ANACOM · AUTORIDADE NACIONAL DE COMUNICAÇÕES

2021/22

REPORT ON OPEN INTERNET

MAY 2021 TO APRIL 2022

Report on open Internet

Application of Articles 3 and 4 of Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015

- May 2021 to April 2022 -

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1. Executive summary

This report reflects the supervision and control activities in matters of open Internet access carried out by the Autoridade Nacional de Comunicações (ANACOM), under Article 5(1) of Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25.11.2015[1] (hereinafter "TSM Regulation[2]"), in the period between 1.5.2021 and 30.4.2022.

During the reporting period, ANACOM sought to evaluate offers with zero-rating characteristics, in light of the rulings of the Court of Justice of the European Union (CJEU) on this matter, in particular those published in September 2021, having accompanied the work carried out by the Body of European Regulators for Electronic Communications (BEREC) in this field.

Also noteworthy is the process of analysing the contracts of the most representative Internet access service providers (ISPs) in the market and the process of monitoring the information published about transmission speeds on the websites of the smaller ISPs, following the communications sent to them by this Authority at the end of July 2020. This process has triggered several interactions between ANACOM and the ISPs, and several providers have made changes to their websites with a view to bringing the information into line with the provisions set out in the TSM Regulation.

As in previous years, ANACOM carried out studies evaluating the performance of electronic communications services and the levels of GSM, UMTS and LTE radio coverage of mobile communications systems in several municipalities and some islands of the Autonomous Regions of Madeira and the Azores. The performance of mobile services on the 'Alfa Pendular' service of Comboios de Portugal, E.P.E. (CP) provided on the Braga-Porto-Lisbon-Faro railway line was also checked, from the user's standpoint.

In addition, ANACOM began collaborating with various entities (involving the main ISPs and the Directorate General for the Consumer (DGC)) with a view to developing the NET.mede measurement system, specifically the accreditation of the results obtained by users in tests with the NET.mede app.

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[1] Regulation 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) 531/2012 on roaming on public mobile communications networks within the Union. Available at https://eur-lex.europa.eu/legal-content/PT/TXT/?uri=CELEX%3A32015R2120.
[2] TSM stands for 'Telecoms Single Market'.

The period in question continued to be marked by the COVID-19 pandemic, which justified the Government's extension of various exceptional temporary measures in the electronic communications sector. As a result, ANACOM monitored the measures implemented, providing relevant information to consumers, as well as presenting recommendations to the ISPs on this matter.

Finally, it is worth mentioning that ANACOM also sought to monitor, from an open internet access perspective, the application by ISPs of the European Union (EU) sanctions on Russia related to the blocking of certain content and sent out a request for information for this purpose.

2. Regulatory framework

The TSM Regulation aims to establish common rules to ensure equal and non-discriminatory treatment of traffic in the provision of Internet access services (IAS) and end-users' rights in relation to such provision (see Article 1(1)). This regulation aims not only to protect end-users, but also to ensure the continued functioning of the Internet ecosystem as an engine of innovation.

With regard to end-user rights, Article 3(1) of the TSM Regulation states that "*End-users shall have the right to access and distribute information and content, use and provide applications and services, and use terminal equipment of their choice, irrespective of the end-user's or provider's location or the location, origin or destination of the information, content, application or service, via their internet access service.*"

In this context, ISPs and end-users enter into agreements on the commercial and technical conditions and the characteristics of IASs. However, under Article 3(1) of the above-mentioned Regulation, such agreements and the commercial practices adopted by the ISPs shall not limit the exercise of users' rights or circumvent the provisions of the Regulation on open Internet access.

Furthermore, the first paragraph of Article 3(3) of the TSM Regulation states that when providing IASs, ISPs "(...) *treat all traffic equally, (...) without discrimination, restriction or interference, and irrespective of the sender and receiver, the content accessed or distributed, the applications or services used or provided, or the terminal equipment used.*" Notwithstanding that, ISPs may apply reasonable traffic management measures, these measures i) shall be transparent, non-discriminatory and proportionate, ii) shall not be

based on commercial considerations and iii) shall not be maintained for longer than necessary. It should also be noted in this regard that it should only be possible to apply traffic management measures going beyond reasonable traffic management measures, to the extent and for the time necessary to comply with the exceptions provided for and justified in the TSM Regulation (see third subparagraph of Article 3(3)).

Under Article 3(5), providers of electronic communications to the public may offer so-called specialised services, i.e., "(...) *services other than internet access services which are optimised for specific content, applications or services, or a combination thereof* (...)", as they require specific quality levels, although these services may not be used or offered as a replacement for IAS.

The provisions for ensuring access to the open Internet also encompass a set of transparency measures, provided for in Article 4(1), to enable end-users to make informed choices.

As stated in Article 5(1), national regulatory authorities (NRAs) are responsible for guaranteeing that the rules on ensuring open Internet access are complied with, publishing annually a report on that enforcement and its findings, for submission to the European Commission (EC) and BEREC. As part of their supervision and enforcement, NRAs should take into account the BEREC guidelines.[3]

3. Supervision and application of the TSM Regulation in Portugal

3.1. Supervisiory and enforcement activities carried out by ANACOM under Article 5(1) of the TSM Regulation

The present report reflects the enforcement exercised by ANACOM in the application of Articles 3 and 4 of the TSM Regulation in the period between 1.5.2021 and 30.4.2022.

In line with the work carried out in the previous period, this section highlights supervision and enforcement activities relating to zero-rating and similar practices and transparency. In addition, reference is made to the activities carried out on ANACOM's control system in the reporting period, NET.mede.

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[3] The BEREC guidelines, initially published in August 2016, were revised in June 2020. The latest version of the guidelines - document BoR(20)112 of 11.06.2020 - is available at: https://berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/guidelines/9277-berec-guidelines-on-the-implementation-of-the-open-internet-regulation. At the time of drafting this report, the guidelines were under review.

3.1.1. Zero-rating and similar practices

With regard to ANACOM's supervision and enforcement activities under Article 5(1) of the TSM Regulation, it is important to highlight the monitoring of commercial practices adopted by ISPs. In this area, ANACOM has placed particular emphasis on zero-rating and similar offers, given their relevance in the context of open Internet.

