Austrian regulator RTR-GmbH. Its purpose is to enable end users to measure various parameters of the mobile network, especially download speed and signal level, which are the most important data for end users. A unique benefit that distinguishes the NetTest mobile application from most freely available speed measurement applications is that anyone who wants to verify whether their mobile internet access service meets the contractually defined parameters has the opportunity to perform a certified measurement, the results of which, in the form of a measurement report, can be saved in a PDF document and used for the purpose of submitting a claim about the quality of the service provided.

Once the application is opened, an option is available on the main screen to select the measurement mode – normal measurement, repeated measurement and certified measurement, see Figure 8. End users can also perform testing by selecting their own configuration (number of tests, time between tests, Wi-Fi speed testing, etc.), however, it is important to note that this is a non-certified measurement that is for their own purposes only. The measurement will provide information about the average download speed, upload speed, ping and signal level. If “QoS measurement” is enabled in the Settings, the test will include obtaining information about the network configuration in terms of throughput for different types of traffic – verification of non-blocking of specific types of packets, and therefore verification of compliance with net neutrality. Information about all past measurements can be found on the History page, and by selecting one of the measurements you can view all the details.

Fig. 8: NetTest graphical interface with measurement mode selection



From the point of view of inspecting compliance with net neutrality, it is interesting to enable the so-called QoS measurement. When activated in the “Settings” menu of the NetTest application, these tests are automatically added as part of the testing process. Among other things, data transfer is checked on standard and commonly used UDP and TCP ports such as e-mail, IP telephony, file transfer (FTP), secure connection (SSH) and others. This procedure makes it easy to detect possible deliberate blocking of a certain type of traffic by a network/mobile operator, and thus can indicate a possible violation of net neutrality.

In the next period, the Office will focus on the use of data obtained from measurements through the NetTest tool, especially by linking it with the Office's Visualization Portal, what will create a nationwide map that will offer end users an overview of the actual values of the quality of mobile and fixed networks, even from places where service providers or the Office do not carry out measurements. At the same time, the Office is preparing the NetTest application for mobile devices with the iOS operating system.

4.4. MEASURING THE COVERAGE OF THE MOTORWAY NETWORK OF THE CZECH REPUBLIC BY SIGNALS OF MOBILE RADIO COMMUNICATION NETWORKS

During the time from October to December 2022, the Office carried out inspection measurements of the coverage of the motorway network of the Czech Republic by signals of GSM and LTE mobile radio communication networks. The measurements were taken with a measuring vehicle while driving, so that each section of a given motorway was measured by passing in each direction. The frequency of measurements was chosen with a period of 1 second, i.e. at a speed of 90 km/h the measurement points were 25 m apart, when passing in both directions they were interleaved. The percentage coverage of the motorway network is assessed for individual motorways by dividing them into 250m sections containing the measured points mentioned above. The measuring vehicle has a bracket with measuring antennas for GSM and LTE bands (OmPlecs®-TOP 200 AMR MF-05-5- MIMO 4x4) installed at a height of 1.5 m.

The aim of the inspection measurements was to determine the current actual coverage of the motorway network by signals of mobile radio communication networks in relation to the requirements set out in "Annex 3 to the announcement of the tender for the granting of rights to use radio frequencies to provide a public telecommunications network in the 800 MHz, 1800 MHz and 2600 MHz bands" and to provide this information to the general public. The inspection measurements were also used to inspect compliance with the development criteria to which the winners of the tender for the granting of the rights to use radio frequencies for the provision of a high-speed public LTE communications network in the bands 800 MHz, 1800 MHz and 2600 MHz had committed themselves. The monitored data parameter was the download speed, whose limit value for determining coverage is defined by the auction at 5 Mbps. The measured data shows that in more than 95% of the sections (250 metres) of the motorway network of the Czech Republic, the available download speed is higher than 5 Mbps, see Table 3.

Table 3 - Percentage coverage of the motorway network of the Czech Republic with available speeds higher than 5 Mbps

Motorway	LTE (data parameters)		
	T-Mobile	O2	Vodafone
D0	100,00	100,00	99,31
D1	95,94	98,49	98,21
D10	96,06	98,92	96,42
D11	95,60	97,58	96,04
D2	94,27	99,59	98,36
D3	100,00	99,26	96,69
D35	97,24	100,00	96,68
D4	97,72	100,00	98,29
D46	100,00	100,00	96,80
D48	96,81	100,00	100,00
D5	83,83	93,00	92,33
D52	96,14	98,54	100,00
D55	100,00	100,00	100,00
D56	100,00	100,00	100,00
D6	98,61	99,44	98,61
D7	96,63	93,95	93,82
D8	100,00	99,72	96,21
Total	95,68	98,24	96,98

The measured average download speed on the motorway network of the Czech Republic is 56.28 Mbps in aggregate across motorway sections and individual operators. The measured download speeds on individual motorway sections are graphically displayed in

the form of boxplots (box diagram) in Figure 9 for Vodafone Czech Republic a.s., Figure 10 for T-Mobile Czech Republic a.s. and Figure 11 for O2 Czech Republic a.s.

