BoR (22) 185

Draft BEREC Report on the regulatory treatment of business services

December, 2022

Contents

Executive Summary

Business services based on electronic communication services are a key input to ensure that the EU companies and public administrations can benefit from the digital economy. For this reason, BEREC has launched several activities to learn on the evolution of the business markets: the present report, a “Study on communication services for businesses in Europe: Status quo and future trends” commissioned by BEREC and a workshop organised in October 2022 with the main stakeholders’ associations.

This report provides a snapshot of the regulatory treatment of business services by BEREC members and observers, based on a comprehensive questionnaire responded by 33 NRAs (all BEREC members and six observers) in June 2022. It focuses on wholesale regulation for M2/2020, M1/2020 and M3b/2014, that are considered as the upstream markets for business services by NRAs, including when relevant information on passive infrastructure access and symmetric regulation. The report also provides an overview of the geographical scope and the remedies applied in the context of business services, as well as of the challenges on data collection and references to good practices by NRAs.

At the time of the data collection, M2/2020 was regulated by majority of the NRAs (21). This is also the case, and even to a higher extent, for M1/2020 (regulated by 29 NRAs) and M3b/2014 (regulated by 27 NRAs). The majority of decisions on market analysis for these markets were taken in the period 2018-2020.

Most NRAs include typical business services as retail leased lines with traditional interfaces and retail Ethernet Services (which might include Layer 2 VPNs) as the key retail services for the analysis of wholesale M2/2020. A number of them also include these retail products in the analysis of other markets, such as M1/2020. Retail business internet access services are in general analysed within the scope of M1/2020, M3b/2014 and M2/2020 or at least a combination of two of them, and only a minority of NRAs analyse business fixed telephony services at the retail level.

In general, business markets tend to be highly concentrated in many countries, as in half of the countries, the incumbent operator has a market share of at least 50% (taking together all responses concerning the incumbent’s market share), while its main competitor represents up to 30% of the product market. Many NRAs, however, report a trend for a declining market share for the SMP operator, and only a minority report a trend to increasing market shares for the SMP operator.

M2/2020 includes for most NRAs retail Ethernet services, leased lines with traditional interfaces and VPNs. The delineation between products in M1/2020 and M2/2020 is based on guaranteed bandwidth and most NRAs also consider symmetrical bandwidth and SLAs as factors leading to inclusion in the wholesale product market for M2/2020.

Most NRAs consider that all bandwidths are part of the same single market, and the geographical scope for M2/2020 is national in most countries. NRAs define sub-national

markets based on the geographical aggregation of communities, municipalities, workplace zones, or administrative parishes, and the aggregation is based on market shares and presence of alternative operators.

In general, the main operators for M1/2020 and M2/2020 are the same in both markets for most countries, and differences are based on presence of smaller fibre operators as well as niche business operators. Furthermore, the geographical scope for both markets is the same, with differences in just a few countries.

Price regulation applied to wholesale products in M2/2020 is mainly cost-oriented, a number of NRAs also apply margin squeeze/economic replicability tests, while other NRAs apply different models of price regulation.

In the context of M1/2020 and M3b/2014, most NRAs do not define separate retail markets for business and residential services. Instead, the wholesale access products imposed on this market usually address both the residential and the business segments, but several of the products have specific business features such as better QoS, SLAs or a lower level of contention/ overbooking.

On other types of inputs and regulation, access to physical infrastructure is mentioned as relevant for business services by part of the NRAs, and a few of them have mentioned symmetric regulation as a remedy applied by the NRA to address competition issues for business services.

A relevant number of NRAs report difficulties, as reliability and consistency in the data collection for the analysis of M2/2020, while some of them also report on difficulties on obtaining relevant revenue-related and location data. Some NRAs report on conducting yearly external surveys focused on the demand side, and also some of them have published guides for business users on contracting these services. Several NRAs have put in place platforms, that allow any user (and thus business users, too) to report complaints regarding their telecom solutions directly to the NRA.

In the next years, BEREC will continue monitoring the evolution of these markets and how NRAs practice wholesale regulation. Some potential lines for future work include the evolution of competition dynamics, the effect of the increasing use of IT services by business users, as well as competition/collaboration between traditional ECS players and IT specific players, switching aspects, out-phasing of traditional lines and geographical segmentation.

1. Introduction and objectives

Business services based on electronic communication services are a key input to ensure that the EU companies and public administrations can benefit from the digital economy. They allow for better provision of new innovative services for organisations and citizens and increases productivity and competition in a globalised world. In the last years, business services have

evolved and are expected to evolve even more to include new high-speed services supported by the deployment of VHCNs.

In 2022, BEREC launched two activities on this relevant topic:

First, the present report, that provides a snapshot of the regulatory treatment of business services by BEREC members and observers. It focuses on wholesale regulation, including when relevant information on passive infrastructure access and symmetric regulation. The report also provides an overview of the geographical scope and the remedies applied in the context of business services, as well as of the challenges on data collection and references to good practices by NRAs.

Second, BEREC commissioned an external study to collect information directly from business users and providers of business services on the use and needs for such services. The "Study on Communication Services for Businesses in Europe: Status Quo and Future Trends" was published by BEREC in December 2022[1]. In this context, BEREC also organised a workshop with the main stakeholders' associations in October 2022 to hear their views on the current regulation for wholesale markets related to business services to encourage competition, investment, innovation and protection of business users, as well their views on future challenges, that will be used, in conjunction with the previous reports as an input for future work on this area.

In relation to business services, and as shown in the next chapter, most NRAs are regulating wholesale markets such as the market for dedicated capacity (M2/2020), the market for local access provided at a fixed location (M1/2020), as well as other wholesale inputs used by alternative operators to compete with incumbents for services to large companies, SMEs and all types of public administrations. Moreover, some NRAs have established or are establishing symmetrical frameworks for the roll-out and sharing of VHCNs, and other measures which can enhance business offers and usages (e.g. via the availability of very high bandwidth services).

The information provided in this report is based on the responses received to a comprehensive questionnaire sent to NRAs in May 2022. A total of 33 NRAs (all BEREC members and 6 BEREC observers) responded.

NRAs and stakeholders will benefit from the results of this report by getting a complete view on how these services are treated by different regulatory authorities (at the time when the questionnaire was sent), on the challenges faced by NRAs and on good practices for ensuring competitive and innovative business markets.

The report is organised as follow: After the executive summary and this introduction, chapter 2 provides a general overview on the regulation of wholesale markets usually used as an input

[1] BoR (22) 184 "Study on Communication Services for Businesses in Europe: Status Quo and Future Trends". 12 December 2022, https://www.berec.europa.eu/en/document-categories/berec/others/external-study-on-communication-services-for-businesses-in-europe-status-quo-and-future-trends

for retail business services, while chapter 3 details the retail services considered by NRAs in the analysis of business services markets. Chapters 4, 5 and 6 summarise how markets 2/2020, 1/2020 and 3b/2014 are regulated by NRAs in the context of business services. Chapters 7 and 8 present NRAs views on the relevance of passive infrastructure access (PIA) for business services as well as the application of symmetric regulation in the context of business services. Chapter 9 is focused on presenting the challenges raised by NRAs on data collection for business services, as well as referencing reports and good practices proposed by NRAs. Finally, Chapter 10 concludes by summarising the report and Chapter 11 outlines proposals on future work for BEREC in the context of business services. Annex I includes the questionnaire sent to NRAs and Annex II shows the list of NRAs responding to the questionnaire.

The present draft report is open to public consultation in December 2022, and BEREC plans to publish the final report taking into account issues to be raised by stakeholders in June 2023.

2. General overview of regulated markets used as an input for retail business services

Table 1 below presents an overview of how many of the 33 NRAs responding to the questionnaire were regulating the market M1/2020, M3b/2014 and M2/2020 at the time of the data collection in June 2022.

The market M2/2020 was regulated by majority of the NRAs (21) at the time of the data collection. Most of the non-regulated NRAs deregulated the market in the previous years, only RAK (Bosnia and Herzegovina) indicated the market has never been regulated.

The vast majority of NRAs (29) were regulating market M1/2020. There was no regulation imposed only in four cases: ACM (Netherlands, due to a court decision in March 2020), ANCOM (Romania, deregulated in 2015), CRC (Bulgaria, deregulated in 2019) and RAK (Bosnia and Herzegovina, where the market has never been regulated).

Similarly, a high majority of NRAs (27) was regulating the market M3b/2014. There was no regulation imposed only in six cases: ACM (Netherlands, due to a court decision in March 2020), ANCOM (Romania, never regulated), CRC (Bulgaria, deregulated in 2015), MCA (Malta, deregulated in 2013), PTS (Sweden, deregulated in 2015) and RAK (Bosnia and Herzegovina, never regulated).

Table 1: Markets regulated in June 2022 (number of countries)

	Yes	No
M 1/2020 (M 3a/2014)	**29**	4
M 3b/2014	**27**	6
M 2/2020 (M4/2014)	**21**	12

Source: BEREC, June 2022

Several NRAs have indicated that the situation changed between June 2022 and the finalization of the draft of this report. AKOS (Slovenia) issued new decisions on markets M1/2020 and M3b/204 in July 2022. CTU (Czechia) deregulated the market M2/2020, based on a new Market analysis decision (case CZ/2022/2380), where no SMP was found. ECOI (Iceland) has been forced to start re-evaluating the current market analysis due to a merger.[2] MCA (Malta) has published a consultation on M2/2020 at the end of September proposing deregulation.

3. Retail business products and related wholesale markets

This section focuses on which retail business products NRAs consider within the framework of market analyses, the competitive situation in each product market as well as which markets be upstream to the retail market for business services are analysed by NRAs, while also providing information on the date of the last market analyses done by NRAs.

3.1. Retail business products considered in market analyses

Concerning the retail market definition for business products, NRAs mostly focus their analysis within the framework of M2/2020 (or previous M4/2014) with 58% of all responses for all products analysed under this market). Specifically, for a given set of business products – namely, retail leased lines with traditional interfaces, retail Ethernet services (including Layer 2 VPNs), VPNs (Layer 3), retail business internet access services and retail business telephony – NRAs report to mostly analyse such products in light of M2/2020 (or previous M4/2014), either solely or together with other markets.

Table 2 - Business retail services that were specifically analysed for each wholesale market

	M1/2020 (M3a/2014)	M3b/2014	M2/2020 (M4/2014)
Retail leased lines with traditional interfaces	2	2	**28**
Retail Ethernet Services (which might include L2 VPNs)	1	2	**26**
VPNs (Layer 3)	2	3	**19**
Retail business internet access services	**20**	19	14
Retail business fixed telephony services	**6**	5	4
Other	3	4	**5**

Source: BEREC, June 2022

This is clearly the case of retail leased lines with traditional interfaces, as all NRAs report considering such products either only under the scope of M2/2020 (M4/2014) (26 NRAs out

[2] At the beginning of October the Icelandic Competition Authority approved the merger of Ardian and Míla. Mila, the dominant infrastructure company in Iceland, was the subsidiary company of Siminn. For further information: https://en.samkeppni.is/published-content/news/merger-of-ardian-and-mila-approved-with-conditions

of 28), or simultaneously within M1/2020 (M3a/2014), M3b/2014 and M2/2020 (M4/2014) (just one country[3]).

Similarly, retail ethernet services at both Layers 2 and 3 are considered within the framework of M2/2020 or M4/2014 by all respondents: for most of them (24 out of 26 for Layer 2 and 17 out of 19 for Layer 3) solely within this market, but for some NRAs (three NRAs for each product) jointly with other markets. For instance, PTS (Sweden) considers these services under both M3b/2014 and M2/2020. However, it should be noted that Layer 3 VPN services (not retail ethernet services) are analysed in fewer countries, and from those which analyse them under multiple markets, AKOS (Slovenia) and Arcep (France) consider Layer 3 services in all three analyses, while PTS (Sweden) considers these services under M3b/2014 and M2/2020 (M4/2014) alone.