Regarding the actions taken, it is recalled that on 3.7.2018 ANACOM approved the decision on zero-rating and similar commercial practices in Portugal.[4] This decision determined that the ISPs should change the procedures adopted in the offers that included the IAS, in cases where there was a differentiated treatment of traffic, once the general data limits had been reached, under the provisions of Article 3(3) of the TSM Regulation. Following this decision, the ISPs have adapted the traffic management procedures associated with these offers.

More recently, ANACOM has been particularly attentive to CJEU rulings on open Internet access matters. In this regard it is important to mention the publication on 2.9.2021 of three CJEU judgments concerning cases C-854/19,[5] C-5/20,[6] and C-34/20.[7] Although these judgments reinforce several aspects highlighted in the judgment of 15.9.2020, in cases C-807/18 and C-39/19,[8] they provide further clarifications in relation to the *"zero tariff"* options, highlighting that "(...) *such a commercial practice does not satisfy the general obligation of equal treatment of traffic, without discrimination or interference* (...)". It is further stated that "(...) *that failure, which results from the very nature of such a tariff option on account of the incentive arising from it, persists irrespective of whether or not it is possible to continue freely to access the content provided by the partners of the internet access provider after the basic package has been used up.*" Thus, the CJEU judgments of 2.9.2021 conclude that "*since such a tariff option is contrary to the obligations arising from Article 3(3) of Regulation 2015/2120, that incompatibility remains, irrespective of the form or nature of the terms of use attached to the tariff options on offer*", such as the limitation of bandwidth, tethering or use of the tariff outside the national territory.

Following the above, ANACOM has sought to assess the interpretation the CJEU gave to the TSM Regulation, introduced by the judgments of 2.9.2021, also bearing in mind the judgments of 15.09.2020 and the impact on end-users of possible changes in the offers

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[4] Decision available at https://www.anacom.pt/render.jsp?contentId=1456674&languageId=1.
[5] Judgment available at https://curia.europa.eu/juris/documents.jsf?num=C-854/19.
[6] Judgment available at https://curia.europa.eu/juris/documents.jsf?num=C-5/20.
[7] Judgment available at https://curia.europa.eu/juris/documents.jsf?num=C-34/20.
[8] Judgments concerning cases C-807/18 and C-39/19 is available at
http://curia.europa.eu/juris/documents.jsf?num=C-807/18.

referred to in those judgments, integrating the work being carried out on the subject in the context of BEREC.

In this context, in February 2022, ANACOM addressed a periodic request for information to the ISPs with a leading market presence, as in recent years, with particular focus on zero-rating and similar offers. It should be noted that, in view of the publication in September 2021 of the three CJEU rulings referred to, ANACOM, in the context of that request for information, specifically requested the identification and description of the measures implemented, under way, or planned in relation to zero-rating and similar offers (involving, for example, the restraint of offers for new subscriptions, migration to new offers).

From the replies received to the aforementioned request for information, the following conclusions should be noted:

- there is a strong predominance of zero-rating and similar offerings in the commercial portfolio of ISPs as far as mobile IAS offerings are concerned;

- most zero-rating and similar offers are reflected in the mobile phone Internet component, either in stand-alone mobile voice tariffs¸ or in mobile voice tariffs included in service packages, with only one ISP having zero-rating and similar offers in the add-ons modality;

- overall, the number of Internet accesses associated with zero-rating and similar offers grew compared to February 2021;

- none of the ISPs with zero-rating and similar offers have, up to the date of the reply to the information request, made any changes following the CJEU rulings of 2.9.2021.

Additionally, it is important to note that during the reporting period, ANACOM has been closely following the work developed at BEREC level, particularly when it is related to the suitability of BEREC's guidelines, as well as to the content of the referred rulings, as already mentioned. In this context, analysis of zero-rating practices in Portugal is also underway.

3.1.2. Transparency

3.1.2.1. Contractual information

As part of the transparency measures to ensure open Internet access, ISPs have to include specific information on IASs in contracts including this service, as provided for in Article 4(1) of the TSM Regulation.

In this context, having analysed the contracts of the most representative ISPs in the market, it has been confirmed that they include clauses on traffic management measures in their contracts, in compliance with the provisions of Article 4(1)(a) of the abovementioned Regulation.

Regarding the information made available on the impact of limitations on volume, speed and other quality of service parameters, most of the said ISPs have clauses to this effect (Article 4(1)(b) of the TSM Regulation).

Regarding the impact that traffic management measures have on the service provided to end-users, most ISPs have complied with the provisions of Article 4(1)(c) of the TSM Regulation, as these providers ensure specific information on this aspect in the contracts, also making available information on the measures adopted when the data limits established in the respective offers have been reached.

It was also found that all ISPs whose contracts were analysed include clauses in their contracts regarding the different download and upload speeds/debit rates, referred to in Article 4(1)(d) of the TSM Regulation, accompanied by an explanation of what is meant by each one.

Attention is drawn, however, to a certain lack of contractual information on the "*corrective measures*" that are available to users to react to differences between actual performance of the IAS and that announced or contained in contracts (Article 4(1)(e) of the TSM Regulation).

3.1.2.2. Information published on the websites of the ISPs

Over the last few years, ANACOM has sought to ensure compliance with transparency measures ensuring open Internet access, on the ISP websites, namely compliance with the provisions of Article 4(1)(d) of the TSM Regulation.

ANACOM monitored the information about ISP transmission speeds published on the websites of smaller ISPs, as had been done in the past for larger ISPs. As part of this process, communications were sent at the end of July 2020 to 15 providers, in which they

were alerted in particular to the obligation to publish on their websites "*a clear and comprehensible explanation*" of the speeds referred to in Article 4(1)(d) in the TSM Regulation, without prejudice to the fact that the information in question should also be specified in the contracts. In these communications, providers were also requested to inform ANACOM of the measures already adopted or to be adopted in this regard. Since then, ANACOM has continuously monitored the changes made by ISPs on their websites.

