

**BEREC Report on the outcome of the  
public consultation on the draft BEREC  
Report on a consistent approach to  
migration and copper switch-off**

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# 1 Executive Summary

BEREC published the draft BEREC Report on a consistent approach to migration and copper switch-off ('the draft Report') on 15 December 2021. At the same time, a public consultation was opened, running until 28 January 2022. BEREC received responses to the public consultation from the following 12 stakeholders:

- Six network operators
  - Deutsche Telekom
  - Open Fiber S.p.A.
  - Sky Ireland
  - T-Mobile Netherlands B.V.
  - Vodafone Group
  - [Confidential]<sup>1</sup>
- Two associations of network operators at national level:
  - BREKO (The German Broadband Association)
  - VATM (German Association of Telecommunications and Value-Added Service Providers)
- Three associations of network operators at European level
  - Ecta (European Competitive Telecommunications Association)
  - ETNO (European Telecommunications Network Operators' Association)
  - FTTH Council Europe
- One consultant
  - GOS Consulting

This report provides an overview of the responses BEREC received and the BEREC response to each topic addressed by stakeholders in particular with regard to the need to adapt the draft Report. It is structured similarly to the draft Report, as follows:

- General aspects
- Type of procedure
- Level (granularity) of the rules
- Stakeholder involvement
- Notice period
- Alternative wholesale access products
- Legacy copper-based wholesale access products
- Migration costs
- Information of the SMPO and monitoring
- Further rules
- Follow-up activities

In addition, BEREC published all non-confidential stakeholder responses received.

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<sup>1</sup> One stakeholder has requested confidentiality.

## 2 General aspects

### Stakeholder responses

#### **The proposed consistent approach is welcomed**

Vodafone Group welcomes BEREC's work in this area, and the very thorough report aiming to provide an excellent overview of the landscape for copper migration and switch-off. Vodafone Group also welcomes the proposed consistent approach on these issues. This is very valuable work and Vodafone Group expects it will be of use to NRAs, wholesale operators, and access seekers across the markets. Vodafone supports the main tenets of the proposed consistent approach. The proposed approach captures the key issues and processes with sufficient clarity.

#### **Switch-off issues where the SMPO has not invested in FTTH/B but ANOs have**

The FTTH Council Europe is of the opinion that the draft Report overlooked the question of what happens where there is full fibre coverage but the SMPO has not itself invested in fibre networks. In many parts of Europe there are fibre networks deployed, but there are areas where there is entrant FTTH/B but no equivalent investment by the incumbent operator. If NRAs are not involved in the switch-off process, there is a risk that the decision by the SMPO to decommission the copper network becomes one of competitive strategy, when to act to its own maximum advantage and its competitors greatest disadvantage. The FTTH Council Europe would like to see the final Report address the question of what competition considerations will be brought to the analysis of copper switch off in the presence of non-SMPO fibre networks.

In the FTTH Council Europe's view some NRAs have recognised the strategic choices that could be made by SMPOs and the risks to competition that could arise. The FTTH Council Europe refers to the Spanish case where the NRA initially demanded a certain level of fibre roll-out as a safeguard measure, in order to avoid damage to competition by strategic exchange closures. If the choice is made as a result of a strategic choice and not driven by the market, it may have negative effects on the level of competition, the level of investment and on customer's experience. If the SMPOs were taking unilateral decisions about when and how to switch off their networks, it would raise important questions about who bears the cost of the copper switch-off. The FTTH Council Europe is of the view that the draft report's scope is not broad enough to fully encompass both the reasons to shut down copper network (externalities do not seem to be considered) and also the potential costs of network shutdown (in terms of impacts on competition and consumers).

#### **Migration issues related to the fibre deployment areas of ANOs need to be considered**

BREKO is of the opinion that the draft Report only covers scenarios where the copper switch-off and migration is initiated by the SMPO itself, while it does not take into consideration scenarios where one or multiple ANOs deploy NGA networks, and in particular, fibre. BREKO understands insofar as Art. 81 EEC only covers migration and copper switch-off scenarios in regard to the SMPO. However, if there are different rules and regulations for the fibre networks of SMPOs and those of ANOs, there is the risk of significant competitive distortions and a potential consolidation of market dominance. More specifically, there is the possibility of a "strategic copper switch-off" in all the areas where the SMPO already deployed fibre

networks, with the goal of migrating end-users and whole-sale customers to its own fibre network to reach a high network usage from the beginning. On the other hand, in areas where the (main) fibre network is deployed and operated by one or multiple ANOs, the SMPO could maintain its own copper network and keep it competitive (at least for some time) with technologies like Vectoring, Super-Vectoring or G.fast. This would slow down the migration process and delay the full usage of the fibre network. However, reaching a high usage of the network shortly after it is deployed is a significant factor in business cases for fibre networks and influences the ANO's possibilities to invest.

BREKO believes that the conditions for a copper switch-off need to be harmonised, without regard to the actor which is deploying fibre networks in order to prevent a "strategic copper switch-off". The goal should not be that the NRA obligates the SMPO to switch-off their copper network e.g. at least in Germany, constitutional law would probably not allow such an obligation. Instead, there should be incentives for a voluntary obligation by the SMPO regarding the acceptance of a level playing field – regardless of the fact if it was the SMPO or an ANO that deployed the fibre network. The SMPO's voluntary obligation to accept a level playing field could fall under the remit of Article 81 EEC and could thereby help avoid market distortion and a potential consolidation of market dominance.