Retail business internet access services are in general analysed within the scope of all three markets (M1/2020, M3b/2014 and M2/2020) or at least a combination of two of them[4]. Retail business fixed telephony services, on the other hand, tend to not be taken into consideration by the majority of NRAs in their market analyses, with just seven NRAs considering these services, a majority of which (five of them) having done so under multiple market frameworks: AGCOM (Italy), BIPT (Belgium) under M1/2020 (M3a/2014) and M3b/2014; and AKOS (Slovenia), Arcep (France), HAKOM (Croatia) under all three markets.

Other types of retail business services taken into consideration by NRAs include:

- Retail business internet access services via leased lines, analysed by the NMHH (Hungary) under M1/2020 (M3a/2014) and M3b/2014;
- Wavelength-division multiplex (WDM)-based solutions, considered by MCA (Malta) under M2/2020 (M4/2014); retail high quality lines (non-leased lines accesses), regarded by ANACOM (Portugal) within the framework of M4/2014;
- Dark fibre, considered by both ANCOM (Romania) and CRC (Bulgaria) under M2/2020 (M4/2014);
- BSA for business similar requirements as private customers considered by DBA (Denmark) under M3b/2014.

3.2. Analysis of market shares and trends

In half of the countries, the incumbent operator has a market share of at least 50% (taking together all responses concerning the incumbent's market share), while its main competitor

[3] PTS (Sweden), following the same approach for other retail products as well.
[4] Only five NRAs (out of 25) opt for analysing these services within a single market, namely the Agency for EKIP (Montenegro) (M1/2020 only), BTK (Türkiye) (M3b/2014) and BNetzA (Germany), CNMC (Spain), and SPRK (Latvia) (solely within M2/2020).

represents up to 30% of the product market (82% of all responses concerning the main competitor's market share).

Both retail leased lines (with traditional interfaces) and retail Ethernet services (including L2 VPNs) fit the description above, as does the market for VPNs (Layer 3), even though with a lower number of overall responses.

The markets for retail business and residential broadband and the market for fixed line business services, however, appear to feature a more balanced distribution of market shares between national incumbents and their competition, even if their main competitors still do not, in general, exceed a 30% market share.

Table 3 - Trend in the incumbent market share over the last three years

	Increasing	Stable	Declining
Retail leased lines (trad. Interfaces)	3	4	**8**
Retail Ethernet Services (which might include L2 VPNs)	4	2	**8**
VPNs (Layer 3)	0	3	**4**
Retail business broadband	3	**8**	**8**
Retail residential broadband	5	5	**10**
Retail business fixed telephony	1	5	**8**
Fixed line business services (total)	1	2	**6**

Source: BEREC, June 2022

With regard to the evolution of the incumbent's market shares in the last years, the vast majority of NRAs report a trend towards a decrease or at least a stable situation of the market share (82% of overall responses). This is valid for almost all products, including retail leased lines, for which a majority of respondents (9 out of 16 NRAs) indicate a declining trend, while only three NRAs report an increase in the incumbent's market share. The market for retail Ethernet services (with L2 VPNs) is seeing an increase of the incumbent's market share only by four NRAs, while the remaining 10 responses report a "declining" (eight NRAs) or "stable" (two NRAs) trend.

The same is true for other products as well. Seven (out of eight) NRAs report a trend of decline or stability in the incumbent´s market share with regard to Layer 3 VPNs, 15 (out of 20) concerning retail residential broadband and 12 (out of 13) in the context of retail business telephony. NRAs report a trend of decline or stability in the incumbent's market share. On retail business broadband, only eight (out of 19) NRAs identify a decrease in the incumbent's market share, and another eight report a stable trend, with only three NRAs identifying an increase in the incumbent's position.

All of the above information is based on the latest data available to the NRAs, most of which is recent (2020 or later), with the exception of some market analysis which date back to 2015.

A few NRAs have annotations concerning the data they have provided, some of which are noteworthy. In particular,

- BNetzA (Germany) mentions that retail residential broadband data includes mass-market internet access sold to private customers as well as businesses;
- EETT (Greece) refers to market shares for retail Ethernet services which includes the following; traditional interface leased lines, ethernet leased lines, Dedicated Internet Access (DIA) services and dedicated capacity IP VPN lines as well as the fact that the data provided for retail business broadband lines are included in retail residential broadband lines;
- Nkom (Norway) excludes a firm with a significant market share from their analysis due to their limited geographic focus, as well as includes VPN L3 and VPN L2 and other L2 retail under "VPN L3", due to these data being reported combined to the NRA;
- ANACOM (Portugal) mentions that retail leased lines data is an approximation, as only the incumbent operator makes use of these connections with traditional interfaces and their retail Ethernet services figures are proxied by the retail high-quality market (M 4/2014) shares;
- CNMC (Spain) notes that the data provided for "retail Ethernet services include all leased lines (traditional and Ethernet, the latter accounting for the great majority of lines), as disaggregated data is not publicly available;
- Both Traficom (Finland) and NMHH (Hungary) note that their markets included multiple SMP areas and operators (in the Finnish case).
- ACM (Netherlands) and PTS (Sweden) pointed to their markets not being regulated (all three markets in the Dutch case and just M2/2020 in the Swedish case).

When asked which markets are considered to be upstream of the retail business market, a large majority identify M1/2020 (or M3a/2014), M3b/2014 and M2/2020 (M4/2014) (25, 21 and 27 out of 31 of responses, respectively).

Table 4 - Upstream markets (in regard to retail business market)

	Yes	No
M 1/2020 (M3a/2014)	**25**	6
M 3b/2014	**21**	10
M 2/2020 (M4/2014)	**27**	4
Market for passive infrastructure access	7	**24**
Other	1	**30**

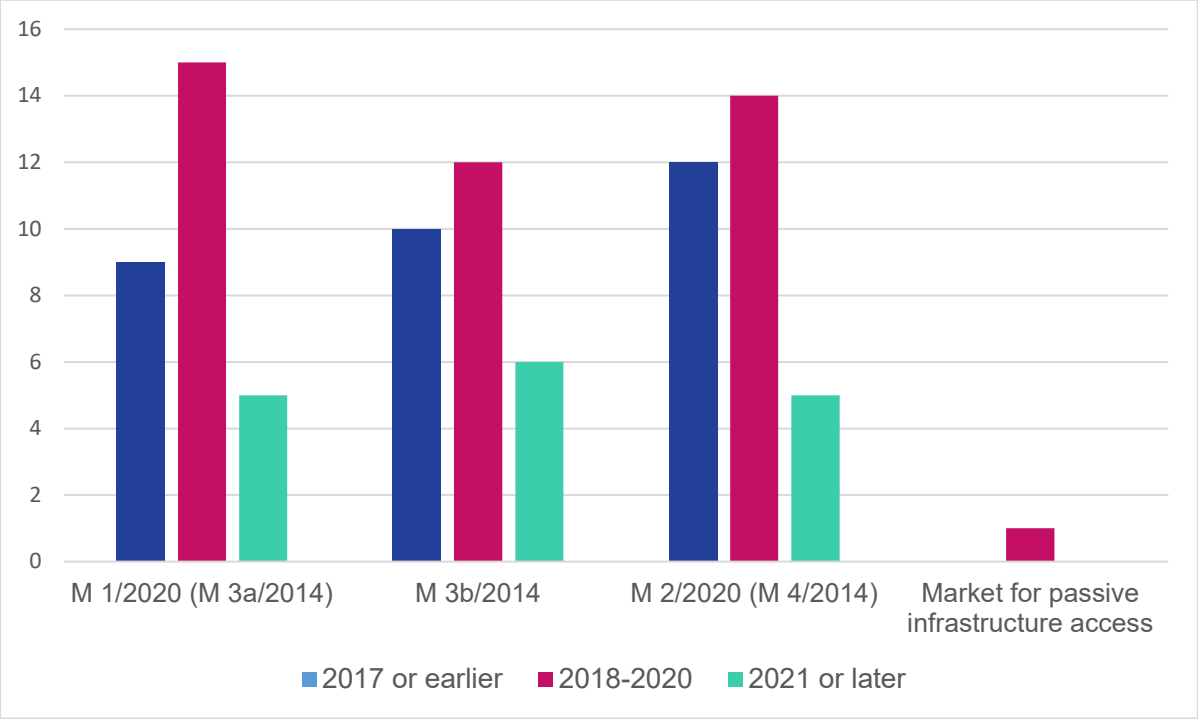
Source: BEREC, June 2022

The exceptions are ANACOM (Portugal), BTK (Türkiye), CNMC (Spain), DBA (Denmark) and OCECPR (Cyprus) for M1/2020 (M3a/2014) and M3b/2014, as well as BNetzA (Germany),

EETT (Greece) and ILR (Luxembourg) for M3b/2014 only[5]. All countries which consider M3b/2014 to be upstream of the retail business market also regard M1/2020 (M3a/2014) and M2/2020 (M4/2014) as such with the exception of RRT (Lithuania) for M2/2020 (M4/2014).

Regarding the market for passive infrastructure access, only seven NRAs report considering it as a specific upstream market of the retail business market[6][7].

Figure 1 – Year of the last decision



Source: BEREC, June 2022

With regard to the year of NRAs last analysis of each market, most of them are reported to have been published between 2018 and 2020 for M1/2020 (M3a/2014). The last decisions for both M3b/2014 and M2/2020 (M4/2014) have mostly been published up to 2020, with several NRAs having carried out their analyses prior to 2018 (10 out of 28 and 12 out of 31 NRAs, respectively). The market for passive infrastructure access is reported to have been analysed by Arcep (France) in 2020.

[5] Out of these, only DBA (Denmark) does not consider M2/2020 (M4/2014) as an upstream market, jointly with RRT (Lithuania) and Ratel (Serbia).

[6] The NRAs which do consider the market for PIA as an upstream market are AGCOM (Italy), Arcep (France), CNMC (Spain), COMREG (Ireland), ECOI (Iceland), ETRA (Estonia) and MCA (Malta).

[7] Only ANACOM (Portugal) considers another market to be upstream to the retail business market, identifying M14/2003 as such.

4. M2/2020

4.1. Retail markets analysis

As a basis for the wholesale M2/2020 market analysis, most NRAs defined and/or analysed several retail markets.

Table 5 - Which retail markets did you define and/or analyse as a basis for the wholesale market analysis? (Q20)

	Yes	No
Retail leased lines with traditional interfaces	**31**	2
Retail Ethernet Services (might include Layer 2 VPNs)	**31**	2
Retail VPNs	**18**	15
Retail business internet access services	13	**20**
Retail business fixed telephony services	4	**29**
Other	6	**15**

Source: BEREC, June 2022

In particular, as can be seen in table 5, retail leased lines with traditional interfaces and retail Ethernet Services (which might include Layer 2 VPNs) were analysed by almost all of the NRAs in their latest review, except for DBA (Denmark) and RAK (Bosnia and Herzegovina).

18 NRAs analysed retail VPNs and 13 NRAs analysed retail business internet access services. All NRAs that looked at the latter service also analysed the three retail markets above, except CNMC (Spain), DBA (Denmark) and Traficom (Finland). These countries were the only ones to analyse the market for business retail internet access services, but not the market for retail VPNs. Similarly, the four NRAs analysing retail business fixed telephony services also analysed all of the above retail markets.