Following the communications sent out, ANACOM has interacted with the abovementioned ISPs, and several providers have adapted their websites. However, in some situations, a greater delay in adapting information has been claimed, particularly by ISPs providing services in different Member States, as a result of the need to harmonise the information disclosed in the different countries. ANACOM will reassess the ways in which it is justified to continue this monitoring, taking into account the practices followed in other EU countries regarding the publication of information on speeds, as well as ongoing developments in the context of NET.mede.

3.1.3. Monitoring mechanism

Article 4(4) of the TSM Regulation provides for the possibility to use a monitoring mechanism at national level, certified by the NRA, to assess the existence of significant discrepancies between the actual performance of the contracted IAS and the performance indicated by the provider of that service. The BEREC guidelines on Open Internet also introduce some clarifications in this respect.

In this context, it should be noted that ANACOM has provided the NET.mede measurement tool (https://netmede.pt/) since December 2013. It allows download/upload speed, latency and jitter tests to be carried out via browser on fixed or mobile access. In 2015 the app version of NET.mede was launched (*app* NET.mede), which can be downloaded from the Google Play Store and App Store or from the NET.mede website. The NET.mede app has two additional tests, on fixed or mobile access: packet loss and web page loading time.

ANACOM has made successive developments and improvements to the NET.mede tool, notably the website*,* online dissemination of aggregated results, installation of its own platform on GigaPIX, graphic and usability improvements to the application, and optimisation of the performance of tests and their characterisation.

Having completed these developments and improvements, ANACOM deemed it relevant and opportune to set up a technical working group, involving the main ISPs, with a network

connection to ANACOM's Autonomous System through GigaPIX, and also the public entity whose main mission is consumer protection (the DGC). The purpose of this working group is to analyse and discuss suitable options for the evolution of the NET.mede measurement system, as well as measurement procedures to be followed by users and other improvements that it may be pertinent to introduce, without prejudice to the timely public consultation of all interested parties. Thus, on 31.1.2022, the first meeting of the NET.mede technical working group was held, starting off the planned work. Following this, both the methodology of tests and the procedures for the accreditation of NET.mede are currently under discussion.

ANACOM considers this collaborative process important for the purpose of recognising the validity of results obtained by users in tests with the NET.mede app, also bearing in mind the provisions of the TSM Regulation.

3.2. Complaints associated to non-compliance with the TSM Regulation

In the exercise of its supervisory and enforcement functions, ANACOM continuously monitors complaints about electronic communications services received by this Authority, and regularly publishes relevant information in this regard.

Between May 2021 and April 2022, there was a decrease in the overall number of complaints filed directly with ANACOM about electronic communications services (-17%) compared to the same period last year. However, complaints about IAS increased significantly (+39%) over the same period.

The speed of fixed Internet access was the main reason for complaints, accounting for around 67% of Internet access complaints, and the one that led to the significant increase in complaints about these services (with a 136% increase). Failures in fixed Internet access were the second reason most mentioned by users, representing almost a third of complaints (36%). Traffic constraining recorded only 4 complaints in this period.

3.3. Main results of the assessment of technical parameters under the application of the TSM Regulation

3.3.1. NET.mede

ANACOM provides users with the NET.mede service, which allows them to test, from a computer, smartphone or tablet, some performance parameters of their IAS, with a focus

on speed and latency. Speed tests can be carried out through a web browser or an app, available for Windows, macOS, Android and iOS systems.

The test via web browser allows download/upload speeds to be measured, as well as latency and jitter. The NET.mede application, on the other hand, allows a more complete test, also including packet loss and loading of a web page. The NET.mede application is designed for a more regular use, allowing each user to consult in their My NET.mede reserved area, in an interactive and systematic way, the history of two years of tests with the application, per type of access (fixed or mobile) and per device.

The aggregate results of the tests carried out by NET.mede users in the last 90 days are disclosed online,[9] based on the type of access, user and equipment, and location. From the end of November 2021 these results available online include both the tests made via web browser and those made through the application.

In the period covered by this report, other improvements were also introduced, especially in terms of the NET.mede application, namely a greater automation of the characterisation of the tests (in terms of the identification of the type of access and provider), for the convenience of the user, and the presentation in the test reports, in Android or iOS, in mobile accesses, of the indication of the mobile network technology and, whenever possible, the signal level.

In the period covered by this report ANACOM also continued to analyse the results of tests carried out by NET.mede users, with the periodic publication of reports on such tests.

The collection and processing of the results of tests carried out through NET.mede by users provide useful information and indications for ANACOM's monitoring of the quality of the IAS. It is noted, however, that given that:

- the tests are of a voluntary and non-random nature,
- the specific motivations of users for taking the tests are not controllable,

the results presented cannot be extrapolated to all Internet users in Portugal, as it is not possible to guarantee the necessary statistical representativity of this group. The results of these tests also depend on the Internet speeds contracted by these NET.mede users and other factors that influence them.

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[9] Reports available at https://netmede.pt/estatisticas.

During the period from 1.5.2021 to 30.4.2022, four reports were published for the quarters of 2021, plus the annual report for 2021, which was published on 19.4.2022.[10]

Specifically, with regard to the report for 2021, it should be noted that users carried out 1.22 million valid tests through a web browser or the NET.mede application, i.e., after eliminating incongruous tests and those carried out internally by ANACOM, as well as the systematic tests from the same IP address and at the same time were aggregated in just one test, when carried out from fixed accesses. Of this set of tests, 73% were carried out in national fixed residential accesses and 19% in mobile accesses, with the rest coming from accesses identified as non-residential, accesses associated with foreign operators or undefined accesses.

Regarding the results of the tests carried out in NET.mede in 2021, through a web browser - in recommended browsers, operating systems and equipments - or through the application, in half of the tests (median) it was found:[11]

- in terms of download speed, 79 Mbps or more in fixed residential accesses and 10 Mbps or more in mobile accesses;
- in terms of upload speed, 44 Mbps or more in fixed residential accesses and 5 Mbps or more in mobile accesses;
- in terms of latency, 13 milliseconds (ms) or less in residential fixed accesses and 41 ms or less in mobile accesses.