Fig. 9: Measured data on individual motorway sections; operator Vodafone Czech Republic a.s.

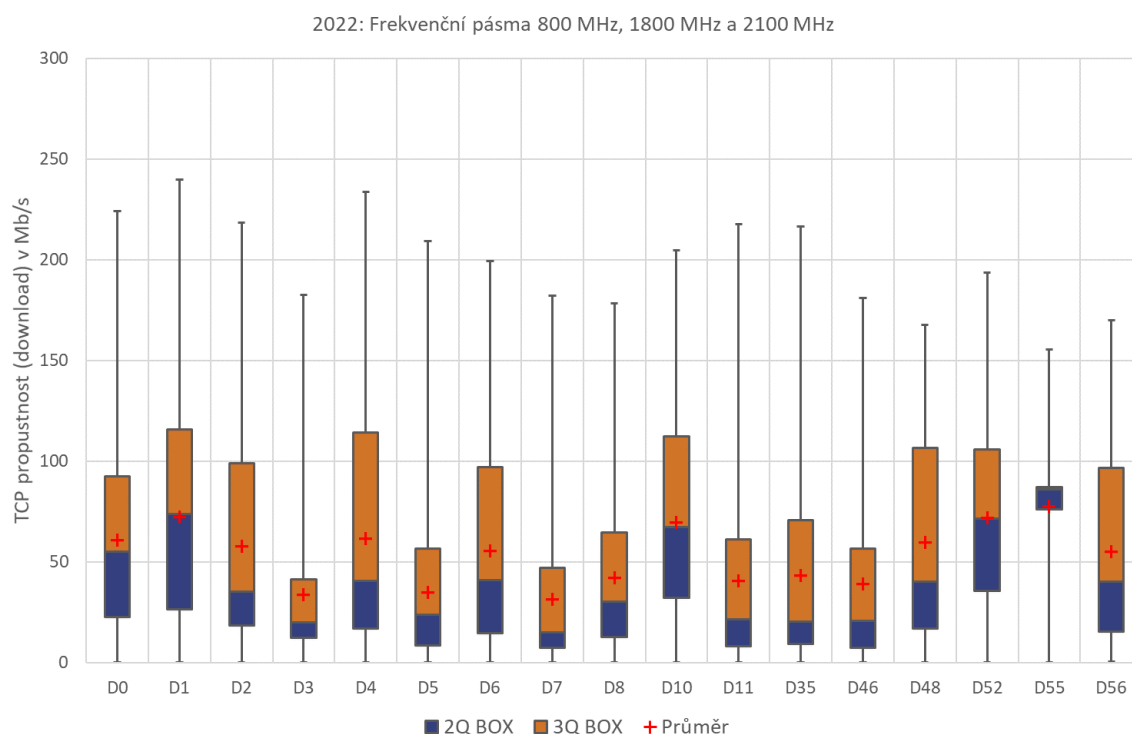


Fig. 10: Measured data on individual motorway sections; operator T-Mobile Czech Republic a.s.