As for other retail markets, ACM (Netherlands) defined a business retail market consisting of closed VPNs, leased lines, dark fibre and light paths. Open VPNs are not part of ACM's retail market. MCA (Malta) decided that, based on a substitutability assessment, the retail product market includes high quality connectivity services offered via traditional leased lines, Ethernet-based solutions and WDM-based solutions.

4.2. Wholesale markets analysis

Similarly to the retail markets, there are differences in the products included in the wholesale market M2/2020 across Member States.

As can be seen in table 6, Ethernet leased lines are part of the wholesale market in all Member States that responded (same as in the retail market). Leased lines with traditional interfaces are included in almost all Member States, with only ILR (Luxembourg) and RTR (Austria) excluding them (although they included it in the retail market).

High-quality VULA (Virtual Unbundling of Local Access) and bitstream products are only considered part of the wholesale market in few Member States. Out of the five NRAs that include high quality VULA over fibre[8], four also include high quality VULA over copper.[9] All of the NRAs who include high quality fibre bitstream also include the corresponding copper bitstream product.[10] Only for AKOS (Slovenia) both bitstream and VULA are part of the market.

Eight responses[11] (27 %) indicate that wavelength services are part of M2/2020. Dark fibre, on the other hand, is indicated as part of the market in only three countries[12] (10% of responses). Two NRAs include both, ACM (Netherlands) and ECOI (Iceland).

Passive infrastructure never forms part of the market, whereas 4 NRAs mention other products. BNetzA (Germany) includes a mixture between Ethernet leased lines and leased lines with traditional interfaces in the market (Ethernet-over-SDH). CTU (Czechia) points out that Layer 3 access and VPNs over fixed wireless access) are part of the market. Layer 2 and 3 VPNs are also included by SPRK (Latvia). HAKOM (Croatia) mentions that dark fibre remains part of the still regulated trunk segment of the market along particular trunk routes (M14/2003).

Table 6 - Products included in the wholesale market (M2/2020)

	Yes	No
Leased lines with traditional interfaces	**27**	2
Ethernet Leased Lines	**29**	0
High quality Copper Virtual unbundling / Layer 2 access	4	**25**
High quality Fibre Virtual unbundling / Layer 2 access	5	**24**
High quality Copper Bitstream / Layer 3 access	5	**24**
High quality Fibre Bitstream / Layer 3 access	5	**24**
Wavelength services	8	**21**
Dark fibre	3	**26**
Passive infrastructure	0	**29**
Other	4	**25**

Source: BEREC, June 2022

[8] The following NRAs considered high quality VULA over fibre to be part of M2/2020: AKOS (Slovenia), ANACOM (Portugal), CNMC (Spain), EETT (Greece), COMREG (Ireland).
[9] Out of the five NRAs to include high quality VULA over fibre, only ANACOM (Portugal) did not include high quality VULA over copper in the market.
[10] The following NRAs considered high quality bitstream over fibre to be part of M2/2020: AKOS (Slovenia), Arcep (France), CTU (Czechia), HAKOM (Croatia), SPRK (Latvia).
[11] ACM (Netherlands), BIPT (Belgium), BTK (Türkiye), ComREeg(Ireland), ECOI (Iceland), HAKOM (Croatia,), NKOM (Norway), MCA (Malta).
[12] ACM (Netherlands), ECOI (Iceland), RTR (Austria).

4.3. Delineation between M1/2020 and M2/2020

For distinguishing products of M1/2020 from M2/2020, the NRAs use various criteria. All but two NRAs who responded indicate that M2/2020 products always have guaranteed bandwidths, unlike products of M1/2020. Symmetrical bandwidth is the second most commonly used criterion.

Repair time SLAs are also often used for distinguishing M1/2020 from M2/2020 products. Repair time ranges from four hours as it is the case for Arcep (France) and ILR (Luxembourg) to one business day as for AKOS (Slovenia) and RRT (Lithuania).[13] Nkom (Norway) explains that there is no specific threshold level for the criterion as it is assessed in combination with the other parameters mentioned. ACM (Netherlands) analyse SLAs according to different characteristics (such as basic, best effort, lite and premium). ILR (Luxembourg) considers delivery time, response time and installation as relevant criteria for SLAs.

Moreover, the following bespoke quality criteria were listed as for "other SLAs" or "other": guaranteed availability of service 99% per month, 24/7 monitoring, possible asymmetrical bandwidth in cases when symmetrical bandwidth is not available (but upload rate must be at least 1/3 of download rate), maximal aggregation 1:4, packet loss, packet delay, jitter, delivery nodes, coverage, transmission speed, technical communications protocols, such as SDH, MPLS, and VPN or technical criteria taken from the Metro Ethernet Forum.

Table 7 - Criteria for distinguishing M1/2020 and M2/2020 products

	Yes	No
Symmetrical bandwidth	**19**	8
Guaranteed bandwidth	**25**	2
Repair time SLAs	**17**	10
Other SLAs	12	**15**
Others	5	**22**

Source: BEREC, June 2022

4.4. Geographic scope

Concerning the geographic scope of the wholesale market, 23 (82%) NRAs define a national market, whereas only five NRAs define a sub-national market, namely AGCOM (Italy), ANACOM (Portugal), RTR (Austria), Traficom (Finland) and ComReg (Ireland).

In Austria, connections with more than 10 Mbit/s within 355 communities are deregulated due to the incumbent market share below 40% and presence of alternative infrastructure(s).

Traficom (Finland), defines 89 sub-national markets as there are regional copper and fibre networks with different network owners (among these network owners are 17 SMP operators

[13] Only 5 of the 17 NRAs who use this criterion indicated exact time spans.

who were all traditional incumbents). 32 of the 89 sub-national markets were deregulated in the last market analysis.

ANACOM (Portugal) defines several geographic markets (competitive areas, non-competitive areas and currently non-competitive areas) according to the presence of alternative operators and according to the competitive dynamics in the retail market.

AGCOM (Italy) identifies two different geographic markets, the municipality of Milan and the rest of Italy, where Milan was found to be effectively competitive.

ComReg (Ireland) divides the country by independent geographic units called *work place zones*[14] and defines such a zone to be competitive if 75% of fibre based leased line demand is within 50 metres of three or more networks. In the zones not fulfilling this criterion, SMP obligations are imposed on the incumbent.

4.5. Retail demand and geographic scope

Only 4 out of 22 NRA responses outline that the retail demand of business users affected the geographic scope of the wholesale market.

CNMC (Spain), which defines a national market, explains that most users of Market 2 products are multi-site companies using VPNs[15]. Moreover, large business users are key to the business market in terms of revenues. Such demand requires 'turn-key solutions' whereby they require the contract bidder to serve all their sites, so if the alternative operator cannot reach one of them, it may lose the contract. In addition, contracts typically have a duration of four years and customers face high switching costs due to the migration process.

CTU (Czechia) mentions the same explanation as CNMC (Spain) for why retail demand affects the geographic scope of the wholesale market by saying that high-end business customers prefer operators which can provide services across the whole country. Therefore, they also define a national market.

ComReg (Ireland) finds the retail market to be national but underpinned by sub-national wholesale geographic markets. This means that the retail demand influences the geographic scope of the wholesale market as for the definition of the competitive zones, 75% of all demand, the majority of which is retail, had to be within 50 metres of three or more networks in each geographic unit.

[14] Ireland consists of approx. 7,000 work place zones.
[15] In Spain, 60% of retail leased lines are concentrated in companies with more than 10 sites and only 7% of retail leased lines are provided to single-site companies.

4.6. Geographic units and aggregation methods

The NRAs which define sub-national markets use either communities (RTR (Austria); 2,100 overall), municipalities (AGCOM (Italy), Traficom (Finland)), Work Place Zones (ComReg (Ireland); 7,000 overall) or administrative parishes (ANACOM (Portugal); 3,092 overall).

For aggregating the units into two or more areas, different criteria are applied. In Austria, communities are aggregated where the market share is below 40%, where a second provider is present and where at least two lines end.

In Finland, municipalities form a uniform geographic area if they are situated next to each other, if the number of operators operating in the market in a specific geographic area is almost the same (+/- 1 operator), if the biggest operator in all the municipalities forming a geographic area is the same operator and its market share is at least 50% in all those municipalities and if the number of connections belonging to the market and owned by the operators in a geographic area is big enough (at least thirty connections)[16].

ANACOM (Portugal) uses three criteria which have to be fulfilled cumulatively in order to classify a geographic area as a competitive area: the number of competitors, the number of competitors with own infrastructure coverage above a certain threshold and the market share of the incumbent. Concerning the number of competitors, at least two alternative operators with accesses effectively provided (supported in their own or third-party networks/wholesale offers) must be present. Moreover, at least two alternative networks with 50% coverage in the geographical unit (or a PoP, in the case of fibre) have to exist. The third criterion is that the incumbent's market share has to be below 50% in the corresponding geographic area.

ComReg (Ireland) aggregates work place zones where the condition that 75% of demand is within 50 metres of three or more networks become part of the deregulated market. Those that don't, remain subject to SMP regulation. Furthermore, in Work Place Zones with no demand, those that have three or more alternative networks present are deregulated and those that have two or less remain subject to SMP regulation.

4.7. Bandwidth segmentation

Only 5 NRAs (18%), i.e. ANACOM (Portugal), BNetzA (Germany), ComReg (Ireland), CTU (Czechia) and RTR (Austria), found segmented product markets based on bandwidths while the remaining 22 NRAs (81%) concluded that all bandwidths are part of a single product market. Where a segmented market was found, the segmentation thresholds is in most cases for low speeds.[17]

[16] The last criterion was chosen in order to avoid an unnecessary fragmentation of the market.
[17] The thresholds mentioned were 2, 6, 10, 24, and 155 Mbps.

4.8. Operators in M1/2020 vs. M2/2020

21 NRAs (78%) report that the main market players are the same in M1/202 and M2/2020, while only 6 NRAs (22%) state that the main operators differ. As explanation for differences, NRAs mentioned that the role of smaller fibre operators such as utilities and niche business operators would tend to be higher in M2/2020 than in M1/2020. The main operators and in particular the SMP operators tend to be active in both markets across Member States.

4.9. Geographic scope of M1/2020 vs. M2/2020

In most Member States, the geographic scope of M1/2020 and M2/2020 is identical. However, 6 NRAs (23%) found that those markets have different geographic scope. ANACOM (Portugal), ComReg (Ireland) and RTR (Austria) further clarified that M2/2020 is geographically segmented while M1/2020 is national. The Spanish NRA, CNMC, stated that the geographic scope of M2/2020 is national while the scope of M1/2020 was found to be sub-national.

4.10. Remedies: access obligations

NRAs have imposed access obligations in M2/2020 for a number of products/services, and as can be seen in table, notably for Ethernet Leased Lines[18] (19 NRAs) and leased lines with traditional interfaces (16 NRAs[19]). All NRAs imposing the latter service have also imposed the former. Of these two wholesale services, NMHH (Hungary), ILR (Luxembourg) and RTR (Austria) have only imposed Ethernet leased lines.

Table 8 - For which products/services have you imposed access obligations in M2/2020? (Q30)

	Yes	No
Leased lines with traditional interfaces	**16**	10
Ethernet Leased Lines	**19**	7
Wavelength services	6	**20**
High Quality Bitstream	4	**22**
Virtual Unbundling Local Access services	2	**23**
Dark fibre	2	**24**
Passive infrastructure	2	**24**
Other	3	**23**

Source: BEREC, June 2022

[18] BIPT (Belgium) also includes Ethernet leased lines in Ethernet services. In Croatia, as regards access obligations to the leased lines with traditional interfaces, HAKOM imposed access obligations for S(H)DSL lines, while access obligations for PDH/SDH leased lines were not imposed, as the SMP operator had announced the switch off of the TDM network. MCA (Malta) imposes that the incumbent is to offer access to its wholesale leased lines products and meet any reasonable requests for access to service variants. In addition, the incumbent must give other alternative operators access to the necessary network elements and facilities, where such access has not been provided.