Compared with 2020, a generalised improvement is thus evident, in both fixed and mobile accesses. In 2020, medians of 50 Mbps, 22 Mbps and 14 ms, respectively, were registered for download, upload and latency in fixed accesses, while these were 7 Mbps, 5 Mbps and 42 ms, also for download, upload and latency, in mobile accesses.

3.3.2. Studies of evaluation of the performance of mobile services and GSM, UMTS and LTE coverage

ANACOM, as part of its functions, carries out studies in Portugal to evaluate the quality of electronic communications services from the user's perspective, supported by mobile

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[10] The reports are available at https://www.anacom.pt/render.jsp?categoryId=367635.
[11] For more detail see the 2021 report at https://www.anacom.pt/streaming/RelatorioAnualNETmede2021_final.pdf?contentId=1720752&field=ATTACHED_FILE.

communications systems present on the market, with the aim of providing users with impartial information on the performance of these services.

In this context, during the reporting period, studies were undertaken and published evaluating the performance of electronic communications services and the levels of GSM, UMTS and LTE radio coverage of mobile communications systems in several municipalities (Baião, Coruche, Bragança, Gavião, Miranda do Douro, Mondim de Basto, Penacova, Sertã, Vimioso and Vinhais), on Santa Maria Island, in the Azores, as well as on Porto Santo Island and on the main roads on Madeira Island. These studies investigated the user experience in terms of accessibility of services, for which telephone calls were established to evaluate the voice service, NET.mede tests were carried out to evaluate the performance of the data service, and signal levels of the radio networks were checked to evaluate the coverage.

Also in the reporting period, the studies assessing the performance of mobile services and GSM, UMTS and LTE coverage in the municipalities of Ourém and Porto de Mós, carried out in accordance with the methodology approved by ANACOM in 2017,[12] were also published.

At CP's request, ANACOM also assessed, according to the same methodology, the performance of GSM, UMTS and LTE mobile services in the 'Alfa Pendular' service provided on the Braga-Porto-Lisboa-Faro railway line.[13] The main results observed for data services showed that the file transfer service generally has adequate capacity for establishing and retaining data sessions. On the other hand, Internet browsing and YouTube video streaming services, and data transmission latency, saw a degradation of these capabilities.

In file transfer sessions that were successfully established and maintained, reasonable overall average data transfer speeds were recorded, in both download and upload, with relevant performance differences being observed between ISPs. This indicator shows a very high variability, with maximum values of 169 Mbps and 55 Mbps and minimum values of 6 Kbps and 11 Kbps, respectively in download and upload, which make data transmission difficult or impossible under suitable conditions. In turn, Internet browsing services and

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[12] Available at https://www.anacom.pt/render.jsp?contentId=1413947&languageId=1.
[13] Detail available at https://www.anacom.pt/render.jsp?contentId=1707562.

YouTube video streaming, as well as data transmission latency, show poorer performance than file transfer, with some differences also being observed between ISPs.[14]

3.4. Assessment of the continuous availability of non-discriminatory IAS

Under the terms of Article 5(1) of the TSM Regulation, ANACOM seeks to assess the continued availability of non-discriminatory IASs with quality levels that reflect technological progress. To this end, this Authority monitors a set of relevant indicators in the field of the IAS.

3.4.1. IAS level of use

At the end of Q1 2022, the number of Internet accesses at a fixed location reached 4.3 million, 149 thousand more accesses (3.6% more) than in the same quarter of the previous year. The growth was slightly lower than in the same quarter of 2021 (3.6%).

As can be seen in Table 1, the accesses supported on cable TV networks decreased 0.7%, and represented 27.4% of the total (1.2 p.p. less than 12 months ago). ADSL accesses continued their downward trend, having decreased by 31.0%, replaced by new generation accesses. ADSL represented 5.4% of total accesses (less 2.7 p.p.). Fixed accesses based on mobile networks decreased by 8.0%, with a weight of 6.0% in the first quarter of 2022 (down 0.8 p.p. year-on-year).

Table 1: Number of Internet accesses at a fixed location, by type of access

	1Q2021	1Q2022	Var. 1Q2021/1Q2022
Fibre optic access (FTTH)	**2367**	**2651**	**12.0%**
% of total	56.4	61.0	4.6 p.p.
Cable modem accesses	**1200**	**1192**	**-0.7%**
% of total	28.6	27.4	-1.2 p.p.
ADSL accesses	**339**	**234**	**-31.0%**
% of total	8.1	5.4	-2.7 p.p.
Mobile networks at fixed location	**285**	**262**	**-8.0%**
% of total	6.8	6.0	-0.8 p.p.
Total Internet accesses at fixed location	**4198**	**4347**	**3.6%**

Unit: thousands of accesses; %; p.p.
Source: ANACOM.
Note: The totals and variations shown may not correspond to the figures in the table due to rounding and/or missing categories.

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[14] All these studies can be accessed at https://www.anacom.pt/render.jsp?categoryId=293495&pag=1.

At the end of 1Q022, there were 9.2 million users of the mobile Internet access service, 13.1% more than in 1Q2021 (Table 2), representing 70.1% of total mobile accesses effectively used.

Table 2: Mobile Internet users

	1Q2021	1Q2022	Var. 1Q2021/1Q2022
Mobile accesses with effective use of the mobile Internet service (excluding M2M)	**8174**	**9242**	**13.1%**
(of which) PC/tablet/pen/router	533	656	23.2%
(of which) mobile phone	7641	8586	12.4%

Unit: thousands of users; %.
Source: ANACOM.

The increase in the number of users is a result of the increase in the number of mobile phone Internet users (+12.4%), and the number of users of the IAS via PC/tablet/pen/router (+23.2%), which represented 7.1% of all mobile Internet users.

In the case of the latter accesses, this is the highest year-on-year growth recorded since 2010, when the e-initiatives programme[15] was underway. The growth recorded since the beginning of 2021 may have been influenced by the entry into force in September 2020 of the Digital School Programme, foreseen in the Government Programme, and whose implementation was accelerated due to the pandemic. On the other hand, the greater mobility associated with the end of the restrictions applied because of the COVID-19 pandemic may also have contributed to this evolution.