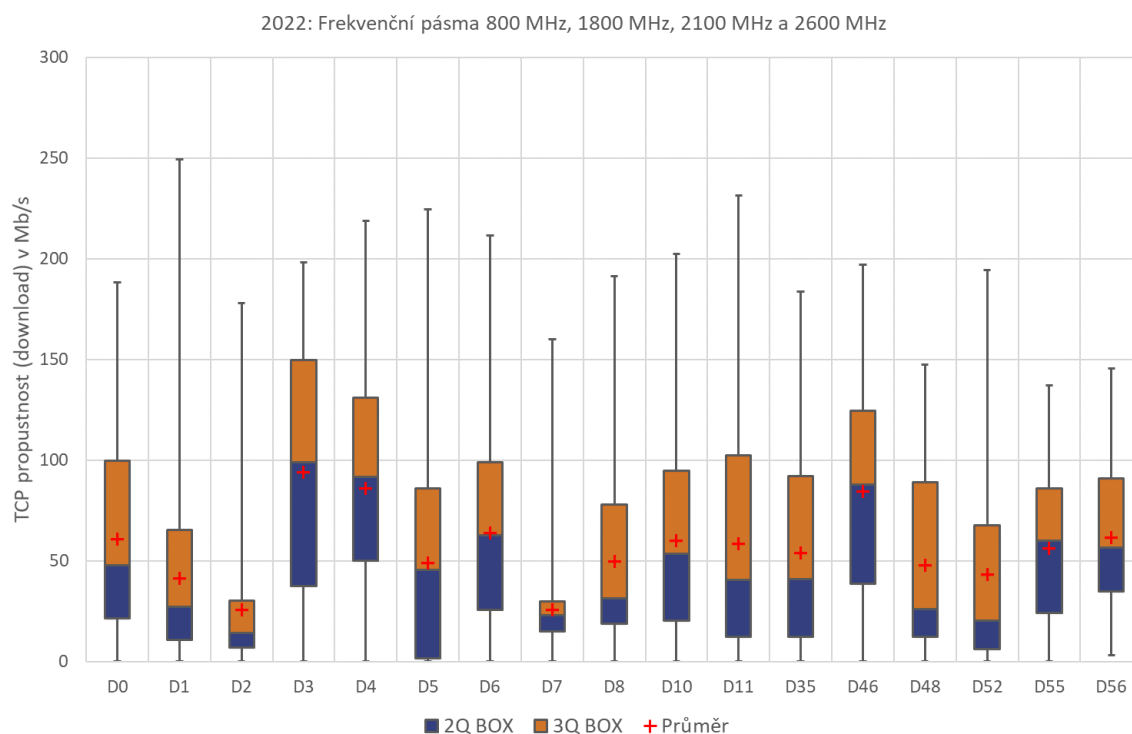
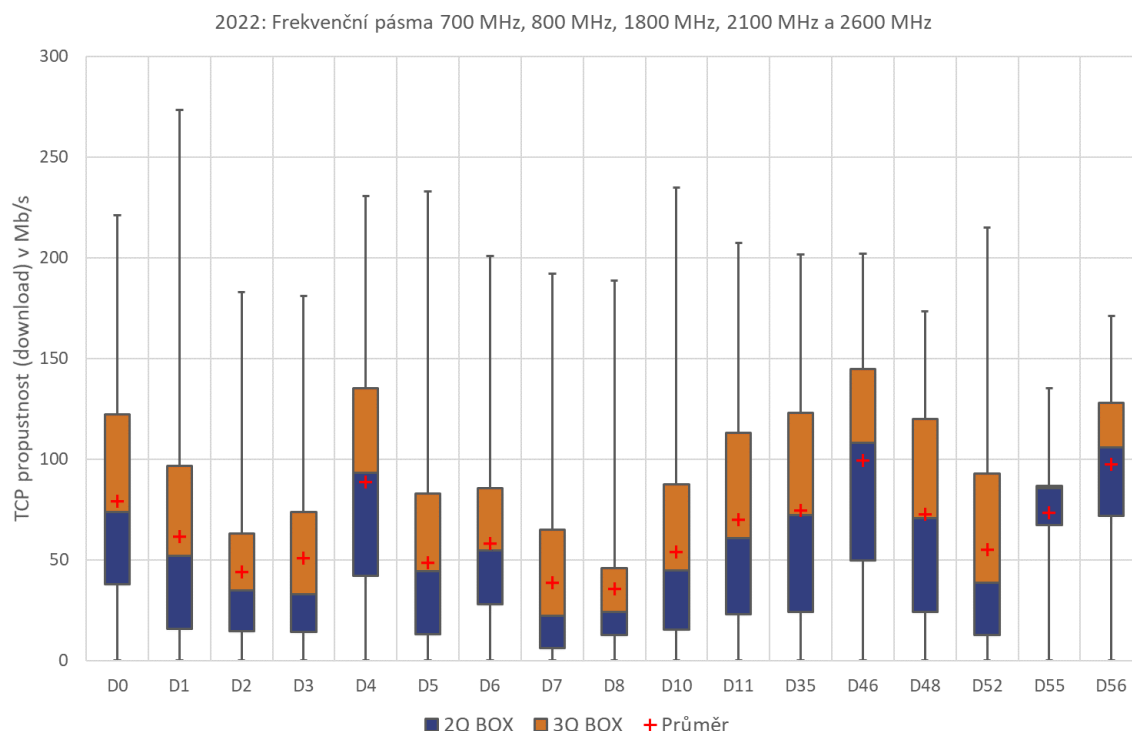


Fig. 11: Measured data on individual motorway sections; operator O2 Czech Republic a.s.



5. ENSURING SUPERVISION AND ENFORCEMENT IN ACCORDANCE WITH ARTICLE 5(1) OF REGULATION (EU) 2015/2120

In the period under review, continued the trend building on the creation of an increasingly stable environment for the provision of internet access services, which began in previous periods and represents the fulfilment of the objectives pursued by Regulation (EU) 2015/2120 and which is the logical outcome of a number of facts. These facts inherently include the adoption of measures by the Office as a regulator during the seven-year period since the Regulation came into effect, responding to the current market situation and facilitating the correct application of the Regulation by providers, continuous monitoring of the quality of the provided internet access services and monitoring of inquiries or complaints from end users indicating weak points with a possible need for intervention by the regulator. Among these factors contributing to the cultivation of the environment for the provision of internet access services, it is not possible to overlook the ongoing education of end users regarding their informed choice or ability to change internet access service providers, or their rights to receive services of contractually agreed quality, including the creation of a user-friendly tool for inspecting the performance of the service provided.

The stability of the environment for the provision of internet access services corresponds to a large extent with the conclusions of the (second) Report from the Commission to the European Parliament and the Council on the implementation of the open internet access provisions of Regulation (EU) 2015/2120, issued on 28 April 2023, which shows that the principles of open internet from the point of view of end users, content and application providers and internet access service providers are still relevant and that despite all the market changes, the Regulation and its implementation have proven their worth and there is no need to make any changes to the provisions contained in the Regulation.