### **The cases with new independent VHCN players in the copper switch-off areas need to be considered**

VATM notes that there is a general trend in the EU towards the emergence of new independent VHCN players, which deploy a VHCN in the intervention copper switch-off areas and may constitute the only network in those areas. VATM suggests that BEREC looks into those cases in detail and provides its view on the copper switch-off in those areas. In particular, VATM sees challenges on market power issues (from the copper SMPO) concerning investment incentives in VHCN as well as issues with the continuation of wholesale access services and therefore retail services by all providers concerned. The draft Report needs to address how migration for end-users relying on legacy contractual obligations (for services with low bandwidths) can be achieved, keeping in mind consumer preferences on the one hand and forward-looking capabilities of VHCNs on the other hand.

### **Actual competitive structure of the market needs to be considered and all market players need to be involved in its definition**

Open Fiber believes that the migration process should be driven by an overall perspective, which considers the actual competitive structure of the market and therefore involves all market players in its definition. The consistent approach suggested in the draft Report is still the one where customers migrate from the incumbent's copper network to the incumbent's fibre network. So far, the switch-off program has been considered as an exclusive issue for SMPOs and their wholesale clients and the impact of these processes on network competition at wholesale level has not been considered at all. Alternative operators are considered only as the ones that use wholesale access services of the SMPO. Open Fiber considers this as an "outdated" approach, which is strongly unsuitable in the light of the main goals of the EEC and of the new market structures for the promotion of infrastructure competition.

Open Fiber is of the opinion that the design of the switch-off and the following migration process should guarantee the migration of end customers from the legacy incumbent's copper

network to any VHCN, whether of the incumbent or of any alternative new infrastructure operator. The migration process should ensure some form of “equality of treatment” between the migration towards the NGA incumbent’s network and the migration towards the NGA networks of any new entrant.

### **It would be helpful to address both categories of ANOs**

GOS consulting considers it would be helpful if the final Report addresses both categories of ANOs (i) those that are downstream from the SMPO and use wholesale access services in order to deliver their services to end-users, and (ii) those that build networks in competition to the SMPO, some of whom compete across wholesale and retail markets and others compete at only retail or wholesale levels. GOS consulting’s reading of the draft Report suggests that its main focus has been on the downstream competitors and potential disruption to their services which rely on wholesale access to the SMPO. This is certainly a very important factor that warrants detailed review. SMPO copper switch-off is, however, also important for operators building competing fibre networks. The timing, communications, and conditions around the copper switch-off could have a significant impact on the incentives to build competing new fibre networks.

### **The switch-off programme should not be considered as a need for the SMPO to replace out of date technologies**

Open Fiber believes that the switch-off programme should not be considered as a need for the incumbent to replace out of date technologies and cannot be even more driven by the minimization of SMPOs’ costs. SMPOs’ cost reduction could be a desirable result but should not be exclusive or central. Regulation should address two main side effects of switch-off programs: i) the disincentive of incumbents to phase out copper assets that are still able to allow significant gains and ii) the incentive of incumbents to target switch-off programs in the areas where competition is eroding or will erode their market power. To address the issue of incumbents’ resistance, a new approach based on the compensation of stranded costs should be used. To address the issue of unfair competition risks by SMPOs’, NRAs should define key criteria to trigger the switch-off of specific areas on the basis of the take up rate of VHCN services already achieved in such areas, and the presence of NGA networks for end-customers, irrespective of the ownership of such networks (SMP and/or ANO).

### **A consistent European approach is needed**

Open Fiber is of the view that a consistent European approach is needed and it should insist both on a procompetitive design of the process and on the necessity to carefully monitor the ways in which incumbents work out the migration processes, in order to i) safeguard the alternative operators’ network/investments, ii) maximise consumers’ welfare, iii) increase the take up of VHCNs; and iv) minimise the costs for the industry, allowing the SMPO to decommission legacy services, by taking into account the needs of ANOs that buy such services at wholesale level and the needs of end-customers to adapt to the new/more performing technologies.

### **The environmental cost is an externality that should be taken into account**

The FTTH Council Europe points out that the draft Report informs that the main reason why the SMPOs switch off their copper-based access networks is that it is not economically viable

to keep both the copper-based access network and the next generation access networks. The FTTH Council Europe understands that this is logical and makes sense from an SMPO perspective, but it is only one part of the consideration since there are important environmental externalities to be considered. The FTTH Council Europe states that environmental benefits of moving to fibre networks are well-known and studies show that fibre networks use vastly less energy than their copper equivalents. There is therefore an important environmental benefit from shutting down copper networks where fibre is sufficiently available in a market. Maintaining a copper network where there is fibre available presents a cost to society as well as to the copper network operator (whether SMP or not). This environmental cost is an externality that cannot be easily internalised by the market. Therefore, where the SMPO continues to rely on copper but alternative (non-SMPO) fibre deployments exist, the NRA should play a major role regarding the timeline and the management of copper switch-off. The question arises as to whether the strategic termination of the copper network is a question for the SMPO alone or whether it needs to be a more collaborative and organised decision made by a broader stakeholder group.

### **Copper switch-off is not only an issue in the presence of SMP**

The FTTH Council Europe points out that the draft Report considers the situation where the SMPO wishes to close its copper network, however, the FTTH Council Europe considers it important that in situations where the network owner is no longer SMP in a region or even in a Member State to also envisage co-ordination and facilitation of the network shut down. The economic obligations and the rules that might apply to an SMPO might not be available, but ensuring a plan is in place and that there is transparency of the switch-off process might still prove beneficial to all operators in the market. The need for a migration plan is also necessary beyond the need of consumers and is important for third party access seekers regardless of whether the copper network operator is SMP in a given region or not.

### **Cross platform switching**

Vodafone Group has noted that certain retail contracts lock end-users into long term copper services, even in areas where NGA is available. This should be discouraged, and end-users should be allowed to switch providers in order to upgrade to NGA services where these are available. Flexibility in retail terms to allow for migration onto NGA should be encouraged.