3.4.2. Residential penetration of IAS

At the end of the first quarter of 2022, the penetration rate of fixed broadband for residential customers (FBB) was 88.4 per 100 households, up 1.0 p.p. from the same period of the previous year.

Mobile Internet access service user penetration was around 89.3 per 100 inhabitants in 1Q2022, up 10 p.p. from the previous year. This is the highest penetration growth since the second quarter of 2017.

3.4.3. IAS availability

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[15] Government initiatives e-school, e-teachers and e-opportunities.

In 2021, the maximum theoretical download speeds made available by residential FBB offers ranged between 256 Kbps and 1 Gbps,[16] similar to the previous year. In 2021 the main download speed used became 200 Mbps (35.4%), followed by 100 Mbps (18.5%), 500 Mbps (14.7%) and 120 Mbps (13.4%). The average download speed increased 33.2% compared to 2020, reaching 205 Mbps (154 Mbps in the previous year).

At the end of 2021, 86% of FBB accesses were ultrafast broadband accesses (i.e., download speed above 100 Mbps), up 4.8 percentage points from the previous year and 23 percentage points more than five years ago. Fast broadband accesses (i.e., download speeds above 30 Mbps and below 100 Mbps), reached 7% of the total, the same figure as in the previous year.

In the case of mobile phone Internet offers, traffic limits varied between 50 MB and 60 GB, with the limits with the most subscribers being 1 GB, 3 GB and 5 GB. In the case of Internet offerings via PC/tablet, traffic limits varied between 30 MB and 100 GB, with the limits with the most subscribers being, in order of importance, 7 GB, 100 MB and 30 GB. Both Internet on mobile phones and Internet via PC/tablet had offers with unlimited traffic.

3.4.4. Use of OTT services

As reported in the previous annual report, there has been an intensification in the use of over-the-top (OTT) services in Portugal, strongly influenced by the COVID-19 pandemic. According to INE, the number of users of some OTT services continued to increase significantly in 2021.[17]

In 2021, the proportion of Internet users who made voice or video calls over the Internet in Portugal reached 80%, 10 p.p. more than in 2020 and 27 p.p. more than in 2019. Portugal has surpassed the EU27 average (+7 p.p.) moving to 9th position in the ranking of the use of this type of service.

In addition, around 91% of Internet users used instant messaging, 12 p.p. above the EU27 average. Portugal was ranked 6th in the EU27 for this indicator.

Online news reading, participation in social networks, online music and Internet banking were other services with participation levels above 50% among Internet users in Portugal (Figure 1). The use of social networks, access to online information and online civic and

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[16] These are the theoretical maximum speeds advertised by service providers. They do not include add-ons.
[17] Detail available at https://www.anacom.pt/render.jsp?contentId=1713912.

political participation in Portugal was significantly higher than the EU27 average. However, Internet banking and ecommerce were more popular in the EU27 than in Portugal.

Figure 1: Use of other OTT services by Internet users
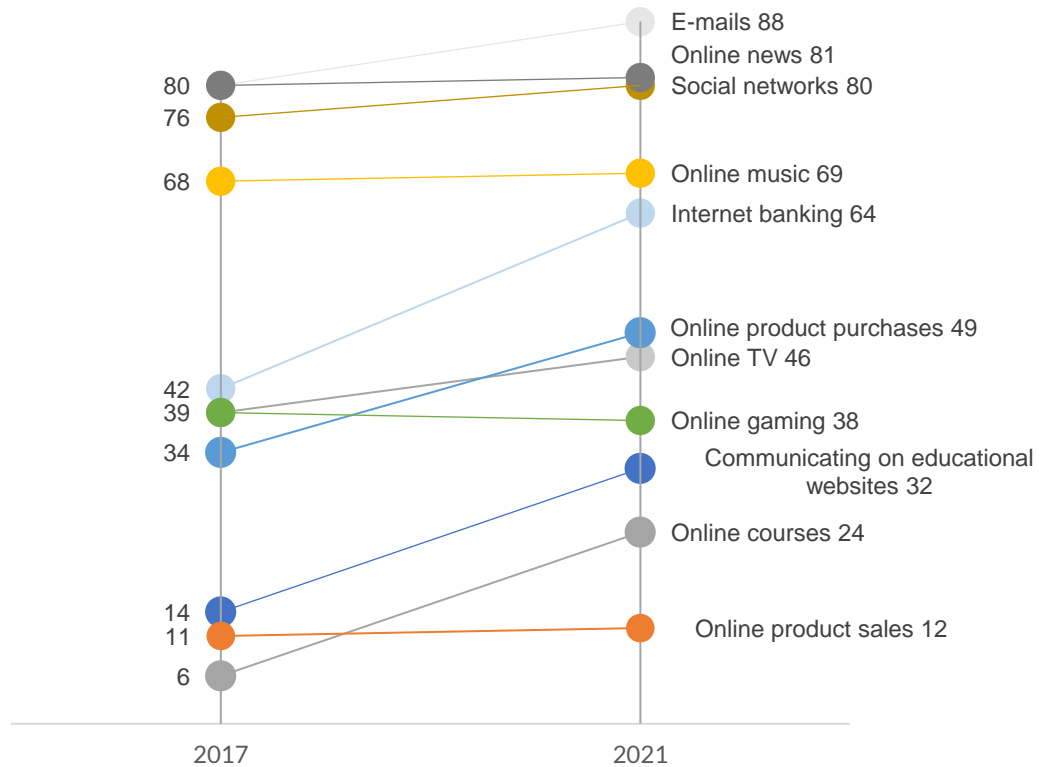
Unit: %.
Source: European Commission, *Information and Communication Technologies in Households and by Individuals* (2017, 2021).
Note: Individuals aged between 16 and 74 who have used the Internet in the last three months.