[19] CTU (Czechia) imposed access obligation for traditional LL but with no price regulation (analysis found no basis for price regulation). Also, please note that there is new CTU M2/2020 Analysis (Market analysis decision) which was adopted in 07/2022 (after data collection for this report) under which M2/2020 in Czechia has been deregulated (no SMP found).

In five countries where access to traditional leased lines is mandated, the SMP operator has announced the dismantling of this service. Different deadlines and transitional periods for decommissioning have been imposed by AGCOM (Italy), BIPT (Belgium), BNetzA (Germany), EETT (Greece) and HAKOM (Croatia).

The regulation only applies to certain bandwidths in six countries. In Spain, the SMP operator has to provide traditional leased lines of 2 Mbit/s for new connections. In Germany regulation applies to bandwidth from 2 up to 155 Mbit/s; in Czechia, to services with a bandwidth ≤ 6 Mbit/s; in Portugal and Ireland, to bandwidth ≤ 2 Mbps for traditional interfaces, 10 Mbps, 100 Mbps and 1 Gbps for Ethernet leased lines and 10 Gbps for Ethernet leased lines for "CAM circuits"[20]. Finally, AGCOM (Italy) regulation applies to bandwidths of > 2 Mbps for digital PDH terminating circuits. Interestingly, CNMC (Spain) and AGCOM (Italy) include all speeds in the market, but do not regulate all of them.

Services other than the above are only imposed in a few countries, in particular: wavelength services (five NRAs[21]), high quality bitstream (four NRAs[22]), dark fibre (four NRAs[23]), passive infrastructure (four NRAs[24]) and virtual unbundling local access services (two NRAs[25]). In Germany, Ethernet-over-SDH is also imposed.

All countries imposing wavelength access services, high-quality bitstream, and virtual unbundled local access services have also imposed remedies for Ethernet and traditional leased lines. In ANACOM (Portugal) and ComReg (Ireland) do not impose access to passive infrastructure and dark fibre in M2/2020, but under M3a/2014 obligations (however, dark fibre only applies when there is no capacity available in ducts).

The countries with the highest number of regulated access products imposed are Belgium, Spain, Croatia, Slovenia, Iceland and Germany (four each) and France, Portugal, Greece, Türkiye and Malta (three each).

Eight NRAs have not imposed any access remedies: CRC (Bulgaria), ETRA (Estonia), Nkom (Norway), PTS (Sweden), RATEL (Serbia), RU (Slovakia), SPRK (Latvia) and Traficom (Finland). In Finland there is no regulation at the moment, since the Supreme Administrative Court annulled Traficom's decision. In the rest of these eight countries the market was deregulated.

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[20] Leased lines supported on submarine cables between the mainland and the islands of the Azores and Madeira archipelagos

[21], BIPT (Belgium), BTK (Türkiye), ComReg (Iceland), HAKOM (Croatia) and MCA (Malta). A part, also imposed by EKIP (Montenegro), but not imposed in M2.

[22] AKOS (Slovenia), Arcep (France), BNetzA (Germany) and CNMC (Spain). A part, also imposed by EKIP (Montenegro), but not imposed in m2.

[23] ECOI (Iceland), EKIP (Montenegro), RATEL (Serbia) and RTR (Austria).

[24] BIPT (Belgium), CNMC (Spain), EKIP (Montenegro) and RATEL (Serbia).

[25] AKOS (Slovenia) and EETT (Greece).

4.11. Remedies: backhaul

Out of the 13[26] NRAs which explicitly regulated fixed or mobile backhaul in M2/2020, three NRAs impose access to wholesale products that specifically target business markets (in contrast to wholesale products for backhaul). In particular, Arcep (France) regulates specific products addressing mobile backhaul and business access products; AKOS (Slovenia) imposes for only fixed backhaul M2/2020 products, but not mobile backhaul; in Croatia, broadband and mobile backhaul products have been introduced by the SMP operator on a voluntary basis and, for transparency obligation reasons, HAKOM has included in the reference offer.

In March 2022, BEREC published a report on the regulatory treatment for fixed and mobile backhaul[27] where, in line with the present findings, it was stated the following:

"*Nearly half of BEREC members include backhaul in market 2/2020 or market 4/2014, and around a 25% of them find this market to be competitive. Part of the NRAs regulate backhaul as an ancillary service in market 1/2020 or market 3b/2014. For those NRAs including backhaul in market 2/2020 or market 4/2014, the obligations are not differentiated based on its use (fixed or mobile).*

Most NRAs regulating backhaul consider both traditional leased lines and Ethernet services as regulated active products. Apart from these regulated active wholesale products, access to passive infrastructure (ducts and poles) is also imposed by the majority of NRAs regulating inputs for backhaul and is considered as especially important by NRAs, as well as by operators."[28]

4.12. Remedies: geographical differentiation

As shown in section 4.4, five NRAs have defined sub-national markets. Accordingly, in areas where no SMP operator has been identified, they have not imposed any remedies. Therefore, different obligations exist in their territories, but mainly (in four out of the five cases) because where SMP is found the same obligations are imposed everywhere.

[26] AKOS (Slovenia), ANACOM (Portugal), Arcep (France), BIPT (Belgium), BNetzA (Germany), BTK (Türkiye), ComReg (Ireland), EETT (Greece), HAKOM (Croatia) MCA (Malta), OCECPR (Cyprus), RTR (Austria), Traficom (Finland). In Finland there is no regulation at the moment since the Supreme Administrative Court annulled Traficom's decision. MCA (Malta) do not regulate fixed or mobile backhaul, but only leased lines which could be used for such purposes.

[27] BoR (22) 33, BEREC Report on the regulatory treatment for fixed and mobile backhaul, 10.03.2022. https://www.berec.europa.eu/en/document-categories/berec/reports/berec-report-on-the-regulatory-treatment-for-fixed-and-mobile-backhaul

[28] For that report, AEC (North Macedonia) participated and stated that they also regulate backhaul.

This is the case of Traficom (Finland), where the same obligations were imposed on all SMP operators, since this NRA has not identified a need for geographically differentiated obligations in different regional markets.

Apart from these cases with sub-national markets, two NRAs (Arcep (France) and BIPT (Belgium)) have geographically differentiated remedies within a single defined national market.

In particular, BIPT (Belgium) differentiates geographically if at least two other operators are sufficiently present with own fibre in a given area, according to two criteria that were examined[29]. Arcep (France) differentiates tariff remedies geographically, according to the level of competition and technology[30].

Only in one case, ANACOM (Portugal), there is a combination of sub-national markets together with different SMP operator remedies depending on the area. In particular, price control (cost-orientation) for non-competitive areas was imposed, with other remedies being geographically differentiated. In a set of geographic units considered as "non-competitive at the moment" but with signs of prospective competition in the medium-long term, only a price control related to preventing margin squeeze was imposed by ANACOM.

4.13. Remedies: price regulation

Figure 2 below shows what kind of price regulation is applied for each product.

For traditional leased lines, 14 NRAs impose cost-oriented pricing, of which eight are based on a bottom-up model (AKOS in Slovenia, AGCOM in Italy, BNetzA in Germany, BTK in Türkiye, ComReg in Ireland, HAKOM in Croatia, MCA in Malta and OCECPR in Cyprus), five on a top-down model (Arcep in France, ECOI in Iceland, EETT in Greece, EKIP in Montenegro and RRT in Lithuania) and one on another approach (ANACOM in Portugal). Three NRAs impose the margin squeeze test/ERT – BIPT[31] (Belgium), EETT (Greece) and RRT (Lithuania) – and three NRAs impose other price regulation remedies (ANACOM (Portugal): non-eviction prices[32]; BIPT (Belgium): fair prices[33]; CNMC (Spain): reasonable prices;).

[29] The criteria followed by BIPT to segment geographically are (1) at least two other operators present in the area must have each (not cumulated) an amount of fibre connections exceeding 40% of the SMP fibre connections in this area. OR (2) at 40% of the locations (grid squares of 400 meter) in the area where the SMP operator is present, at least two other operators are also present within short distance. In the areas where one of these criteria was valid the price remedy was not imposed.

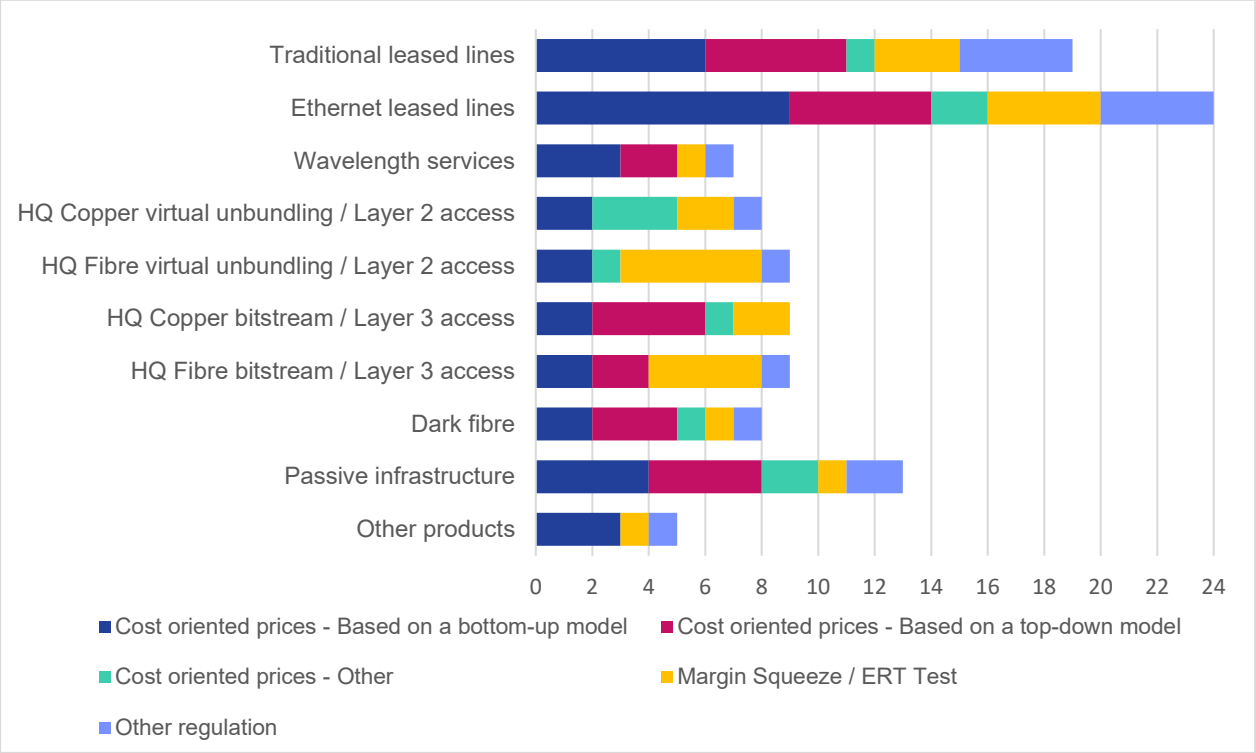
[30] Arcep (France) assessed differently the level of competition depending on the technology. For copper, depending on the presence of alternative providers at the wholesale level. For dedicated fibre, depending on the market shares of alternative provider, the Orange infrastructure market share (including self-supply), the city density, and the number of dedicated fibre lines deployed in the city.

[31] BIPT has specifically imposed a margin squeeze test.