### **NRA intervention may also be required to achieve the benefits of the copper switch-off**

GOS Consulting is of the view that NRA intervention may also be required to achieve the benefits of the copper switch-off. NRAs could benefit from reviewing these incentives, which will depend upon factors including (i) whether the SMPO has developed its own VHCN, (ii) the number and extent of competing VHCNs, (iii) whether the SMPO is vertically integrated, and (iv) the availability of civil engineering infrastructure (CEI) access products. Considering these factors, NRAs may need to intervene to ensure that copper switch-off goes ahead on a timely basis and on appropriate terms in order to protect consumer interests, incentivise VHCN investment by SMPO and ANOs, and create the correct economic incentives for downstream service providers.

**Pace and timing of the migration process should be up to the SMPO**

Deutsche Telekom considers that the only practical way to ensure that the migration process runs properly is for the SMPO to design and propose when and how individual steps of the migration process are to be scheduled, as the switchover from copper to fibre is a highly technical process involving several layers of network architecture. It should be the SMPO who outlines technical details of migration, namely, how alternative operators are to be “switched off” from the legacy network. Excessive intervention into migration process would interfere with property rights of the SMPO, especially since investment into fibre is associated with high uncertainty and therefore high commercial risk. To be able to manage this risk, the SMPO should be able to make independent decisions about migration.

**Preferably less migration phases and rules**

Deutsche Telekom prefers a streamlined migration plan with outlined individual migration steps. The last migration showed that Deutsche Telekom had a good collaboration with the market player with less rules.

**Certain elements should be identified explicitly as best practice in BEREC’s final Report**

Ecta agrees that the commonalities between the SMPO plans, practices and NRAs market analysis decisions identified in Section 5 of the draft Report exists. However, BEREC does not make recommendations or provide guidance for improvement and best practices. Ecta asks for certain elements to be identified explicitly as best practice in BEREC’s final Report.

**BEREC should compile a list of recommendations for a sustainable copper migration and copper switch off**

VATM is of the view that BEREC should compile a list of recommendations for a sustainable copper migration and copper switch off, considering the improvement of the current competition level of the Member States` telecommunication markets. Although the draft Report has introduced detailed information on the situation in the EU Member States, it has not outlined any best practices and recommendations. VATM is convinced that creating stable and predictable rules and procedures governing the copper migration process, such as strict notice periods based on common understanding, ensuring stable access to network services and fair and transparent cost distribution would provide for a sustainable competition on the telecommunication market.

**It is premature for BEREC to provide any recommendation regarding the copper switch-off**

ETNO would like to highlight that, given the current review process of the NGA and NDCM Recommendations and the upcoming adoption of a new Access Recommendation aimed at supporting a consistent approach regarding the regulatory approach on NGA/fibre networks, it is premature for BEREC to provide any recommendation regarding the copper switch off. The Report should only provide a snapshot of the current practice and identify those practices supporting swift switch-off processes.



## **National rules transposing Article 81 EEC should not be altered or undermined by BEREC guidance**

Deutsche Telekom points out that the transposition of EEC into national law includes national rules reflecting the provisions of Article 81. Deutsche Telekom considers it of great importance that the final Report does not suggest anything that would render national implementation redundant or would undermine it in any way, as this would cause considerable uncertainty for the market players.

### **The processes of the types of copper switch-off differ**

Ecta suggests that the final BEREC Report should separate full copper switch-off from copper evolution scenarios. In Ecta's view these are entirely different processes, which should be subject to separate reporting. The non-discrimination and competition issues raised by full copper switch-off are different from those that merely concern copper network evolution and require specific attention. A key difference between the two subjects is that in copper network evolution, the wholesale access takers are transitioned between wholesale products of the SMPO (which is well-understood within a known regulatory framework), whereas in the full copper network closure scenario (transition to end-to-end fibre), there is potentially a much more disruptive change in the relationship between SMPOs and those taking or seeking wholesale network access. In addition, there are new provisions of the EEC (e.g. Articles 61(3), Article 72(2) last paragraph, Article 76/79, Article 80, Article 81), some of which relate to new network elements, entailing a major change in the legal and regulatory framework, resulting in severe risks of eviction of alternative operators from the market, and increasing responsibilities for regulatory authorities.

### **The difference between full and partial copper switch-off is significant**

GOS consulting is of the view that the difference between full and partial copper switch-off is significant. It is important that the report reflects the extent to which the SMPOs across Europe continue to rely on copper in their access infrastructure. GOS consulting therefore recommends that the final Report and its conclusions are clarified accordingly to show clearly the extent of both full and partial copper switch-off.

### **The implications of copper shut down for the Broadband Cost Reduction Directive (BCRD)**

The FTTH Council Europe is of the opinion that the retirement of copper networks will also affect the availability of duct capacity in the SMPO network and will potentially facilitate the deployment of alternative fibre networks. The orderly shutdown of copper networks where copper wires are harvested could be accompanied with an obligation to indicate availability of ducts or at least map those parts of the network where copper has been harvested. The FTTH Council Europe believes that the interaction between copper switch-off and the effective implementation of the BCRD could be highlighted and merits consideration and potential guidance.

### **Example of how regulation has not led to the desired results**

Open Fiber is of the opinion that an example of how the regulation adopted so far has not led to the desired results is the Italian case in which, although the switch-off process has been

widely regulated, it is struggling to take off and this is slowing down the take up of VHCNs significantly.

In Open Fiber's view in Italy the process failed on the following elements: i) the incentives by the incumbent to carry out the switch-off programs as indicated, for approval, to the NRA on the occasion of the latest market analysis; ii) the (non) consideration of the competitive landscape and, in particular, the presence of an alternative infrastructure (FTTH) in some areas of the country where the retail operators may be interested to migrate their customer base; iii) the role of the NRA in monitoring the compliance of the decommissioning initiatives with the regulatory conditions indicated within the market analysis, especially with reference to the necessary requirements to announce the decommissioning of a main station; and iv) the low take up rate (and relative growth prospects) of VHCN services.