Despite the above-mentioned prevailing positive trend, where there has been a general acceptance of the conditions set out in the Regulation by providers, the Office will continue to

closely monitor the situation in the electronic communications market with regard to the offer of services and terminal equipment, where for some types of offers there are still tendencies on the part of providers to “test” the possible boundaries of the provision of internet access services by combining them with the offer of mandatory terminal equipment to subscribers, which would compromise the right to free choice of their terminal equipment.

The Office will also continue to monitor the business practices of providers in terms of non-discriminatory access to content and applications to ensure that the rights of end users are not restricted within the meaning of the Regulation.

DEVELOPMENT OF THE MEASUREMENT PROPERTIES OF THE CTU-NETTEST TOOL FOR THE PERIOD OF 2021 AND 2022

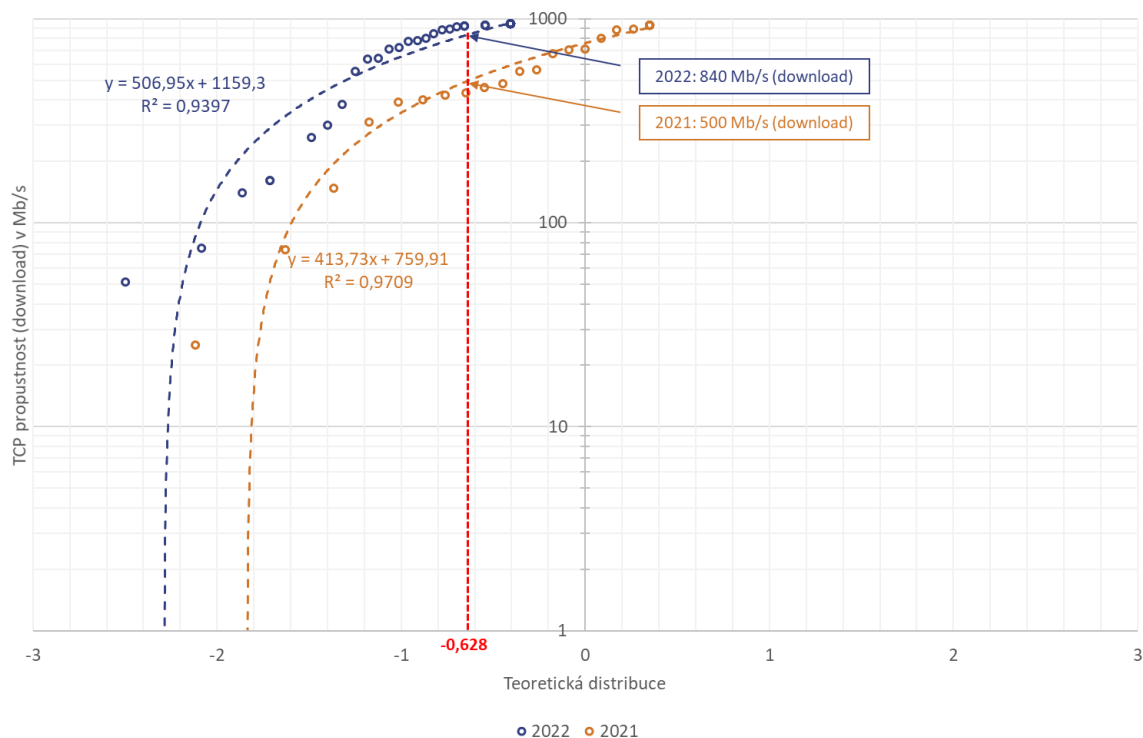
This study summarises the key findings of the development of NetTest's measurement properties for the period 2021 to 2022. The study was based on the results of measurements obtained by user devices from technical university students on the NetTest measurement system within the testing polygon. The measurements were carried out on dedicated HW in the form of the NetTest measurement system, i.e. on a separate measurement server and corresponding virtualised servers providing the necessary functionalities for the correct functioning of the NetTest measurement tool within the CTU testing polygon intended for studies and training in the case of the provision of internet access services at a fixed location. This measurement system is a direct copy of the publicly available NetTest tool. The measurement method used eliminated the influence of electronic communications networks, i.e. backbone networks including the internet access service providers' own networks (connection, distribution and access networks). The only device that could affect the measurement results was the user's own equipment (PC or laptop). The condition for the measurements was that the device had a network interface for connection with a standard Ethernet cable with a bandwidth of 1000 Mbps, alternatively with a Thunderbolt interface with the same bandwidth (in this case verification was performed).

In 2021, measurements were performed on a total of 29 user devices (list 1.1), where the results of this part of the study were used to determine the thresholds for the use of the certified mode of the publicly available NetTest tool (the results were presented to the sector during the CTU Workshop held in September 2021). The thresholds were set in the form of advertised speeds of the internet access service $R_{\text{inzer}} \leq 500/250 \text{ Mb/s}$ (download/upload). Subsequently, during 2022, the source codes were modified by upgrading the measurement engine, the Austrian measurement tool RTR-NetzTest, and several upgrades were made to operating systems and web browsers. The objective of the second part of the study, conducted in late 2022, was to determine whether all these upgrades changed the measurement properties of the NetTest tool. Therefore, measurements were performed on a total of 80 user devices (list 1.2). Each user device was benchmarked using the publicly available CPU-Z tool. In this way, it was possible to scale the individual user devices and take into account each other (ANOVA).