Younger individuals, students, with higher education and higher income showed a greater propensity to use the various OTT services analysed, as happens in the EU27 average. However, for some OTT services the annual growth was greater for the groups with the lowest usage, as is the case for retired people and people aged 45 or more for making voice and video calls over the Internet and for unemployed people and people aged 55 to 64 for using instant messaging.

3.4.5. Use of IoT equipment

In 2021, around 23% of Portuguese companies with 10 or more employees used interconnected devices or systems that can be remotely monitored or controlled through the

Internet, 10 p.p. more than in the previous year. Portugal was 6 p.p. below the EU27 average, having moved from 19th to 16th place in this ranking.

The use of these devices tends to be greater as the company size increases, being above average in the case of medium-sized companies (35%), and large companies (46%). The structure of the Portuguese productive fabric may explain the relatively lower use of these technologies compared with other countries.

Companies tend to use Internet of Things (IoT) equipment mainly for "security of premises" (86%), "energy consumption management" (32%), "logistics management" (21%), "production processes" (19%), "monitoring maintenance needs" (18%) and "customer service" (13%). Portugal was above the EU average in the use of "plant safety" equipment (+14 p.p.), occupying the 3rd position in this ranking.

3.5. Disclosure of the application of the TSM Regulation

In the context of disclosing the application of the TSM Regulation, it is important to mention the approval, on 09.06.2021, of the annual report regarding the application of Articles 3 and 4 of the TSM Regulation, which integrates the monitoring and supervisory actions carried out by this Authority during the period between 01.05.2020 and 30.04.2021.[18]

Also of note is the publication on ANACOM's website of the public consultation on BEREC's guidelines on the open Internet access.[19]

3.6. Enforcement and supervision in the context of the COVID-19 pandemic

Since the beginning of the COVID-19 pandemic, several legislative measures have been taken by the Government in response to the pandemic situation. In this context, it is important to highlight Decree-Law no. 14-A/2021 of 12.2.2021,[20] which established specific measures for the electronic communications sector, with the aim of ensuring the continuous provision of services considered critical. This Decree-Law was in force until September 2021.[21]

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[18] Decision available at https://anacom.pt/render.jsp?contentId=1683341&languageId=1.
[19] Detail available at https://www.anacom.pt/render.jsp?contentId=1720603.
[20] Decree-Law available at https://data.dre.pt/eli/dec-lei/14-a/2021/02/12/p/dre/pt/html.
[21] On 29.9.2021, Decree-Law 78-A/2021 was published (available at https://data.dre.pt/eli/dec-lei/78-a/2021/09/29/p/dre/pt/html), which revoked Decree-Law 14-A/2021 of 12.2.2021.

Notwithstanding the measures set out in the referred Decree-Law, an exceptional and temporary regime for response to the COVID-19 pandemic was already foreseen (Article 361 of Law no. 75-B/2020 of 31.12.2020[22]), regarding the assurance of consumer access to essential electronic communications services, and which was in force until 30.6.2021. On 20.5.2021, Law no. 29/2021[23] was also approved, which established the exceptional temporary suspension of contracts for the supply of essential services, including electronic communications services, to support the business fabric in the context of the COVID-19 pandemic.

Considering the high volume of complaints made about communications services during the COVID-19 pandemic and anticipating the end of the application - on 30.6.2021 - of exceptional consumer protection measures imposed because of the COVID-19 pandemic, on 2.6.2021 ANACOM published a set of recommendations for companies providing electronic communications services, in response to the main problems which had come to the attention of this Authority.[24] These recommendations include not charging penalties for late payment of invoices, making the conditions for renegotiation of contracts more flexible, at the initiative of consumers due to financial difficulties arising from the COVID-19 pandemic, facilitating the reduction of contracts according to judgements of fairness.

To ensure support for families affected by the COVID-19 pandemic, the Government decided to extend the prohibition on suspension by the provider of electronic communications services, for lack of payment, until the end of 2021, through Decree-Law no. 56-B/2021 of 7.7.2021.[25] In turn, Decree-Law no. 70-A/2021 of 6.8.2021[26] re-established, for the same period, the prohibition on suspending electronic communications services in situations of unemployment, drop in household income, or infection with COVID-19. Additionally, the exceptional regimes of cancellation and temporary suspension of electronic communications service contracts available to consumers were re-established. On 23.12.2021, under Decree-Law no. 119-B/2021,[27] the Government decided to maintain the exceptional consumer protection measures until 31.3.2021.