### **Items affecting alternative fixed operators' business which are not yet properly addressed at Italian level**

A stakeholder notes that non-regulated services and markets other than 3a and 3b that rely on copper network sites will be dismissed. Reducing the scope of intervention for NRA in the switch-off process to mere fixed access services, especially excluding terminating circuits, BTS backhauling and backhauling in general, will have significant impacts on alternative operators such as additional costs and timing of new realizations.

This stakeholder also points out that it will be necessary to establish guidelines for the modalities of how to inform the customers about the switch-off, possibly starting with a technical round table between operators and the NRA. This stakeholder is also of the opinion that appropriate transparency mechanisms have not been provided to fixed ANOs to enable them to monitor the progress of the coverage and take-up parameters, leaving ANOs with an unmanageable margin of uncertainty in planning their migration activities. It also considers that, for each specific copper legacy service, it should be guaranteed an equivalent effective NGA service at an equivalent price, in order to avoid that market positions obtained by ANOs in the past in certain sectors will be lost and that such services' re-monopolization occurs. These are sectors where ANOs are providers of important utilities that manage critical infrastructure and services (like power plants or dams).

### **Corrections to information on Greece**

In Vodafone Group's view in the draft Report the following information in relation to Greece is not correct. In Greece, the NRA has completed the first stage of its consultation in relation to the migration rules, but the final position is expected to be a part of the upcoming market analysis consultation that is yet to be announced. Therefore, the NRA has not yet set rules for the migration process and copper switch-off and in the final Report Figure 1 on page 7 needs to be adapted accordingly and on page 11 Greece should be included in the group of countries (CH, FI, IE, ME, MT) in which the NRA has not (yet) set rules for the migration process and copper switch-off although the SMPO has already announced that it will switch off its copper-based access network.

Vodafone Group is of the opinion that in the final Report in section 2.3 on page 10 Greece should be included in the group of countries (LU, MT) in which the SMPO has not yet closed MDFs, only street cabinets. In the final report in section 3.2 on page 13, in the list of ANO's main concerns, Greece should be added in the group of countries (ES, IT) in which access

seekers have expressed the view that the SMPO shall only be allowed to close MDFs/exchanges after all end-users migrated to fibre (no forced migration).

### **BEREC response**

BEREC welcomes that Vodafone Group supports the main tenets of the consistent approach proposed in the draft Report and that Vodafone Group considers the draft Report as a very valuable work which will be of use to NRAs, wholesale operators, and access seekers across the markets.

Regarding the view from FTTH Council Europe, BREKO, VATM, Open Fiber and GOS Consulting that the BEREC Report should also consider the case where ANOs deploy fibre networks but not the SMPO, BEREC wants to clarify the following. The draft Report (sections 3.1) informs that in most countries in which the NRA already set rules for the migration process and copper switch-off, the NRA set these rules in a market analysis procedure. The market analysis needs to be carried out according to the EECC. NRAs have to carry out an analysis of the relevant markets (Art. 67(5) EECC) and where an undertaking is designated as having SMP on a specific market, NRAs shall, as appropriate, impose obligations foreseen in the EECC, however the NRAs shall choose the least intrusive way of addressing the problems identified in the market analysis (Art. 68(2) EECC). The market analysis needs to consider all networks, not only the fibre-based network of the SMPO but also the fibre-based networks of the other operators. Therefore, the rules for the migration process and copper switch-off set by the NRAs are based on considerations of fibre-based networks not only of the SMPO but also of ANOs, even in cases where only fibre-based networks of ANOs are present. BEREC also wants to point out that the draft Report (section 5.3) explicitly states, in accordance with Article 81 EECC, that the rules for the migration process and copper switch-off set by the NRAs apply to the geographic area where the NRA imposed access remedies on the SMPO and, therefore, the scope of these rules does not depend on whether the SMPO and/or ANOs rolled out fibre-based networks.

Concerning the view of the FTTH Council Europe and BREKO that the decision by the SMPO to decommission the copper network becomes a competitive strategy, BEREC wants to point out the following. NRAs examine in a market analysis procedure the relevant aspects for the promotion of effective competition on retail markets and, therefore, do consider these aspects also when defining the rules for the migration process and copper switch-off. This has been made more explicit in the final Report. For example, the NRAs may only permit a copper switch-off in case a certain NGA coverage has already been reached which, according to the draft Report (section 3.3), is the case in six of the 17 countries analysed. In a further country the NRA also foresaw such a condition, however, later it removed it because the risk of strategic closures disappeared. However, BEREC agrees with BREKO that it is not possible that the NRA impose on the SMPO the obligation to switch-off its copper-based access network e.g. in order to foster the migration to fibre-based networks in areas where only fibre-based networks of ANOs, not of the SMPO, are available. Such an obligation is also not possible if it is limited to cases where a certain take up rate of VHCN services has been reached, irrespective of the ownership of such networks (SMP and/or ANO), as suggested by Open Fiber and such an obligation is also not possible for reasons of the environmental benefits of fibre compared to copper, as suggested by the FTTH Council Europe. BEREC also wants to reiterate and emphasise that the NRA has to choose the least intrusive measure of addressing the problems identified in the market analysis. BEREC does not understand

BREKO's proposal to create incentives for a voluntary obligation by the SMPO regarding the acceptance of a level playing field. BEREC also wants to point out that the EECC does not provide NRAs with specific legal competences with regard to the climate and environmental impact of electronic communications networks and services.

Regarding the opinion of BREKO and Open Fiber that the conditions for a copper switch-off need to be harmonised ("equality of treatment"), without regard to the actor which is deploying fibre networks, BEREC wants to point out that, according to the draft Report (see section 3.1), the rules set by the NRA apply in the area where the incumbent (or another operator) has SMP and access remedies have been imposed on the SMPO regardless which network operator deploys a fibre-based network. The draft Report (see section 3.5) also informs that in six of the 17 countries examined, alternative wholesale access products, e.g. based on FTTH, are also available by other operators than the SMPO. Therefore, in these countries ANOs have the possibility to migrate from the copper-based wholesale access product(s) of the SMPO to fibre-based wholesale access products of ANOs.