It is worth noting that the first phase of the study considered the median performance of a 4 thread processor, i.e. the most widely used user devices in 2021, which corresponded to a CPU-Z score of 800. At the same time, the measurement characteristics of the user devices for this benchmark value corresponded to an absolute TCP throughput of $\approx 550 \text{ Mbps}$ in the download direction, which was rounded down to a resulting value of 500 Mbps (half of this value was chosen for the upload direction). The same limit values were chosen by the Austrian national regulator RTR, GmbH.

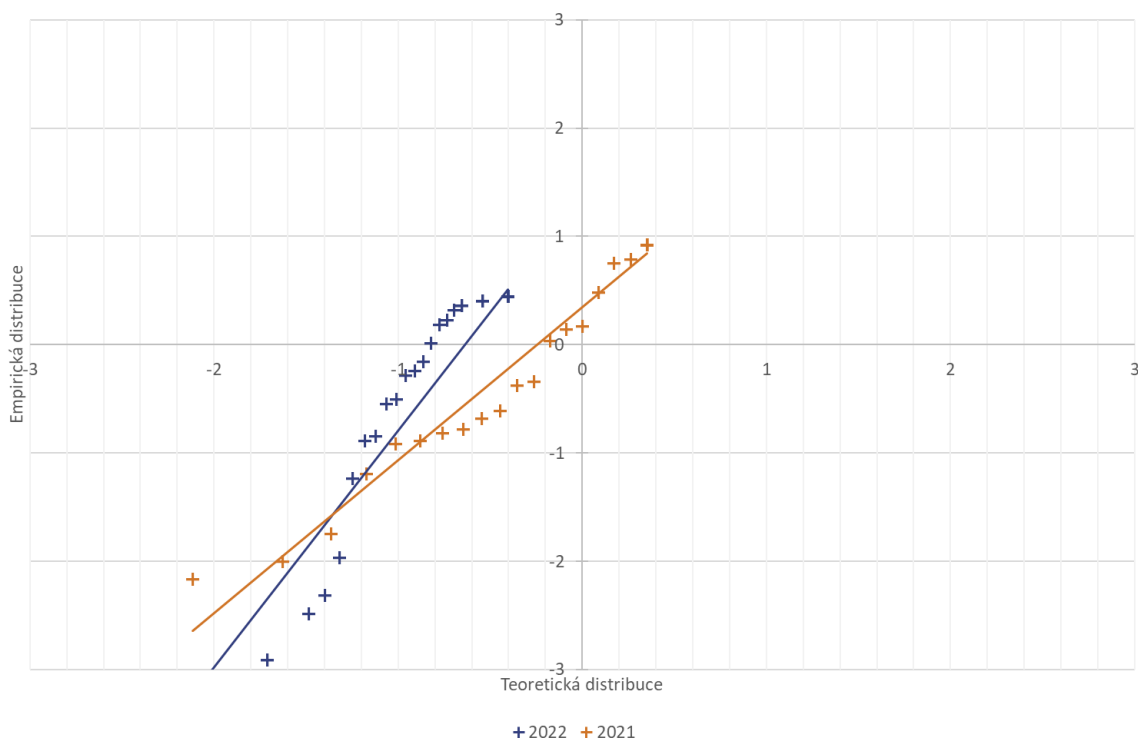
In this study, statistical evaluation was performed based on the Q-Q plot method, which is used, among other things, to test the normality of the data set. The principle of this method is to plot the quantiles of the hypothetical normal distribution on one axis and the quantiles of the set under study on the other axis. In the case of a normal distribution, all points on the plot lie on a straight line. In this case, the "y" axis was kept in the absolute values of the TCP throughput measurement results in the download direction and additionally converted to a logarithmic scale with a better representation of the differences. The results are shown in Figure 1.1.

Fig. 1.1: Comparison of the measurement properties of NetTest in 2021 and 2022



It is evident from the measurement results that thanks to the comprehensive upgrade (both on the NetTest tool side and on the operating systems and web browsers side) the measurement properties have been significantly improved, namely the TCP throughput value from 500 Mbps (under the same specified conditions) to 840 Mbps in the download direction. For the sake of completeness, we present a Q-Q plot of the measurement results below.

Fig. 1.2: Q-Q plot of NetTest in the period 2021 and 2022



The results of the Q-Q plot shown in Figure 1.2 show that the NetTest measurement results fit the theoretical normal distribution. Subsequently, the results of the user device benchmark were assessed to rule out that the reason for the improvement was simply the use of user devices with higher performance that show better results of measurement using the NetTest tool (its dependence on CPU performance). First, it was necessary to assess whether the set of user devices used conformed to the theoretical normal distribution. The result of the Q-Q plot is shown in Figure 1.3.