[32] In "Áreas ANC" the prices are regulated but should be defined by the SMP operator as non-eviction prices. If there were complaints (which did not happen until now), ANACOM should analyse the situation and, if necessary, conduct a margin squeeze test.

[33] BIPT imposes a "fair pricing" which ensures a reasonable margin between costs and prices.

Figure 2: What kind of price regulation is applied for each product?



Source: BEREC, June 2022

Concerning Ethernet leased lines, 16 NRAs impose cost-oriented pricing, of which nine are based on a bottom-up model (same countries as traditional leased lines, plus EETT (Greece) and ILR (Luxemburg)), five on a top-down model (Arcep (France), ECOI (Iceland), EKIP (Montenegro), RRT (Lithuania) and RTR (Austria)) and two on another approach (ANACOM (Portugal) and NMHH (Hungary[34])). NRAs in four countries impose the margin squeeze test / ERT (BIPT (Belgium), EETT (Greece), RRT (Lithuania) and RTR (Austria)) and in four countries, NRAs impose other price regulation remedies (same countries as traditional leased lines, but CNMC (Spain) imposes a retail minus methodology).

As regards high quality copper and fibre Virtual unbundling (Layer 2 access), AKOS (Slovenia) and EETT (Greece) impose cost-oriented pricing based on a bottom-up model, and ANACOM (Portugal) with other remedies. BNetzA (Germany) and ComReg (Ireland)[35] impose cost-oriented pricing with other remedies only for copper. RU (Slovakia) imposes an ERT test for both copper and fibre, while BNetzA (Germany), ComReg (Ireland), EETT (Greece) and MCA (Malta), only for fibre. ANACOM (Portugal) imposes a non-eviction prices remedy for fibre access.

[34] Direct costs of services plus mark up, based on historical costs. Prices are calculated by the SMP operator and approved by the NRA.
[35] BU-LRAIC + for non-reusable assets, Top Down cost for reusable assets.

For high quality copper and fibre bitstream (Layer 3 access), AKOS (Slovenia), BTK (Türkiye) and CNMC (Spain)[36] impose cost-oriented pricing based on a bottom-up model. EKIP (Montenegro) and ETRA (Estonia) impose cost-oriented pricing based on a top-down model, while ARCEP (France) and RATEL (Serbia) only in the case of cooper access. ComReg (Ireland) imposes cost-oriented pricing based on another approach. BTK (Türkiye) and RU (Slovakia) impose a margin squeeze test / ERT, while, Arcep (France) and CNMC (Spain)[37] only in the case of fibre access. Arcep (France) also imposes non-excessive prices in the case of fibre.

With respect to wavelength services, five NRAs impose cost-oriented pricing: three based on a bottom-up model (BTK (Türkiye), ComReg (Ireland) and HAKOM (Croatia), and two on a top-down model (ECOI (Iceland) and EKIP (Montenegro)). BIPT (Belgium) imposes both a margin squeeze test / ERT and also a fair pricing.

Regarding dark fibre, six NRAs impose cost-oriented pricing, of which two are based on a bottom-up model (BTK (Türkiye) and RTR (Austria)), three on a top-down model (ECOI (Iceland), EKIP (Montenegro) and RATEL (Serbia)) and one on another approach (ComReg (Ireland)[38]). PTS (Sweden) imposes a margin squeeze test / ERT and RTR (Austria) imposes other price regulation remedies.

With respect to passive infrastructure, ten NRAs impose cost-oriented pricing. In four countries, prices are based on a bottom-up model (BNetzA (Germany), BTK (Türkiye), CNMC (Spain) and RU (Slovakia)), four on a top-down model (EKIP (Montenegro), ETRA (Estonia), RATEL (Serbia) and SPRK (Latvia)) and two on another approach (ComReg (Ireland)[39] and HAKOM (Croatia)[40]). BIPT (Belgium) imposes a margin squeeze test / ERT. Two countries impose other price regulation remedies (BIPT (Belgium)[41] and HAKOM (Croatia)[42]).

Concerning other types of price regulation, two NRAs impose cost-oriented pricing based on a bottom-up model (BNetzA (Germany) [43], RU (Slovakia)[44]).

5. M1/2020 in the context of business services

This section discusses the market definition and remedies for market M1/2020, the market for wholesale local access provided at a fixed location, with a focus on the relevance for business services. This market primarily consists of physical access products (physical unbundling of copper or fibre access lines, in some cases also civil infrastructure) as well as virtual

[36] Layer 2 access.
[37] Layer 2 access.
[38] BU-LRAIC + for non-reusable assets, TD cost for reusable assets.
[39] BU-LRAIC + for non-reusable assets, TD cost for reusable assets.
[40] For Croatian incumbent Hrvatski telekom-HT prices are based on top-down model with efficiency adjustments.
[41] Fair pricing.
[42] For other infrastructure operators prices are based on benchmark.
[43] LLU.
[44] Collocation on previous M3a/2014 and M3b/2014.

unbundled local access products (VULA) enabling transmission of internet and related data services.

5.1. Market definition

Before defining and analysing a wholesale market, NRAs have to analyse the downstream retail markets. The BEREC questionnaire therefore included a question asking whether the NRAs defined separate retail product markets for the residential and the business segments. Only two NRAs replied with "Yes" to this question (see Table 9, Q6): BIPT (Belgium) and RTR (Austria).[45]

With regard to the wholesale level, four NRAs defined sub-national wholesale markets (Traficom (Finland), NMHH (Hungary), UKE (Poland), AGCOM (Italy)) but in none of these countries did particular features of business demand, such as multi-site demand and sourcing from a single supplier, play a role in the geographic market definition (see Table 9, Q7 and Q8).

As a conclusion, most NRAs do not define separate retail markets for business and residential services in the context of the analysis of M1/2020, nor define different sub-national wholesale markets when assessing significant market power.

Table 9: M1/2020, responses to questions on market definition

	Yes	No
Q6: Did you define separate retail product markets for the residential and the business segment?	2	**27**
Q7: Did you define sub-national wholesale markets?	4	**24**
Q8: Did particular features of business demand, such as multi-site demand and sourcing from a single supplier, play a role in the geographic market definition?	0	**24**

Source: BEREC, June 2022

5.2. Regulated products

Table 10 shows the regulated wholesale access products that have been imposed on the SMP operator(s) on market M1/2020. Most NRAs (26) have imposed access to physical copper unbundling (only ACM (Netherlands) and DBA (Denmark) did not) and several NRAs imposed access to passive infrastructure (17), fibre unbundling (14) and/or virtual unbundling (15 on copper and 19 on fibre). Six NRAs imposed access to other wholesale products, in particular to backhaul products (mainly dark fibre) and wavelength unbundling in one case.

[45] Even though BIPT concluded that ther are separate retail broadband markets, the delineation between the two (more specifically with regard to smaller businesses) was not clearly defined.

Table 10: M1/2020, regulated wholesale access products (Q12)

	Yes	No
Access to passive infrastructure	**17**	10
Physical copper unbundling	**26**	2
Physical fibre unbundling	**14**	12
Copper virtual unbundling / Layer 2 access	**15**	12
Fibre virtual unbundling / Layer 2 access	**19**	8
Other	6	**10**

Source: BEREC, June 2022

In M1/2020, only three NRAs regulate wholesale access products addressing specifically the business segment: In Norway, there is a VULA Professional product providing VLAN support and improved contention/overbooking characteristics compared to mass market VULA products.[46] In Italy, there is a VULA product that can address part of business users speed connectivity needs (profile 1000/500 Mbps over FTTH).[47] Arcep (France) mentions multi-pair copper access lines in this context. In all cases, the regulated wholesale access products on M1/2020 address both, the residential segment and the business segment (see Table 11, questions a) and b)).

A majority of NRAs (18) state that the standard mass market wholesale products are often used for products aimed at the SME segment. There are much less cases (6) where such products are used for the high-end business segment (see Table 11, questions c) and d)).

Table 11: M1/2020, What applies to the regulated wholesale access products? (Q13)

	Yes	No	Don't know
a) Are there regulated wholesale products specifically addressing the business segment?	3	**24**	-
b) Do regulated wholesale products address both the business and the residential segments?	**27**	0	-
c) Are the standard mass market wholesale products often used by business telecom providers for the SME segment?	**18**	5	4
d) Are the standard mass market wholesale products often used by business telecom providers for the high-end business segment?	6	**13**	8

Source: BEREC, June 2022

The majority of wholesale access products on M1/2020 appears not to have any specific business feature. In those cases, it can be assumed that the standard wholesale product can be used to address the residential and, in many cases, also the SME business segment. However, there are some regulated wholesale access products on M1/2020, which have characteristics specifically addressing the business segment (see Table 12). In case of passive infrastructure and physical unbundling of copper or fibre, some products have specific

[46] Shttps://www.telenorwholesale.no/wp-content/uploads/2021/03/VULA_Bilag_2.3_produktblad_01.06.2021.pdf
[47] Telekom Italia 2021 Reference Offer for Operators relating to the VULA service and related ancillary services (Market 3a), 14.04.2022.
https://wdc.wholesale.telecomitalia.it/tw_offerte/2022/04/14/mercato-3a-offerta-di-riferimento-2021-vula-pubblicazione-del-14-04-2022-definitiva/

business SLAs (e.g. shorter installation or repair times). In case of virtual unbundling, there are also products with business SLAs, but also some cases with lower contention / overbooking and one case with specific business QoS (e.g. delay, jitter, packet loss).

Table 12: M1/2020, Product characteristics of regulated wholesale products which specifically address the business segment (Q14)

	Business QoS (e.g. delay, jitter, packet loss)	**Business SLAs** (e.g. installation times, repair times)	**Contention / Overbooking**	**Other**
Passive infrastructure	0	**1**	0	0
Physical copper unbundling	0	**6**	0	0
Physical fibre unbundling	0	**4**	0	0
Virtual copper unbundling	2	**5**	1	0
Virtual fibre unbundling	2	**6**	2	0
Other	0	0	0	0

Source: BEREC, June 2022

NRAs were also asked whether retail market trends in the business segment affect the wholesale regulation on M1/2020. Only one NRA responded to this question: Nkom (Norway) answered that business-oriented functionalities like VLAN support were introduced in the virtual unbundled local access to Telenor's FTTH network.

It can be concluded that only very few NRAs defined separate retail markets for business and residential users in the context of the analysis of the wholesale market M1/2020. Instead, the wholesale access products imposed on this market usually address both the residential and the business segment, but several of the products have specific business features such as better QoS, SLAs or a lower level of contention / overbooking.

6. M3b/2014 in the context of business services

This section discusses market definition and remedies on M3b/2014, the market for wholesale central access provided at a fixed location for mass-market products, with a focus on its relevance for business services. Products on this market include bitstream access and VULA, which are provided to the access seekers at a higher and more central layer in the network architecture.

6.1. Market definition

No NRA defined a separate market for wholesale products addressing the (retail) business segment within M3b/2014 (see Table 13, Q9). Eleven NRAs defined sub-national wholesale markets but, as for M1/2020, in none of the countries did particular features of business demand, such as multi-site demand and sourcing from a single supplier, play a role in the geographic market definition (see Table 13, Q10 and Q11).

Table 13: M3b/2014, responses to questions on market definition

	Yes	No
Q9: Did you define a separate wholesale market for wholesale products addressing the (retail) business segment?	0	**27**
Q10: Did you define sub-national wholesale markets?	11	**16**
Q11: Did particular features of business demand, such as multi-site demand and sourcing from a single supplier, play a role in the geographic market definition?	0	**23**

Source: BEREC, June 2022

6.2. Regulated products

Table 14 shows the regulated wholesale access products that have been imposed on the SMP operator(s) on market M3b/2014.12 NRAs imposed access to a Layer 2 (L2) copper wholesale access product and ten of them also to a L2 fibre product (In Norway and Portugal, the L2 product is only imposed on copper).[48] 18 NRAs imposed access to a L3 wholesale access product based on copper lines, 16 of them also on fibre lines (in Cyprus, France and Serbia, the L3 product is only imposed on copper). Four NRAs imposed access to other wholesale products, which includes bitstream access to cable networks in Belgium, Denmark and Hungary, while Türkiye imposed access to copper and fibre resale.