With respect to FTTH Council Europe's considerations that in situations where the copper network owner no longer has SMP, rules for the copper switch-off are also important, BEREC wants to clarify that, according to the EECC, NRAs have only the possibility to impose in a market analysis procedure obligations on operators which do have SMP and also Article 81 of the EECC only applies to SMPO. Therefore, in case of competitive and de-regulated markets at national level (entire territory) or in certain areas, the NRAs do not have the legal competence to impose obligations on the incumbent regarding the copper switch-off and, since the markets are (already) competitive there is no longer a need for intervention.

Concerning Deutsche Telekom's view that the SMPO should be able to make independent decisions about migration and Deutsche Telekom's preference for fewer migration phases and rules, BEREC wants to clarify that it is the NRA which decides in a market analysis if and which measures need to be imposed on the SMPO and it is also the NRA which has to apply the rules of Article 81 of the EECC.

BEREC notes the following contrary views. Ecta and VATM are of the opinion that the final Report should include best practices or recommendations and ETNO is of the opinion that it is premature to include recommendations in the final Report. BEREC wants to point out that, according to the BEREC Work Programme 2022, the type of deliverable of the project is a report, not a recommendation or best practice. BEREC may decide to include a follow-up project in the BEREC 2023 Work Programme, however, this will be decided in the process of the preparation of this BEREC Work Programme, which will also include stakeholder involvement. BEREC also wants to emphasise that the NRAs (and also the Commission) have to take the utmost account of any recommendation and best practices adopted by BEREC, according to Article 4(4) of the BEREC Regulation.<sup>2</sup> Therefore, careful consideration needs to be given to whether measures that have proven useful in one or a few countries should be considered best practices or recommendations. BEREC agrees with ETNO, that rules set by

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<sup>2</sup> Regulation (EU) 2018/1971 of the European Parliament and of the Council of 11 December 2018 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Agency for Support for BEREC (BEREC Office), amending Regulation (EU) 2015/2120 and repealing Regulation (EC) No 1211/2009

the NRA in the future also have to take into account the relevant provisions of the Commission's revised Access Recommendation(s) currently being prepared by the European Commission.

Regarding Deutsche Telekom's opinion that national rules transposing Article 81 EECC should not be altered or undermined by BEREC guidance, BEREC wants to point out that BEREC understands that the NRAs have to apply national law and that the final Report should not contradict these national laws, as long as they comply with EU law.

BEREC's response to Ecta's and GOS Consulting's view that the final Report should consider full and partial copper switch-off separately is that in case of both types of copper switch-off, the SMPO may close MDFs, as pointed out in the draft Report (see section 1). The rules for the copper-switch-off (e.g. MDF closure) may differ between both types of copper switch-off, because the alternative wholesale access products may differ and also the legacy copper-based wholesale access products which no longer can be used after copper switch-off. However, this has been taken into account in the draft Report (see section 3.4) and the alternative wholesale access products also differ between countries due to national circumstances, as pointed out in the draft Report (see section 5.6). The end-users have to migrate to another service in case of a full copper switch-off, however, they may migrate to another service also in case of a partial copper switch-off. BEREC agrees with Ecta that the EECC includes new provisions (e.g. Art. 76) which NRAs have to consider in a market analysis procedure. The draft Report (section 3.1) shows that the NRAs typically set the rules for the migration process and copper switch-off in a market analysis procedure. Therefore, in the future the NRAs will have to take into account the new provisions of the EECC.

BEREC agrees with FTTH Council Europe's view that the retirement of copper networks may affect the availability of duct capacity in the SMPO network. However, if and the extent to which this is actually the case depends on several factors e.g. whether (i) the SMPO's legacy copper lines are deployed in ducts, (ii) the SMPO removes the copper lines from the ducts after copper switch-off, and (iii) this removal does not damage the ducts too much. BEREC wants to point out that the SMPO's obligation under the BCRD (Article 3(2)) to meet all reasonable requests for access to its physical infrastructure, includes all ducts and, therefore, also ducts where the SMPO removed legacy copper lines. The NRA may have also imposed on the SMPO the obligation to provide access to its ducts in a market analysis procedure, however, this obligation may also not depend on whether the SMPO has removed legacy copper lines.

Regarding Open Fiber's view that regulation adopted in Italy so far has not led to the desired results and it is slowing down the take up of VHCNs significantly, BEREC wants to point out that, according to the Italian NRA (AGCOM), the situation appears to be different. In fact, despite the fact that part of the regulatory approach related to the SMP switch-off plan is currently under pending appeal, it is important to point out that although the SMP switch-off plan has been voluntarily proposed by the incumbent, its implementation depends on the rules set by the NRA. The regulation of the switch-off process has the following goals: preserving competition during the transitional period and, at the same time, promoting migration of customers toward NGA ultra-broadband solutions. This twofold goal does not imply necessarily the forced migration of customers via the switch-off of local exchanges, as migration can also be realised without a planned switch-off of legacy network elements. As a matter of fact, both goals have been reached in Italy since the adoption of the regulation (in

2019): legacy copper-based fixed lines have decreased from a percentage of 49,5% of the total fixed lines in 2019 to 29,2% in 2021, at the same time SMP market shares decreased from 47,4% in 2019 to 43,9% in 2021. Open Fiber's assertions are in general incorrect, in fact: i) no incentives have been set in the regulation for the incumbent, as the incentives have been set only for the ANOs to migrate customers, ii) the presence of alternative FTTH infrastructures has been considered by the regulation, e.g. imposing a longer notice period in FTTH public funded (white) areas, iii) requirements to announce the decommissioning of a local exchange have been assessed and approved with a specific proceeding by AGCOM, iv) take up rate of NGA networks (including VHCNs) has increased significantly in recent years.