Fig. 1.3: Q-Q plot of user devices used in the study in the period of 2021 and 2022

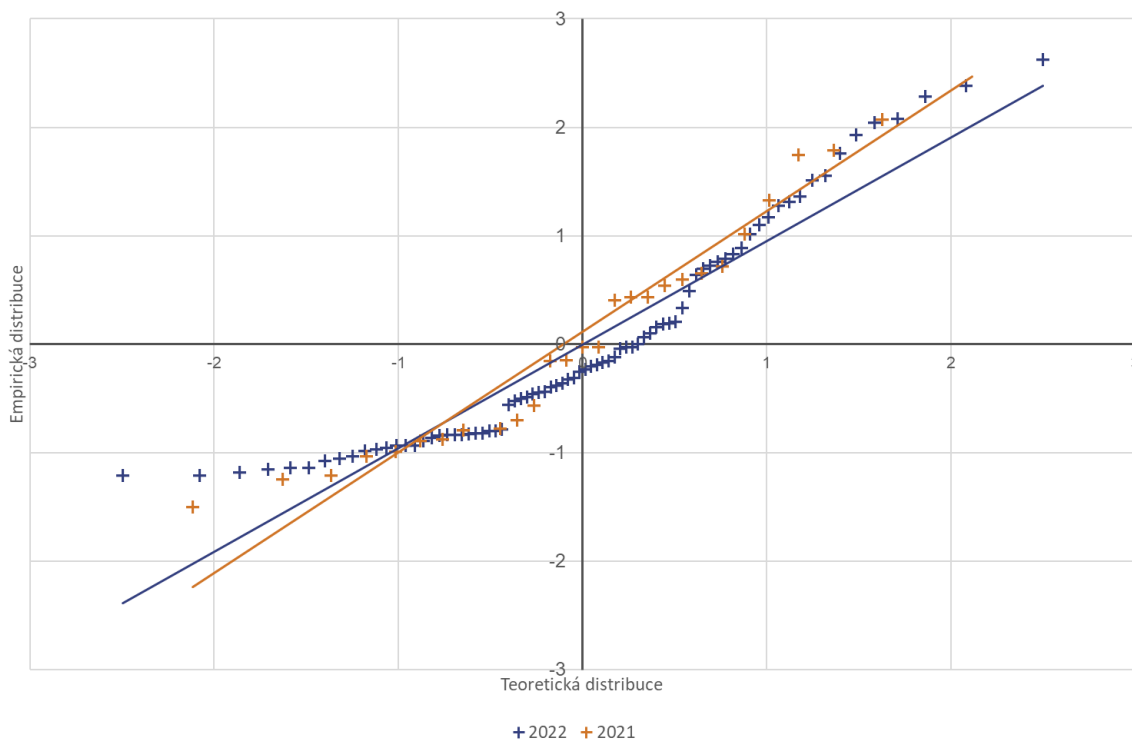
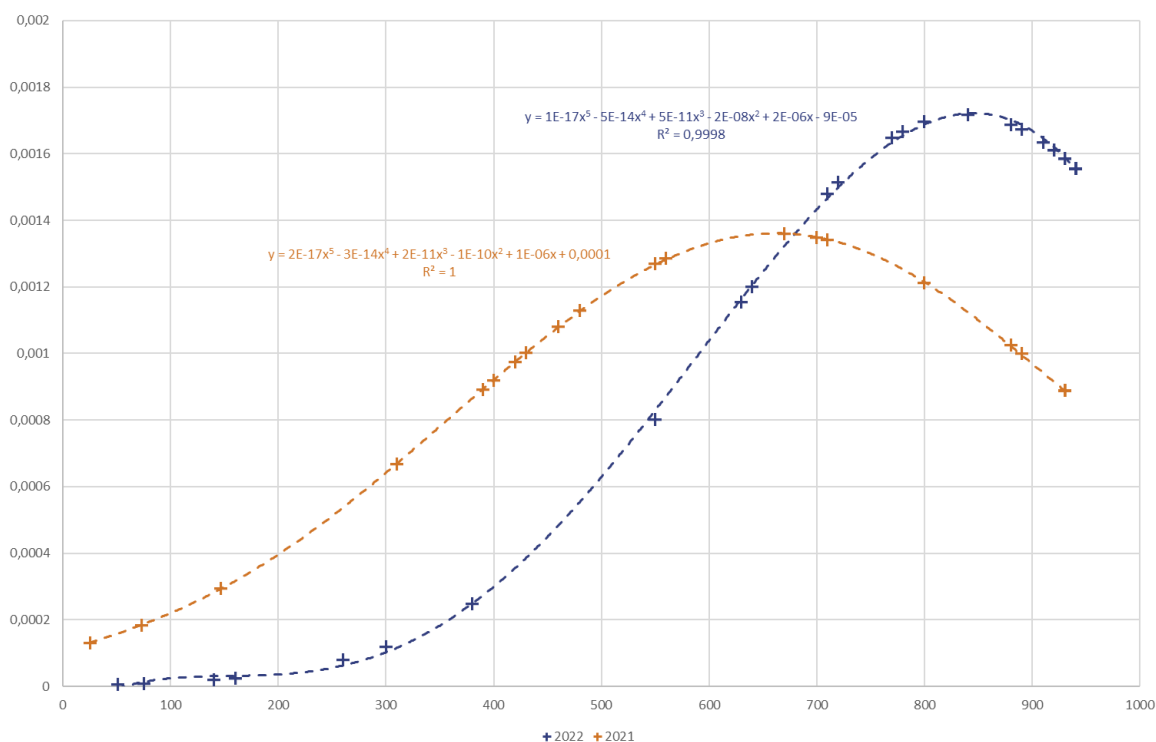