Table 14: M3b/2014, regulated wholesale access products (Q16)

	Yes	No
Copper virtual unbundling / Layer 2 access	12	**15**
Fibre Virtual unbundling / Layer 2 access	10	**17**
Copper Bitstream / Layer 3 access	**18**	9
Fibre Bitstream / Layer 3 access	**16**	11
Other	4	**14**

Source: BEREC, June 2022

On M3b/2014, there are no cases where regulated wholesale products specifically address the business segment (see Table 15, question a). In most cases, the regulated wholesale access products on market 3b/2020 address both, the residential segment and the business segment (see Table 7, question b). Similar to M1/2020, a majority of NRAs (16) state that the standard mass market wholesale products on M3b/2014 are often used by business ECS providers for the SME segment. There are only five NRAs where such products are used by business ECS providers for the high-end business segment (see Table 15, questions c) and d)).

[48] In Finland, the Layer 2 product both in the copper and the fibre networks is a bitstream product, not a VULA. Similarly, the copper Layer 2 products in Portugal and Norway are Bitstream products. In Table 6 they are counted in the lines with the Layer 2 access products.

Table 15: M3b/2014, What applies to the regulated wholesale access products? (Q17)

	Yes	No
a) Are there regulated wholesale products specifically addressing the business segment?	0	**27**
b) Do regulated wholesale products address both the business and the residential segments?	**19**	7
c) Are the standard mass market wholesale products often used by business telecom providers for the SME segment?	**16**	6
d) Are the standard mass market wholesale products often used by business telecom providers for the high-end business segment?	5	**16**

Source: BEREC, June 2022

As shown in Table 16, in some countries regulated M3b/2014 wholesale access products have characteristics specifically addressing the business segment, but in most cases wholesale access products on M3b/2014 appear not to have any specific business features, and it can be assumed that the standard wholesale product can be used to address the residential and in many cases the SME business segment.

Some NRAs pointed to the fact that the wholesale access products on M3b/2014 are also available with symmetric bandwidths, which primarily target the business segment.

Table 16: M3b/2014, Product characteristics of regulated wholesale products which specifically address the business segment (Q18)

	Business QoS (e.g. delay, jitter, packet loss)	**Business SLAs** (e.g. installation times, repair times)	**Contention / Overbooking**
Copper virtual unbundling / L2 access	2	**3**	2
Fibre Virtual unbundling / L2 access	2	**3**	2
Copper Bitstream / L3 access	1	**6**	4
Fibre Bitstream / L3 access	1	**4**	3
Other	0	**2**	1

Source: BEREC, June 2022

NRAs were also asked whether retail market trends affect the wholesale regulation on market 3b/2020. Only one NRA responded to this question: BIPT (Belgium) answered that the SMP operators had to offer a new SLA specifically taking into account the needs of small and medium companies.

In conclusion, no NRAs defined a separate wholesale market for wholesale products addressing the (retail) business segment when analysing M3b/2014. The wholesale access products imposed on this market usually address both, the residential and the business segment, but several of the products have specific business features such as better QoS, SLAs, lower level of contention / overbooking, specific bandwidth profiles and/or symmetric bandwidth.

7. Relevance of passive infrastructure access for business services

This section discusses the relevance of passive infrastructure products, targeting especially duct and pole access, for business services.

13 out of 33 NRAs (39%) responded that, indeed, wholesale passive infrastructure products are important for business services, while 13 NRAs (39%) do not consider such products as especially important for business services

The main reasons why the NRAs consider physical infrastructure products important for business services is that these services enable and facilitate the deployment of their own network (9 NRAs) and thus, offer the ability to reach business users (4 NRAs) and compete with the incumbent at a (quasi-) national level (4 NRAs) especially for multi-site customers.

Duct access and/or access to poles/aerial infrastructure have been identified by six NRAs (ANACOM (Portugal), Arcep (France), CRC (Bulgaria), ETRA (Estonia), MCA (Malta), RRT (Lithuania)) as important passive infrastructure wholesale products for the business segment.

Finally, the role and relevant importance of symmetrical access remedies in the deployment of alternative operators' networks was stressed by two NRAs: AKOS (Slovenia) and HAKOM (Croatia).

As a conclusion, there is not a clear trend among the NRAs regarding the significance of passive infrastructure for business services.

8. Symmetric regulation in the context of business services

Symmetric regulation focused on business services is applied in only two cases, Arcep (France) and EETT (Greece).

In the case of Arcep (France), there is a complete symmetric optical fibre regulation[49], which applies equally to all FttH infrastructure owners, as well as several recommendations that provide additional details on this framework's application. According to this scheme, all FttH infrastructure owners are obliged[50] among other things to provide SLA on repairs, to take commitments for the respect of the above SLAs, monitor the key performance indicators, and publish the results on their websites.

[49] The FttH regulatory framework, updated 10.10.2022, Arcep, France. https://www.arcep.fr/la-regulation/grands-dossiers-reseaux-fixes/la-fibre/le-cadre-relatif-a-la-regulation-du-ftth.html

[50] Decision No.2020-1432, 08.12.2020, Arcep, France. https://www.arcep.fr/uploads/tx_gsavis/20-1432.pdf, chapter 4, p.23.

In the case of EETT (Greece), the symmetrical regulation was introduced in the context of M3a/2014 analysis[51] and is applied only in the areas where the operators (incumbent or alternative) have deployed NGA access networks in the context of the procedure for introducing VDSL vectoring in the access network. In these areas, the deploying operators are obliged to offer L2 WAP products in order to allow the access seekers to offer the same (business) services over the NGA network.

9. Data collection, reports, and good practices by NRAs

9.1. Data collection

All NRAs collect market data from the telecom operators regarding the business segment even if the data collection process is often not business specific. Three quarters of the NRAs collect this data periodically, in various intervals, depending on the data collected, while the remaining quarter of NRAs collect these data at every market analysis cycle. Among the 24 NRAs that collect data periodically, most NRAs collect data quarterly or half-yearly. EKIP (Montenegro) collects data monthly, 10[52] NRAs collect data quarterly, 8[53] NRAs collect data half yearly and 5[54] NRAs collect data yearly. The NRAs that collect data periodically may also additionally collect ad hoc data for market analysis purposes.

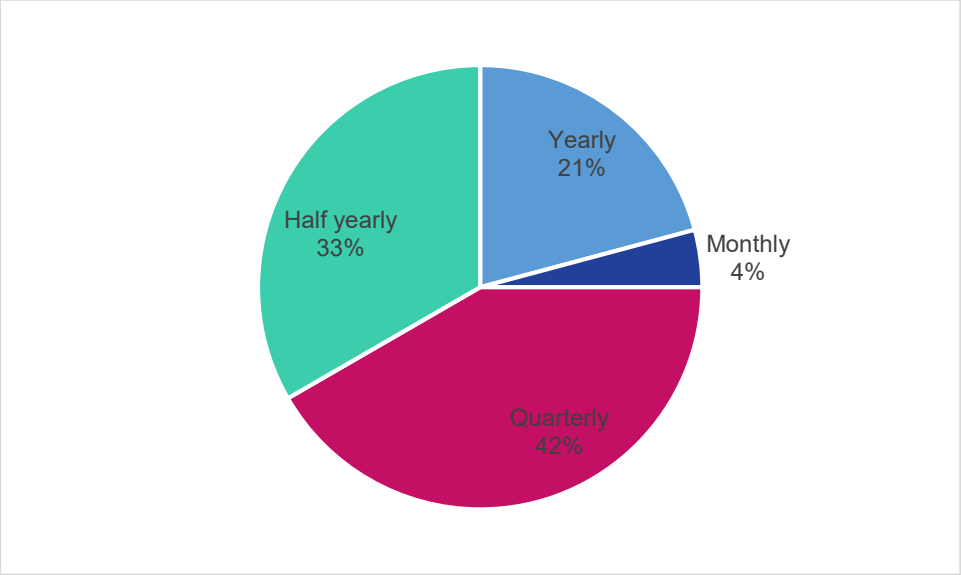
[51] M3a/2014 analysis, No.792/07, 22.12.2016, EETT, Greece.
https://www.eett.gr/opencms/export/sites/default/admin/downloads/telec/apofaseis_eett/kanonistikes_apofaseis_eett/AP792-007.pdf

[52] ACM (The Netherlands), AKOS (Slovenia), Arcep (France), CNMC (Spain), COMREG (Ireland), ETRA (Estonia), HAKOM (Croatia), MCA (Malta), RAK (Bosnia and Herzegovina), RTR (Austria)

[53] ANCOM (Romania), CRC (Bulgaria), CTU (Czech Republic), ILR (Luxembourg), NKOM (Norway), RU (Slovak Republic), SPRK (Latvia), Traficom (Finland),

[54] BIPT (Belgium), EETT (Greece), NMHH (Hungary), PTS (Sweden), RATEL (Serbia)

Figure 3: How often do you collect business segment market data from the telecom operators?



Source: BEREC, June 2022

Ten NRAs (37%) report difficulties in the data collection for the analysis of M2/2020. In particular, the reliability and consistency of data is highlighted as an issue. BNetzA (Germany) and ComReg (Ireland) replied that good location data were difficult to obtain. Finally, EETT (Greece) and Nkom (Norway) reported difficulties in obtaining relevant revenue related data, for example because of revenue allocation problems between wholesale access services and other services.

9.2. External surveys and reports on business market

Arcep (France) and NMHH[55] (Hungary) conduct yearly external surveys focused on the demand side of the business market, while MCA (Malta) conduct it every two to three years. BNetzA recently commissioned an external report.

9.3. Business end-users' complaints reported to the NRA

Nine NRAs have put in place platforms, that allow any user (and thus business end-users, too) to report complaints regarding their telecom solutions directly to the NRA: Arcep[56]

[55] Electronic Communications Market Consumer Survey- Business Survey, 31.03.2022, prepared on behalf of the NMHH.
https://nmhh.hu/cikk/228121/Az_elektronikus_hirkozlesi_piac_fogyasztoinak_vizsgalata_2021__uzleti_felmeres

[56] https://jalerte.arcep.fr/

(France), BNetzA[57] (Germany), BTK[58] (Türkiye), ECOI[59] (Iceland), HAKOM[60] (Croatia), NMHH[61] (Hungary), MCA[62] (Malta), RATEL[63] (Serbia), and RTR (Austria).

Two of these NRAs require end users to follow additional steps prior to submitting a complaint: For HAKOM (Croatia) users have to submit their complaint to its telecom service provider, for NMHH (Hungary) they have to allege that the service provider has broken the national rules in the area of electronic communications applicable to their contract.

For Arcep (France), the platform does not aim to solve nor investigate each individual situation but rather to identify, through statistical analysis and monitoring, weak signals, local complaint bursts, or sudden complaint bursts, to provide systemic responses (contact the operator to ensure that they are aware of the problem and able to provide a prompt solution, modify or clarify the regulatory framework to adapt it to concrete situations and if necessary, initiate a proceeding against an operator). Even though submitted complaints are not answered individually, guided questions help business users to understand the problem they encounter. The platform provides them with targeted information and advice regarding potential legal procedures available to them. As an indication on the use of the platform by business users, around 8% of the alerts received are raised by business customers or public administrations.