About the view of a stakeholder that some items are not yet properly addressed at Italian level, BEREC emphasizes that NRAs may only intervene on provision of services included in regulated markets. This follows directly from the EECC, Art. 81 (Migration from legacy infrastructure), which specifically concerns SMPOs "when they plan to decommission or replace with a new infrastructure parts of the network, including legacy infrastructure necessary to operate a copper network, which are subject to obligations pursuant to Articles 68 to 80". In addition, according to the Italian NRA (AGCOM), appropriate transparency mechanisms have been provided to fixed ANOs at Italian level, through imposition of specific notice periods which permit ANOs to know well in advance which local exchanges will be dismissed. The economic and technical conditions of the substituting wholesale (regulated) services have also been identified well in advance, following a series of technical meetings with the market players and consultation procedures. A trial among operators (at wholesale and retail levels) has also been approved by the NRA for a duration of six months, however, most ANOs did not participate and failed to further support the regulator's decision on this point.

BEREC's response to Vodafone Group's view that in the draft Report information in relation to Greece is not correct is as follows. According to information of the NRA in Greece, the NRA set rules for the migration process and copper switch-off in a market analysis (market 3a/2014) in December 2016 (see draft Report Table 29, p. 65), which include e.g. the obligation of the SMPO to inform the ANOs in advance when the SMPO plans significant changes to its network (e.g. 5 years for MDF closure, 18 months for other changes). Vodafone Group's response refers to the NRA's public consultation regarding the rules for copper switch-off in the context of the new round of market analysis, however, this public consultation does not cancel the existing rules. According to information of the NRA in Greece, the SMPO has only informed the ANOs about its intention to switch-off 19 MDFs in a 5-year timeframe (following the obligation of in-advance notification), but the NRA has no knowledge of SMPO closing street cabinets (see draft Report Table 1, p. 37). According to information of the NRA in Greece, ANO's comments were expressed during the NRA's public consultation in 2021, which concerned the forthcoming analysis of market 1/2020 and which has been made more explicit in the final Report, however, in this public consultation Vodafone did not express the view that the SMPO shall only be allowed to close MDFs/exchanges after all end-users migrated to fibre, there was not such question in the consultation (see draft Report Table 36, p. 72). Therefore, there is no need to adjust the information on Greece in the final Report.

### 3 Type of procedure

#### Stakeholder responses

##### **Market analysis procedure is the appropriate procedure**

Ecta agrees with BEREC that it is appropriate that the NRAs set the rules for the migration process and the copper switch-off in a full market analysis procedure because it involves the strongest guarantees on proper technical and economic assessment, stakeholder involvement, and is subject to the Article 32/33 EEC notification process to the European Commission, BEREC, and other NRAs.

Sky Ireland agrees that it is appropriate for NRAs to set the rules for the migration process and the copper switch-off process in a market analysis procedure.

##### **Criteria used to select the areas of switch-off plans need to be transparent and public**

Open Fiber is of the view that the draft Report has not addressed the issues of criteria and public processes used to select the areas of switch-off plans. As mentioned in the report for the case of Spain and underlined by Open Fiber, switch-off plans can distort competition. To avoid this, the criteria used to select the areas need to be transparent and public. This would reduce the incumbent's arbitrariness and thus the chance to execute or only announce a switch-off plan with the aim to distort competition.

#### BEREC response

BEREC welcomes that Ecta and Sky Ireland agree with BEREC that it is appropriate that the NRAs set the rules for the migration process and the copper switch-off in a market analysis procedure. However, in its report BEREC also acknowledges that in certain circumstances an NRA may set the rules for the migration process and the copper switch-off outside and already before the next market analysis procedure.

BEREC's response to Open Fiber's considerations that the criteria used to select the areas of switch-off plans need to be transparent and public is that, according to the draft Report (section 3.1), the NRAs typically set the rules for the migration process and copper switch-off in a market analysis procedure. As already pointed out in the BEREC response in section 2 above, NRAs may permit a copper switch-off only in case certain conditions are fulfilled, e.g. a certain NGA coverage has already been reached. Since these criteria are set in a market analysis procedure they are public and transparent. However, as also mentioned in the BEREC response in section 2 above, it is not possible for the NRA to force the SMPO to switch-off its copper-based access network.

### 4 Level (granularity) of the rules

#### Stakeholder responses

##### **Matching the level of granularity of the rules to the SMPO's plans**

Ecta agrees with BEREC that it is appropriate for NRAs to match the level of granularity of the rules to the plans expected or notified by the SMPO. However, Ecta considers it preferable to

recommend this more explicitly and invites BEREC to indicate this as a best practice in the final Report.

### **The most appropriate level (granularity) depends on the copper switch-off the SMPO pursues**

ETNO agrees with the fact that the most appropriate level (granularity) depends on the copper switch-off the SMPO pursues. ETNO sees that copper switch-off can be done per different areas, potentially one or several simultaneously, and not per city as such.

Sky Ireland agrees that the level of granularity of the migration and copper switch-off process depends on the type of copper switch-off process that is pursued.

### **BEREC response**

BEREC welcomes that Ecta, ETNO and Sky Ireland agree that the level (granularity) of the rules set by the NRA depends on the copper switch-off the SMPO pursues.

BEREC responded to Ecta's proposal to include in the final Report best practices already in section 2 above.

## **5 Stakeholder involvement**

### **Stakeholder responses**

#### **Stakeholders must have the ability to express their views**

Ecta agrees with BEREC, that stakeholder involvement is a must. Ecta would welcome if BEREC would add that stakeholders must be involved not only to learn about the SMPO's plan, but must have the ability to express their views on any change of access type and hand-over points and on the details of migration arrangements, including any costs that may have to be borne by access takers.