Fig. 1.4: Distribution of the performance of the user devices used in the study

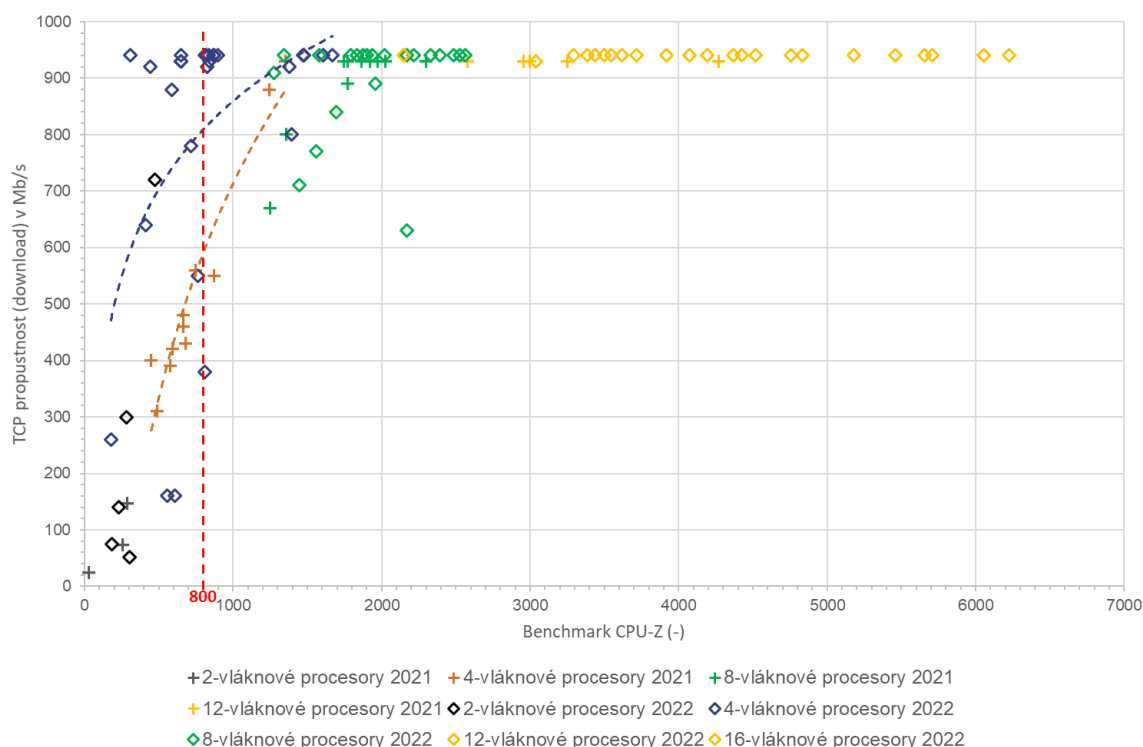


The results presented in Figure 1.3 show that the distribution of performance of user devices used in 2022 is almost identical to that of devices used in 2021, although the absolute values of performance of the user devices have increased (natural renewal of user devices over time).

A two-factor analysis of variation was used to assess whether the change in measurement properties was due to higher performance of user devices. The subject of the analysis was therefore to compare the measurement performance of NetTest in the period of 2021 and 2022, while eliminating the influence of user devices. It was a two-factor, unbalanced, non-repeated ANOVA test. As a result of the test, the improvement in the measurement performance of the tool in the period from 2021 to 2022 was not related to the change in the performance of the user devices.

Finally, a figure with the absolute results of the measurements taken during the study is also included. The results show that the reason for the improvement is now the ability to achieve maximum TCP throughput on 4 thread processors with lower performance (benchmark) than was the case in the 2021 part of the study. The new TCP throughput measurement limit of 800 Mbps in the download direction is also reflected in the absolute measurement results, see Figure 1.5.

Fig. 1.5: Absolute results of NetTest measurement properties



Based on the above measurement results on a total of 110 user devices, it can be concluded that due to the comprehensive upgrade (both on the NetTest tool side as well as on the operating systems and web browsers side), the measurement properties of the NetTest tool have been significantly improved. Given that offers of internet access services at a fixed location with advertised speeds between 500 Mbps and 800 Mbps are hardly offered on the market, where services with advertised speeds of 500 Mbps are followed by services with advertised speeds of 1 Gbps, the Office maintains the current threshold for the application of the certified mode at 500/250 Mbps. However, the Office will continue to monitor and evaluate this issue so that the threshold for certified measurements with the NetTest tool can be moved to 1000/500 Mbps (download/upload).