Although ad-hoc meetings take place with business user associations, no NRA has reported on having regular meetings.

9.4. Guidelines on contracting business services for specific end-users

Arcep (France) published a guide[64] in partnership with end-user associations and operators with the aim of helping small businesses to better understand and better choose their telecom services (how to choose an offer, contract with the supplier and manage the supplier change), while CNMC published a guide[65] on public procurement and competition (not specific for electronic communication services, although applicable).

[57] *Bundesnetzagentur - Beschwerden und Fragen*
[58] *BTK Consumer Complaint Notification System*
[59] *Consumer complaint (fjarskiptastofa.is)*
[60] *How to complain to the operator (hakom.hr)*
[61] *https://english.nmhh.hu/customers*
[62] *https://www.mca.org.mt/consumer/help*
[63] *https://portal.ratel.rs/sr/complaint/complaint/form*
[64] https://www.arcep.fr/uploads/tx_gspublication/guide-pratique-telecom-tpe-pme_juin2019.pdf
[65] https://www.cnmc.es/sites/default/files/1185705_10.pdf

10. Conclusions

Most NRAs regulate wholesale markets that are being used as an input for retail business services (M2/2020, M1/2020, and M3b/2014). Regarding the business retail markets considered for wholesale market analysis, most NRAs include retail Ethernet services, leased lines with traditional interfaces and VPNs as the key retail services for the analysis of wholesale M2/2020. However, a number of them also include these retail products in the analysis of other markets, such as M1/2020. Retail business internet access services are in general analysed within the scope of M1/2020, M3b/2014 and M2/2020 or at least a combination of two of them, and only a minority of NRAs analyse business fixed telephony services at the retail level.

Markets for retail business services are highly concentrated in the majority of countries, showing market shares above 50% for the SMP operator, and, in most of them, also a market share lower than a 30% for the main alternative operator. Many NRAs, however, report a trend for a declining market share for the SMP operator, and only a minority report a trend to increasing market shares for the SMP operator.

A large majority of NRAs identify M2/2020, M1/2020 and M3b/2014 as the upstream markets for the retail business markets, and a small number of them also consider the market for passive infrastructure access as an additional upstream market for retail business services. At the moment of the preparation of this report, most of the decisions from NRAs on these wholesale markets were taken between 2018 and 2020. The conclusions in this report concern the cases where the considered markets are regulated.

A large majority of the NRAs do not define separate retail markets for business and residential in the context of the analysis of M1/2020, nor define different sub-national wholesale markets when assessing conditions of competition. In fact, a majority of NRAs state that the standard mass market wholesale products are often used by business services providers for the SME segment. In this line, only a few of NRAs have defined specific business features in M1/2020 for business use, such as shorter repair times or QoS.

Regarding M3b/2014, no NRA defined a separate wholesale market for products addressing the business market, and while a significant number of NRAs defined sub-national M3b/2014 markets, the criteria applied for geographical segmentation is not based in any case on specific features of business services. Similarly to M1/2020, the standard mass market wholesale products are often used by business services providers for the SME segment, but not in general for the high-end business segment, and just a few NRAs regulating M3b/2014 wholesale access products have characteristics specifically addressing the business segment.

On M2/2020, as already expressed, Ethernet-based and traditional leased lines are part of the retail market for the analysis of M2/2020 by most NRAs, while only a minority include high-quality bitstream/VULA, wavelength services, or dark fibre as one of the products. In general, the delineation between products in M1/2020 and M2/2020 is based on guaranteed bandwidth and most NRAs also consider symmetrical bandwidth and SLAs (especially repair time) as

factors leading to inclusion in the wholesale product market for M2/2020. Regarding product segmentation, only a few of them found different markets based on bandwidth, i.e., for most NRAs all bandwidths are part of the same single market.

The geographical scope for M2/2020 is national in most countries, with some few NRAs defining sub-national markets. Those defining sub-national markets based the geographical aggregation on communities, municipalities, workplace zones, or administrative parishes, aggregating based on market shares and presence of alternative operators.

In general, the main operators for M1/2020 and M2/2020 are the same in both markets for most countries. When there is a difference, this is due to the presence of smaller fibre operators as well as niche business operators. Furthermore, the geographical scope for both markets is the same, with differences in just a few countries.

Remedies in M2/2020 are mainly imposed for Ethernet and traditional leased lines, with only some countries also imposing obligations for wavelength services, high quality bitstream or other products.

Some countries regulate just some speeds, although in most of them there is no restriction on speeds. A minority of NRAs have geographically differentiated remedies, based on geographical segmentation of the market or applying geographic segmentation or applying specific criteria according to the level of competition.

As traditional leased lines are increasingly being substituted by Ethernet leased lines, the SMP operator has announced the dismantling of the former in several countries and NRAs have defined transitional periods to ensure a smooth transition.

In relation to backhaul regulation, the findings are in line with the BEREC report on the regulatory treatment for fixed and mobile backhaul published in 2022.[66]

Price regulation in the context of M2/2020, when applied, is typically cost-oriented (bottom-up or top-down, depending on the countries), and some of the countries apply an economic replicability test, and others apply other modes such as fair, reasonable or non-eviction prices.

There is not a clear trend among the NRAs regarding the significance of passive infrastructure (i.e. ducts and poles) for business services. With regard to symmetric regulation, just a couple of NRAs mention specific obligations related to business services.

NRAs regularly collect market data regarding business services, mostly periodically (typically each 3 or 6 months). A significant number of them report difficulties on reliability and consistency of data, as well as on location data and revenue allocation by operators.

[66] Ibid footnote 27

A number of NRAs have put in place platforms to report complaints regarding their telecom solutions directly to the NRA. It should be noted that these platforms may be a useful reference for NRAs taking similar actions setting up similar.

A few NRAs report to conduct periodically external surveys on the demand side, and also a couple of them prepared guidelines for SMEs and public institutions to contract business services, that can be a good reference to those willing to do so, or future BEREC work on this.

11. Future work

BEREC will continue monitoring the evolution of wholesale regulation practiced by NRAs on markets related to these services, collecting good practices, and analysing different aspects related to the regulation of business services to encourage competition, investment and innovation.

In the future, BEREC will explore in more detail the evolution of competition dynamics among different actors and its relation to countries characteristics (such as size, business structure, and regulation applied) with the aim to identify good practices to be shared among all NRAs, benefitting from the diversity of BEREC members.

The increasing use of IT services (such as cloud services) by business users and the dynamics of competition/collaboration between traditional ECS players and IT specific players, such as (but not only) the Big Tech companies, will also be part of the BEREC agenda.

Easy switching from one provider to another is a key aspect to encourage competition, and business services have specificities compared to mass-market (as the need for porting many sites at the same time) and deserve an analysis by BEREC. This may also involve switching issues for IT services that can be sold in conjunction with ECSs.

One of the existing trends is the increasing substitution of traditional leased lines by Ethernet services at the retail level, which also raises the issue on how to address the evolution of the wholesale regulation to adapt to this evolution. On this, a comparison on details for the different approaches applied by NRAs may help to harmonise and learn from each other, one of the key objectives of BEREC.

Although most NRAs do not define sub-national M2/2020 markets, an analysis of geographical aspects of market analysis in the context of business services may also be useful for NRAs in the medium and long term, and the analysis done in this report may be extended and be addressed in more depth.

An additional topic where coordination and exchange of experiences among NRAs may help is on data collection issues, in order to learn from each other on how to best ensure reliability and consistency of data, while facilitating the work on the operators' side providing the information.

BEREC may also consider the preparation of recommendations for companies and public institutions aimed to encourage competition in the context of business services.

Last, but not least, SMEs are a key pillar of the EU economy, and a more in-depth analysis of the needs of SMEs for business services, potential issues they may have, as well as taking their specificities into account on the wholesale regulation, can also be particularly useful for NRAs, but also for all stakeholders: SMEs, as well as ECS providers to better adapt their catalogue of services.

Annex I: Questionnaire sent to NRAs

BEREC Questionnaire on the regulatory treatment of business services

Retail Business Markets

1. Which business retail services were specifically analysed in the context of the analysis of markets M1/2020 (M3a/2014), M3b/2014 and M2/2020 (M4/2014)?
   a.

	M1/2020 (M3a/2014)	M3b/2014	M2/2020 (M4/2014)
Retail leased lines with traditional interfaces	(Y/N)	(Y/N)	(Y/N)
Retail Ethernet Services (which might include L2 VPNs)	(Y/N)	(Y/N)	(Y/N)
VPNs (Layer 3)	(Y/N)	(Y/N)	(Y/N)
Retail business internet access services	(Y/N)	(Y/N)	(Y/N)
Retail business fixed telephony services	(Y/N)	(Y/N)	(Y/N)
Other (if Y, please explain)	(Y/N)	(Y/N)	(Y/N)

2. Please fill in the table below to describe the competitive situation on the relevant retail markets identified in Q1 2022 and using the latest data available. The market share calculations for business services should be based either on number of lines (following

the figures provided in the COCOM questionnaire B, sheet 6 “Non-residential lines”,[67]) or in terms of revenues (please indicate in the last column what you are providing). Market shares may be reported as approximate values. Information on retail residential broadband is collected for means of comparison. Market share data will only be published in aggregated form.

	Incumbent market share [%]	Trend in incumbent market share over the last three years [increasing / declining / stable]	Market share of largest competitor [%]	Market concentration trend over the last three years [increasing / declining / stable]	Type of data provided and year
Retail leased lines (trad. Interfaces)					
Retail Ethernet Services (which might include L2 VPNs)					
VPNs (Layer 3)					
Retail Business broadband					
Retail residential broadband					
Retail business fixed telephony					
Fixed line business services (total)					
Other					

3. General Comments on Q2. [Text]

[67] Definition of non-residential customer from the COCOM questionnaire B: „A non-residential customer primarily uses an electronic communication service(s) for performing economic activities. Non-residential customers include businesses, entrepreneurs/self-employed individuals, non-governmental organisations, and public/state sector bodies.”

Wholesale markets relevant for business services

All questions refer to your last analysis of the respective market.

4. According to the specific market conditions in your Member State, which wholesale markets are considered as upstream in the vertical chain of the retail business market?
    a. M 1/2020 (M3a/2014) (Y/N)
    b. M 3b/2014 (Y/N)
    c. M 2/2020 (M 4/2014) (Y/N)
    d. Market for passive infrastructure access (Y/N)
    e. Other. Please define: _____

Please respond only to the sections concerning regulated wholesale markets that you have identified as upstream markets of the business retail market(s) you have defined.

5. What is the year of your last market analysis decision?
    a. M 1/2020 (M 3a/2014):
    b. M 3b/2014:
    c. M 2/2020 (M 4/2014):
    d. Market for passive infrastructure access:

M 1/2020 (M3a/2014) and M 3b/2014

Retail market definition

Q6 refers to the broadband retail markets downstream to M 1/2020 (M3a/2014) and M 3b/2014.