#### **Public consultation is a minimum engagement**

Sky Ireland considers a public consultation as a minimum engagement with key stakeholders. Further engagement throughout the process is also crucial, and NRAs should seek to ensure that there is open engagement with access seekers through a stakeholder forum.

#### **Market-tested commitments on migration**

ETNO is of the view that prior to imposing migration rules, the NRA should first assess and test with stakeholders on the market, any possible voluntary commitments offer by SMPOs in this regard.

#### **The position of certain, but not all ANOs are reported**

Open Fiber is of the view that the ANOs positions reported are only related to cases of ANOs hosted within the incumbent's main stations that are subject to switch-off. The positions of ANOs that compete at wholesale level with the incumbent are not reported and considered by BEREC. Open Fiber deems the impact assessment of switch-off projects on ANOs that



compete at wholesale level crucial, since with switch-off projects, incumbents can pursue predatory conducts, such as crowding out investments by alternative operators, discouraging investments in selected areas and/or diminishing the investment profitability even below the hurdle rate.

### **BEREC response**

BEREC wants to point out that, according to the draft Report (section 3.2), in 16 of the 17 countries examined the NRA involved the stakeholders. In some countries, the NRA involved the stakeholders not only in a public consultation but also e.g. in a technical forum or with a dedicated questionnaire. However, which involvement at which stage in the migration process is most appropriate depends on national circumstances. BEREC also wants to emphasise that, according to the draft Report (section 3.1), the NRAs typically set the rules for the migration process and copper switch-off in a market analysis procedure. Therefore, the views of the stakeholders expressed in the market analysis procedure will also be taken into account when setting the rules for the copper switch-off. BEREC also wants to clarify that all these stakeholder involvements are also not limited to certain ANOs and, therefore, the positions of ANOs reported in the draft Report are not limited to certain ANOs, as assumed by Open Fiber.

BEREC's response to ETNO's proposal on voluntary commitments by SMPOs is that the SMPOs have the possibility to propose such voluntary commitments in the procedure in which the NRAs set the rules for the migration process and copper switch-off, e.g. in a market analysis procedure, and this proposal will be taken into account. The draft Report (section 3.8) also points out that a few NRAs did allow the SMPO a copper switch-off to some extent for test purposes. The SMPOs have the possibility to ask the NRAs to test the copper switch-off which may make it easier for SMPOs to propose a voluntary commitment.

## **6 Notice period**

### **Stakeholder responses**

#### **Beginning of the notice period, SMPO's use of the copper network and examples**

Ecta thanks BEREC for clearly stating that SMPOs want to switch off their copper-based access networks to reduce costs. This is an important statement, that needs to be borne in mind at all times. Ecta can agree that the notice period is modulated, depending on the use made of various types of copper-based wholesale access products. However, Ecta suggests that the notice period should only start after migration processes are agreed by operators and validated by the NRA, and the shut-off date should apply equally for alternative operators and for the SMPOs' own products (retail, wholesale, internal use).

Ecta is of the view that NRAs have not in fact been taking consistent decisions on notice periods, because there is a high degree of variation among them, and that the notice periods listed by BEREC, especially those for copper local loop unbundling, entail real risks of damaging competition by being unduly short. Ecta also considers that specific attention by NRAs is also needed to verify whether SMPOs intend to continue to use the copper network after ceasing wholesale access provision to third parties. Such an outcome would be discriminatory and highly damaging to competition, and is unacceptable. Ecta notes that in Spain, after the notice period ends, the SMPO must stop commercial offers on copper. This is

clearly justified, and represents an important best practice which Ecta asks BEREC to highlight in its final Report. The provisions adopted by the Italian NRA in Decision 348/19/CONS providing as prerequisites for the switch off a 100% NGA coverage in the area of the local exchange and a 60% of retail NGA take-up also deserve attention as an element of best practice, that could easily be used for both full and partial switch off.

### **Beneficial set of prerequisites that NRAs should set prior to the switch-off process**

Vodafone Group considers that a beneficial set of prerequisites that NRAs should set prior to the switch-off process to further assist with a smooth migration for consumers, includes for example:

- The NGA coverage in the merging exchange should be 100% completed (with residual FWA of ~5%) at least 24 months prior to the switch off date.
- The retail NGA services marketed should reach a minimum of 80% penetration in the central switch off areas.
- The NRA should require that all existing copper connections to NGA should be further specified to ensure prior availability of all necessary resources to cover 100% of the active connections such as ports and backhaul, in order to ensure proper customer migration and avoid any rejections on the basis of technical weaknesses or lack of available resources.
- The wholesale offers should be available during the migration phase so that an NGA product equivalent to the technical and commercial terms of the legacy copper product can be offered to all customers (starting e.g. with a low end 50 Mbit/s product).
- The wholesale operator of the copper network should provide detailed technical and design changes on both the network and active equipment level, prior to the start of the migration and switch off process.

### **There is no reason not to aim for 100% coverage before a switch-off can commence**

Sky Ireland believes there is no reason not to aim for 100% coverage in an exchange area before a switch-off can commence to ensure that consumers and other end-users are not negatively impacted. It is important for the notice period to reflect the diversity of consumers and end-users that need to be accommodated. In particular, consumers who are using the copper line for fixed voice services only or who potentially have their copper service connected to house alarms or care alarms, and who most likely will be vulnerable customers, will need to be carefully managed.

### **The notification period may commence only after the SMPO and ANOs have reached full agreement**

T-Mobile Netherlands points out that from an ANO perspective there is actually one lesson learned from previous legacy phase-outs of copper based wholesale services in the Netherlands that supersedes all other learnings: make sure that a notification period is meaningful by imposing that such a notification period may commence only after the SMPO and ANOs have reached full agreement on migration terms and conditions. In case SMPO

and ANOs fail to reach an agreement, a notification period may only commence after the NRA has ruled over the relevant migration terms and conditions.