List 1.1: Results of measurements performed by NetTest tool in 2021

User Equipment No.	Year of measurement	CPU-Z benchmark version 17.01.64	Number of processor threads	TCP throughput (download) v Mb/s	TCP throughput (upload) v Mb/s
1	2021	1919,6	8	930	880
2	2021	1248,4	8	670	680
3	2021	1356,7	8	800	620
4	2021	677,2	4	430	360
5	2021	1353,2	4	930	840
6	2021	574	4	390	440
7	2021	589,5	4	420	390
8	2021	485,8	4	310	290
9	2021	665,1	4	460	410
10	2021	2996,8	12	930	870
11	2021	1866,4	8	930	930
12	2021	1770,6	8	890	660
13	2021	449,5	4	400	390
14	2021	665,1	4	480	430
15	2021	1769,6	8	930	930
16	2021	2300,2	8	930	900
17	2021	4268	12	930	940
18	2021	1743,5	8	930	810
19	2021	1241	4	880	810
20	2021	869,8	4	550	600
21	2021	2579	12	700	480
22	2021	2954,1	12	710	910
23	2021	1972,2	8	930	900
24	2021	25,9	2	25	17
25	2021	745,8	4	560	530
26	2021	3249,9	12	930	900
27	2021	2026,6	8	930	840
28	2021	257	2	73,3	70
29	2021	287	2	146,6	150

List 1.2: Results of measurements performed by NetTest tool in 2022

User Equipment No.	Year of measurement	CPU-Z benchmark version 17.01.64	Number of processor threads	TCP throughput (download) v Mb/s	TCP throughput (upload) v Mb/s
30	2022	871,2	4	940	940
31	2022	3542,8	12	940	920
32	2022	4830,9	16	940	940
33	2022	2482,7	8	940	940
34	2022	1556,7	8	770	330
35	2022	650,2	4	940	930
36	2022	2526,3	8	940	940
37	2022	280,8	2	300	300
38	2022	2214,4	8	940	930
39	2022	557,1	4	160	310
40	2022	5181,1	16	940	940
41	2022	177,2	4	260	260
42	2022	1938,6	8	940	940
43	2022	832,5	4	940	930
44	2022	302,6	2	51	130
45	2022	824,6	4	920	930
46	2022	760,2	4	550	500
47	2022	650,7	4	930	930
48	2022	2168,6	8	630	510
50	2022	806,5	4	380	840

51	2022	647,2	4	930	820
52	2022	2560,4	8	940	940
53	2022	588,8	4	880	910
54	2022	3499,2	12	940	910
55	2022	4193,7	12	940	940
56	2022	2148,5	12	940	830
57	2022	1793,8	8	940	940
58	2022	1376,5	4	920	760
59	2022	3290,3	12	940	940
60	2022	897,8	4	940	900
61	2022	5654	16	940	940
62	2022	184,8	2	75	90
63	2022	1446,7	8	710	680
64	2022	1392,5	4	800	790
65	2022	4422,7	16	940	940
66	2022	3436,5	12	940	940
67	2022	1874,8	8	940	940
68	2022	814,3	4	940	930
69	2022	229	2	140	230
70	2022	715,1	4	780	820
71	2022	1691,9	8	840	910
72	2022	811,5	4	940	930
73	2022	3716	12	940	940
74	2022	2536,3	6	940	940
75	2022	3384,9	12	940	940
76	2022	1668,5	4	940	940
77	2022	2783	6	940	940
78	2022	1472,3	4	940	940
79	2022	1606	4	940	930
80	2022	1477,8	4	940	930
81	2022	3615,3	12	940	940
82	2022	441,7	4	920	910
83	2022	3919,8	16	940	940
84	2022	1273,7	8	910	740
85	2022	2329,3	8	940	930
86	2022	5709,2	16	940	940
87	2022	412,1	4	640	560
88	2022	1831,6	8	940	940
89	2022	3037,6	12	930	790
90	2022	605,6	4	160	360
91	2022	1578,7	8	940	920
92	2022	812,7	4	940	930
93	2022	304,9	4	940	940
94	2022	4755,3	16	940	940
95	2022	2390,5	8	940	940
96	2022	1340,5	8	940	910
97	2022	6635,8	20	940	940
98	2022	6225,4	16	940	940
99	2022	2018,2	8	940	940
100	2022	6054,6	16	940	940
101	2022	4071,4	12	940	940
102	2022	839,9	4	930	890
103	2022	4515,2	16	940	940
104	2022	5461,2	16	940	940
105	2022	4368,3	12	940	940
106	2022	1902,1	8	940	930
107	2022	1955,6	8	890	810
108	2022	868,3	4	940	670
109	2022	473,9	2	720	890
110	2022	2167,4	8	940	820

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