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[22] Law available at https://data.dre.pt/eli/lei/75-b/2020/12/31/p/dre/pt/html.
[23] Law available at https://data.dre.pt/eli/lei/29/2021/05/20/p/dre/pt/html.
[24] Detail available at https://anacom.pt/render.jsp?contentId=1663598&languageId=1.
[25] Decree-Law available at https://data.dre.pt/eli/dec-lei/56-b/2021/07/07/p/dre/pt/html.
[26] Decree-Law available at https://data.dre.pt/eli/dec-lei/70-a/2021/08/06/p/dre/pt/html.
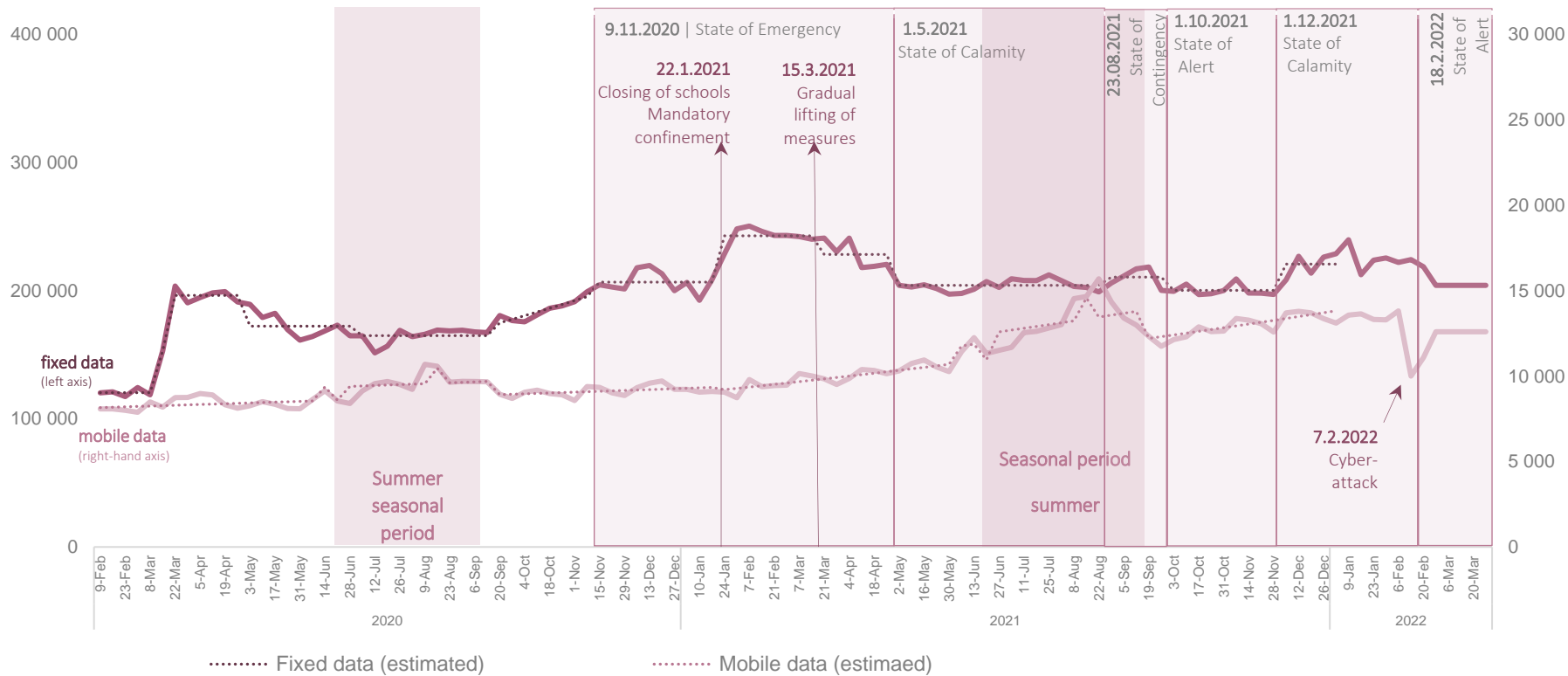[27] Decree-Law available at https://data.dre.pt/eli/dec-lei/119-b/2021/12/23/p/dre/pt/html.

ANACOM has been monitoring the legislative measures adopted to protect electronic communications customers in the context of the COVID-19 pandemic, having published on 18.10.2021 a new assessment of the application of those measures.[28]

In this area, it is worth recalling that in May 2020 ANACOM published the practical guide "*What you need to know about communications during the COVID-19 pandemic*", to clarify the main questions of communications consumers in Portugal, in the context resulting from the COVID-19 pandemic. This guide has been continuously updated in an effort to reflect the legislation in force on the topic at any time.

In addition to the problems affecting electronic communications customers, since the beginning of the COVID-19 pandemic ANACOM has been monitoring the communications sector's ability to respond to the growing use of electronic communications services, particularly in relation to IAS.

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[28] Detail available at https://anacom.pt/render.jsp?contentId=1708322.

Figure 2: Evolution of fixed and mobile data traffic since February 2020

.... Fixed data (estimated)   .... Mobile data (estimaed)

Source: ANACOM.
Unit: TB.
Note: The following log-linear regression models were used to model these series: Fixed-data traffic: $Ln(Y) = 18.6 + 0.240OMS + 0.489EMERGENCY2020 + 0.359CALAMITY2020 + 0.314ALERT2020 + 0.358CONTINGENCY\_CALAMITY2020 + 0.016 CONTINGENCY\_CALAMITY2020*t + 0,540EMERGENCY2021 + 0,161CONFINEMENT2021 + 0,099DECONFINEMENT2021 + 0,528CALAMITY\_MAY2021 + 0,559CONTINGENCY2021 + 0,509ALERT2021 + 0,606CALAMITY\_DEC2021$. Adjusted R^2 of 0.955; Mobile data traffic: $Ln(Y) = 15.9 + 0.0028t1 + 0.086SAZ\_2020 + 0.130SAZ\_2021 + 0.088HOLIDAY\_SAZ + 0.116CONFINEMENT2021\_pos + 0.008CONFINEMENT 2021\_pos*t2$ (adjusted R2 of 0.932). Adjusted R2 of 0.948. The independent variables, significant at 95% confidence level, refer to events related to the COVID-19 pandemic in the case of fixed data and to the seasonal summer period in the case of mobile data.

As can be seen in Figure **2**, the increase in data traffic compared to the pre-COVID-19 period is evident, with fixed data traffic having grown the most.

In this regard, it should be noted that as of 15.3.2021, the date on which deconfinement began, fixed data traffic began a downward trajectory, stabilising at a value around 70% above the figure before the pandemic after the State of Calamity came into force on 1.5.2021. Also of note is the strong positive correlation between fixed data traffic and the proportion of the population confined during the State of Calamity.[29]

With the entry into force of the State of Contingency, on 23.8.2021, fixed data traffic increased to levels 75% above the pre-COVID period, dropping, with the State of Alert, which began on 1.10.2021, to levels 66% above those verified in that period. In December 2021, the holidays occurring in this period, the suspension of school activities (until 7.1.2022), compulsory teleworking (until 14.1.2022) and prophylactic isolations have contributed to a new peak in fixed data traffic, 83% above that recorded in the pre-COVID-19 period.

In the week of 28 March to 24 April 2022, fixed data traffic, which represents about 93% of total data traffic, was still 84% higher than before the pandemic.

Regarding mobile data traffic, it should be noted that mobile data grew around 73% between the week of 24.1.2021 and the week of 22.8.2021, a week in which it reached a historic maximum (2.1 Petabytes per day, on average). During the summer period, and as has historically been the case, mobile data traffic increased. In 2021 new historic maximums were registered in the week of 13.6.2021, a week in which there was a public holiday, and in August, in the week of 22.8.2021. After the 2021 summer period mobile data traffic resumed the previously recorded growth trend. In the Easter week (17.4.2022) mobile data reached a new historic high.