6. Did you define separate retail product markets for the residential and the business segment? (Y/N, if yes, please explain how these markets were defined)

Wholesale market definition M 1/2020 (M 3a/2014)

Geographic market definition

7. Did you define sub-national wholesale markets? (Y/N, if yes, please explain)
8. Did particular features of business demand, such as multi-site demand and sourcing from a single supplier, play a role in the geographic market definition? (Y/N, if yes, please explain)

Wholesale market definition M 3b/2014

Product market definition

9. Did you define a separate wholesale market for wholesale products addressing the (retail) business segment? (Y/N, if Y, please describe how this market was defined)

Geographic market definition

10. Did you define sub-national wholesale markets? (Y/N, if yes, please explain)
11. Did particular features of business demand, such as multi-site demand and sourcing from a single supplier, play a role in the geographic market definition? (Y/N, if yes, please explain)

Remedies M 1/2020 (M 3a/2014)

12. Which wholesale access products are regulated on this market?
    a. Access to passive infrastructure (Y/N)
    b. Physical copper unbundling (Y/N)
    c. Physical fibre unbundling (Y/N)
    d. Copper virtual unbundling / Layer 2 access (Y/N)
    e. Fibre virtual unbundling / Layer 2 access (Y/N)
    f. Other (please describe)

13. What applies to the regulated wholesale products:
    a. Are there regulated wholesale products specifically addressing the business segment? (Y/N if yes, please describe)
    b. Do regulated wholesale products address both the business and the residential segments? (Y/N)
    c. Are the standard mass market wholesale products often used by business telecom providers for the SME segment? (Y/N/I don't know)
    d. Are the standard mass market wholesale products often used by business telecom providers for the high-end business segment? (Y/N/I don't know)

14. Please indicate in the following table if there are any product characteristics which specifically address the business segment.

	Business QoS (e.g. delay, jitter, packet loss)	Business SLAs (e.g. installation times, repair times)	Contention / Overbooking	Other (please describe)
Access to passive infrastructure	[Y/N]	[Y/N]	[Y/N]	[Text]
Physical copper unbundling	[Y/N]	[Y/N]	[Y/N]	[Text]
Physical fibre unbundling	[Y/N]	[Y/N]	[Y/N]	[Text]
Virtual copper unbundling	[Y/N]	[Y/N]	[Y/N]	[Text]

Virtual fibre unbundling	[Y/N]	[Y/N]	[Y/N]	[Text]
Other	[Y/N]	[Y/N]	[Y/N]	[Text]

15. How did retail market trends affect the wholesale regulation? In particular, was there a need for new regulated wholesale products/services or product features in order to address new retail demand in the business segment in your last market analysis (compared to the previous one)? (Y/N if yes, please describe)

Remedies M 3b/2014

16. Which wholesale access products are regulated on this market?
    a. Copper virtual unbundling / Layer 2 access (Y/N)
    b. Fibre Virtual unbundling / Layer 2 access (Y/N)
    c. Copper Bitstream / Layer 3 access (Y/N)
    d. Fibre Bitstream / Layer 3 access (Y/N)
    e. Other (Y/N, if Y, please describe)

17. What applies to the regulated wholesale products:
    a. Are there wholesale products specifically addressing the business segment? (Y/N if Y, please describe)
    b. Do the wholesale products address both the business and the residential segments? (Y/N)
    c. Are the standard mass market wholesale products often used by business telecom providers in the SME segment? (Y/N)
    d. Are the standard mass market wholesale products often used by business telecom providers in the high-end business segment? (Y/N)

18. Please indicate in the following table if there are any product characteristics which specifically address the business segment.

	Business QoS (e.g. delay, jitter, packet loss)	Business SLAs (e.g. installation times, repair times)	Contention / Overbooking	Other (please describe)
Copper virtual unbundling / Layer 2 access	[Y/N]	[Y/N]	[Y/N]	[Text]
Fibre Virtual unbundling /	[Y/N]	[Y/N]	[Y/N]	[Text]

Layer 2 access				
Copper Bitstream / Layer 3 access	[Y/N]	[Y/N]	[Y/N]	[Text]
Fibre Bitstream / Layer 3 access	[Y/N]	[Y/N]	[Y/N]	[Text]
Other	[Y/N]	[Y/N]	[Y/N]	[Text]

19. How did retail market trends affect the wholesale regulation? In particular, was there a need for new regulated wholesale products/services or product features in order to address new retail demand in the business segment in your last market analysis (compared to the previous one)? (Y/N if yes, please describe)

M 2/2020 (M 4/2014)

Retail market definition

20. Which retail markets did you define and/or analyse as a basis for the wholesale market analysis?
    a. Retail leased lines with traditional interfaces (Y/N)
    b. Retail Ethernet Services (which might include Layer 2 VPNs) (Y/N)
    c. Retail VPNs (Layer 3) (Y/N)
    d. Retail business internet access services (Y/N)
    e. Retail business fixed telephony services (Y/N)
    f. Other (Y/N, if Y, please explain)

Wholesale market definition

21. Which services/products are included in the M2/2020 (M4/2014):
    a. Leased lines with traditional interfaces (Y/N)
    b. Ethernet Leased Lines (Y/N)
    c. Wavelength services (Y/N)
    d. High quality Copper virtual unbundling / Layer 2 access (Y/N)
    e. High quality Fibre Virtual unbundling / Layer 2 access (Y/N)
    f. High quality Copper Bitstream / Layer 3 access (Y/N)
    g. High quality Fibre Bitstream / Layer 3 access (Y/N)
    h. Dark fibre (Y/N)
    i. Passive infrastructure (Y/N)
    j. Other (Y/N, if Y, please explain)
22. Which criteria did you use for distinguishing M1/2020 from M2/2020 products?
    a. symmetrical bandwidth (Y/N)
    b. guaranteed bandwidth (Y/N)

c. repair time SLAs (Y/N, if Y, please explain)
d. other SLAs (Y/N, if Y, please explain)
e. others (Y/N, if Y, please explain)

23. What is the geographic scope of the market?
    a. National (Y/N)
    b. Sub-national (Y/N, if Y, please explain)
24. Has the retail demand of business users affected the geographic scope of the wholesale market? (Y/N). If yes, how?
25. If there are sub-national geographic markets:
    a. What is the geographic unit used?
    b. What criteria were used to aggregate the geographic units into two (or more) areas?
26. Did you encounter any difficulties in collecting the data for the Market 2 analysis, e.g. the regional data, from the operators? (Y/N, if Y, please explain and add how you have overcome these difficulties).
27. Is the market split by bandwidths or are some bandwidth categories not included in the market definition? (Y/N) (if Y, please explain)
28. Are, by and large, the same Operators active in both M1/2020 and M2/2020 or do the main players differ? (Y/N, if N (=the main players differ), please explain)
29. Does the geographic scope of M1/2020 differ from the geographic scope of M2/2020? (Y/N, if Y, please explain):

Remedies

30. For which products/services have you imposed access obligations in market 2?
    a. Leased lines with traditional interfaces (Y/N)
    b. Ethernet Leased Lines (Y/N)
    c. Wavelength services (Y/N)
    d. High Quality Bitstream (Y/N)
    e. Virtual Unbundling Local Access services (Y/N)
    f. Dark fibre (Y/N)
    g. Passive infrastructure (Y/N)
    h. other (Y/N, if Y, please explain)
31. If your answer to 30a is (Y), has the SMP Operator announce decommissioning of leased lines with traditional interface? (Y/N) If Yes:
    a. In which timeframe? _____
    b. Have you defined any transitional period for the decommissioning?
32. Does the regulation only apply to specific bandwidths? (Y/N, if Y, which bandwidths for which wholesale products)
33. If fixed or mobile backhaul are also regulated in market M 2/2020: Are there wholesale products specifically addressing the business markets (in contrast to wholesale products for backhaul)?
    a. No
    b. Yes (please explain)
    c. Fixed or mobile Backhaul is not regulated in market M 2 /2020

34. Are any remedies geographically differentiated? (Y/N)
    a. If yes, Please elaborate on the criteria you used for this differentiation: _____
35. What kind of price regulation is applied? [Matrix with products]
    a. Cost oriented prices - Based on a bottom-up model (Y/N)
    b. Cost oriented prices - Based on a top-down model (Y/N)
    c. Cost oriented prices - Other (Y/N, if Y, please explain)
    d. Margin Squeeze / ERT Test (Y/N)
    e. Other (Y/N, if Y, please explain)

Passive infrastructure

36. Are passive infrastructure wholesale products important for the business segment? (Y/N)
37. If yes, please describe how passive infrastructure wholesale products are important for the business segment.

Current and Future Trends

38. With a focus on Business Services: Do you see any current of future tends which may lead to a need to change the market definition or the remedies? Please describe (and mention the market(s) it refers to).

Trend	Potential need for change	Market

Symmetrical regulation

39. Is there any specific symmetric regulation focused on business services in place? (Y/N)
40. If this is the case, please list the relevant products and provide details on the characteristics of these products as well as their availability and use. Please indicate how important these products are compared to the regulated wholesale access products for business services.

Data collection on the fixed business market and business needs

41. How often do you collect market data from the telecom operators regarding the business segment?
    a. Periodically (Y/N, if Y please specify the frequency and provide an overview of the data collected, with a link to the survey/questionnaire if possible)

b. At every market analysis cycle (Y/N)
c. Other, please explain.

42. Do you conduct external surveys focused on the demand side of the business market? (Y/N, if Y, how often? Please briefly describe the methodology, e.g. sample and its size, targeted group etc. and provide a link to the survey if possible)
43. Did you recently prepare or commission a report on business services? (Y/N, if Y, please provide the link)

Good practices to increase competition or to protect business users

44. Have you put in place a platform that allows business end-users to report complaints regarding their telecom solutions directly to the NRA? (Y/N, if Y, feel free to provide more details)
45. Do you have regular meetings with business end-user associations? (Y/N, if Y, feel free to provide more details)
46. Did you publish guidelines on contracting business services for specific end-user segments (public administrations, SMEs, …)? (Y/N, if Y, please provide a link)
47. Are there any other good practices to increase competition or to protect business end-users which have not yet been dealt with in this questionnaire? (Y/N, if Y, please explain)

Other issues

48. Are there any additional issues you would like to mention in the context of the regulatory treatment of business services?

Follow-up questions

49. In June 2022 (i.e. at the time of the original questionnaire), were you regulating the following markets:
    a. M 1/2020 (M 3a/2014) (Y/N)
    b. M 3b/2014 (Y/N)
    c. M 2/2020 (Y/N)
50. Did the situation change between June and October 2022, if yes, please specify:
51. If your answer to the question 49. a) is "No", please indicate when was the market deregulated.
52. If your answer to the question 49. b) is "No", please indicate when was the market deregulated.
53. If your answer to the question 49. c) is "No", please indicate when was the market deregulated.

35+. What kind of price regulation is applied for each product?

	Cost oriented prices - Based on a bottom-up model (Y/N)	Cost oriented prices - Based on a top-down model (Y/N)	Cost oriented prices - Other (Y/N, if Y, please explain)	Margin Squeeze / ERT Test (Y/N)	Other (Y/N, if Y, please explain)
Leased lines with traditional interfaces					
Ethernet Leased Lines					
Wavelength services					
High quality Copper virtual unbundling / Layer 2 access					
High quality Fibre Virtual unbundling / Layer 2 access					
High quality Copper Bitstream / Layer 3 access					
High quality Fibre Bitstream / Layer 3 access					

Dark fibre					
Passive infrastructure					
Other (Please explain)					

Annex II: NRAs responding to the questionnaire

Table 17 – List of NRAs responding to the questionnaire

Country	NRA
Austria	RTR
Belgium	BIPT
Bosnia and Herzegovina	RAK
Bulgaria	CRC
Croatia	HAKOM
Cyprus	OCECPR
Czechia	CTU
Denmark	DBA
Estonia	ETRA
Finland	TRAFICOM
France	Arcep
Germany	BNetzA
Greece	EETT
Hungary	NMHH
Iceland	ECOI
Ireland	ComReg
Italy	AGCOM
Latvia	SPRK
Lithuania	RRT
Luxembourg	ILR
Malta	MCA
Montenegro	EKIP
Netherlands	ACM
Norway	Nkom
Poland	UKE
Portugal	ANACOM
Romania	ANCOM
Serbia	RATEL
Slovakia	RU
Slovenia	AKOS
Spain	CNMC
Sweden	PTS
Türkiye	BTK