The increase in fixed data traffic is related to the change in consumer usage behaviour resulting from the COVID-19 pandemic.[30] It is estimated that in 2020 and 2021 the pandemic have had an overall effect of +33.0% on average fixed data traffic per access.[31] The

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[29] Pearson correlation coefficient of 0.70 for a 99% confidence level.
[30] Detail available at https://www.anacom.pt/render.jsp?contentId=1720959&languageId=1.
[31] The estimated effect of COVID-19 results from the difference between the value of traffic actually verified and the estimated value of traffic if the previous historical trend had been maintained (i.e., if the pandemic had not occurred).

pandemic's effect on average fixed data traffic per access was +32.8% in 2020 and +32.6% in 2021. In the case of mobile data traffic, it was not possible to determine a specific effect of the COVID-19 pandemic, given the exponential evolution of this indicator since 2010, the seasonal acceleration in the summer period, and other factors that could influence this growth.

Despite the significant increase in data traffic in the context of the COVID-19 pandemic, the ISPs did not report significant network congestion problems, nor did they indicate that they had implemented exceptional traffic management measures.

In this regard, it should also be noted that in 2021 there was a significant reduction in the total number of security incidents notified to ANACOM by companies providing electronic communications networks and services: 38 security incidents, 41% less than in the previous year.[32] As in recent years, 47% of the causes associated with the occurrence of security incidents were due to failure by third parties to supply goods or services, that is, they resulted from events or developments that were exogenous to the sector. Fixed telephony was the most affected service (with 61% of total security incidents received), followed by mobile telephony and mobile Internet.

However, on 7.2.2022, one of the most representative ISPs in the market suffered a network disruption due to a cyber-attack, affecting the provision of services based on data networks, namely 4G/5G network, fixed voice, television, SMS and voice/digital answering services. The affected services were gradually restored in the days that followed.

3.7. Implementation of the TSM Regulation in the context of EU sanctions on Russia

Following Russia's military actions towards Ukraine, the EU has adopted several packages of economic sanctions and individual restrictive measures to be applied to Russia. Among these restrictive measures are the restrictions imposed by Council Regulation (EU) 2022/350 of 1.3.2022.[33]

According to that regulation, '[i]t *shall be prohibited for operators to broadcast or to enable, facilitate or otherwise contribute to broadcast, any content by the legal persons, entities or*

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[32] Detail available at https://www.anacom.pt/render.jsp?contentId=1723133&languageId=1.
[33] Council Regulation (EU) 2022/350 of 1.3.2022, amending Regulation (EU) 833/2014, is available at http://data.europa.eu/eli/reg/2022/350/oj.

bodies listed in Annex XV, including through transmission or distribution by any means such as cable, satellite, IP-TV, internet service providers, internet video-sharing platforms or applications, whether new or pre-installed'. That prohibition applies to the following entities: 'RT - Russia Today English, RT - Russia Today UK, RT - Russia Today Germany, RT - Russia Today France, RT - Russia Today Spanish, Sputnik'.

Whilst the open Internet access Regulation provides that ISPs must treat all traffic equally when providing Internet access services, as per its Article 3(1), it also provides for a number of justified exceptions in Article 3(3). In particular, exception (a) allows traffic management measures to be implemented to "(...) *comply with Union legislative acts, or national legislation that complies with Union law, to which the provider of internet access services is subject, or with measures that comply with Union law giving effect to such Union legislative acts or national legislation, including with orders by courts or public authorities vested with relevant powers*".

Following this, ANACOM sent a communication to ISPs, noting the approval of Regulation (EU) 2022/350 by the Council of 1.3.2022, recalling that the Internet Regulation allows exceptions to the obligation of equal treatment of traffic, in order to comply with national and EU legislative acts. In this context, in the context of ANACOM's participation in BEREC, the said providers were requested to send information on domain names and IP addresses blocked under the said regulation.

Additionally, ANACOM has published on its website[34] the BEREC statement of 11.3.2022 supporting the ISPs in the implementation of EU sanctions on Russia, in which it reiterates that the Open Internet Regulation is not an obstacle to the blocking of "Russia Today" and "Sputnik".

4. Main conclusions

As in previous periods, ANACOM sought to enforce and ensure compliance with the measures to guarantee open Internet access provided for in the TSM Regulation, in the period between May 2021 and the end of April 2022.

Within the scope of the enforcement and supervision actions conducted by this Authority, it is important to mention the continued monitoring of zero-rating and similar offers and their

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[34] Detail available at https://www.anacom.pt/render.jsp?contentId=1718640.

evaluation in accordance with the interpretation of the CJEU, involving participation in the work carried out by BEREC in this context.

In the field of transparency, the continued monitoring process of the information published by the ISPs, both on their websites and in their contracts, should be noted. In the case of monitoring the ISPs' websites, the best way of continuing this monitoring must be assessed, taking into account the practices followed in other EU countries and the ongoing developments in the NET.mede speed meter.

During the reporting period, ANACOM continued to evaluate and publish relevant information on the performance and coverage of mobile services from a user perspective, based on tests conducted with NET.mede. Also noteworthy is the work developed by ANACOM, with the collaboration of the main ISPs and DGC, regarding NET.mede, with a view to recognising the validity of the results obtained by users in tests with the NET.mede app.

Furthermore, within the scope of measuring the continued availability of non-discriminatory IAS with quality levels that reflect technological progress, the monitoring of OTT and IoT services indicators is relevant.

In the context of the COVID-19 pandemic, ANACOM continued to assess the communications sector's capacity to respond to the growing use of IAS. Additionally, ANACOM monitored the various measures adopted by the Government, presenting recommendations to the ISPs and publishing relevant information for consumers.

Finally, from an open Internet perspective, and in the context of ANACOM's participation in BEREC, the ISPs have been asked to provide information on the application of EU sanctions on Russia imposed by Council Regulation (EU) 2022/350 of 1.3.2022.

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