### **No pre-conditions to be fulfilled at the beginning of the notice period**

ETNO is of the view that there is no need for any pre-condition to be fulfilled at the beginning of the notice period and this indeed is not provided for in the NGA Recommendation. In particular, requiring a 100% NGA coverage at the beginning of the notice period significantly delays the switch off, any condition related to NGA coverage should apply only at the end of the notice period and could never be 100% as many networks might have outliers that are uneconomic and unreasonable to reach. BEREC should also clarify that the starting of the notice period should not be conditioned by any requirement regarding the migration of customers to NGA services, as it is the case in Italy where AGCom conditions the announcement of the switch-off to the reach of 100% NGA coverage and 60% NGA take up. Such a requirement would have the effect of significantly delaying the switch-off.

### **Migration and switch off should be possible at a lower coverage than 100% fibre**

Deutsche Telekom is of the opinion that the obligation to have 100% coverage by fibre to allow for the SMPO to announce switch-off should not be imposed. Under no circumstance should copper switch-off be conditioned by 100% fibre coverage. The main point will be that alternative comparable products are available and could be offered. As EECC in Article 81(2) clearly distinguishes between “decommissioning” and “replacement”, BEREC should also make clear beyond doubt that not all of the legacy network footprint should be “replaced” – some part of it will not be replaced by fibre and customers may be migrated to other technologies. It is also necessary to ensure that in the areas where fibre network will not be available, SMPO will no longer be obliged to offer access. Under no circumstance may the SMPO be obliged to resell or in other way provide wholesale services which it procures from third parties to access seekers.

### **Stop selling should be allowed and ANOs should be required to only procure SMPO’s new wholesale access product on the new future-proof (FTTH) infrastructure**

ETNO agrees that “*SMPOs may be allowed to stop selling legacy copper-based wholesale access products already earlier (the switch off)*”. As this will help the migration by providing some sort of progression in the process, this is indeed a necessary step in the migration process and should be rephrased into “SMPOs should be allowed” instead. ETNO considers it even to be more efficient to require an ANO, as soon as the target (FTTH) infrastructure is available at a specific location, and thus also alternative retail/wholesale fibre-based access products are available, to only procure its new additional wholesale access product on the new future-proof (FTTH) infrastructure. This would help avoiding short-term migration still to be implemented at the time of migrations. Therefore, access obligation on the legacy/copper network for new access lines should be removed and the price control obligation lifted or allowed to increase for the remaining existing accesses.

### **Exceptional shorter notice periods**

ETNO is of the view that during the period of migration, in the presence of special external circumstances, the SMPO should have the possibility to notify copper out-phasing with a shorter notice period, prior to the officially communicated end of service date.

**A notice period of at least 12 months is fully sufficient**

Deutsche Telekom points out that the German law specifies a notice period of at least 12 months and Deutsche Telekom considers this fully sufficient. Deutsche Telekom prefers a short notice period. Timing of switchover steps has to reflect contract duration with retail customers, normally no longer than 24 months, which is consistent with the shorter switchover timing Deutsche Telekom pleads for. This would allow to align possible changes on the retail side with the necessary changes on the product side.

Deutsche Telekom is of the opinion that the SMPO should have the possibility to apply exceptional short notice period, that is, to announce copper switch off earlier than originally planned, in the presence of special external circumstances. The most compelling and practical examples of such special external circumstance are breakdowns caused by construction works, such as building or road or other comparable activities or, due to degrading copper, especially in areas where fibre is already available or will be soon available.

**Prioritize specific clusters**

ETNO suggests that during the migration period the SMPO should have the possibility to commonly agree with ANOs to prioritize the migration of certain (geographic) (clusters of) lines before the officially communicated end of service date. It might in fact be necessary to group geographic sub-categories of lines more efficiently than treating them equally across the board.

**Guard period**

ETNO is not in favour of the possibility of a “guard period” if this can be used as a structural manner to further postpone with an additional period of e.g. six months to migrate their end-customers. Such guard period should remain an exception.

**Forced migration after stop selling**

ETNO is of the view that the SMPO should have the possibility to force a migration (following a previous notice for example), if at the stop service date ANOs refuse to voluntarily switch to another network.

**BEREC response**

BEREC notes the following opposing views. On the one hand, Ecta, T-Mobile Netherlands, Vodafone Group and Sky Ireland suggest that the copper switch-off should only be possible or commence after certain conditions, e.g. a certain NGA coverage has been reached, the SMPO and ANOs have reached an agreement on the migration process. On the other hand, ETNO proposes that not any pre-condition needs to be fulfilled at the beginning of the notice period and Deutsche Telekom similarly suggests that copper switch-off should be possible at a lower coverage than 100% fibre. BEREC wants to point out that, as already mentioned above, according to the draft Report (section 3.1), the NRAs typically set the rules for the migration process and the copper switch-off in a market analysis procedure. Therefore, and in accordance with Article 81 EECC, the NRA may set appropriate conditions if this is necessary to safeguard competition. The competitive situation differs between countries and, therefore, also the conditions set by the NRA. For these reasons, BEREC is of the view that it

is adequate that the NRAs decide which conditions are appropriate, taking into account the national circumstances, in particular the competitive situation.

BEREC also notes the following contrary views. On the one hand, Ecta considers the notice periods listed in the draft Report entail real risks of damaging competition by being unduly short and, on the other hand, Deutsche Telekom considers a notice period of at least 12 months to be fully sufficient. As mentioned in the paragraph above, NRAs typically set the rules for the migration process and the copper switch-off in a market analysis procedure. Therefore, BEREC is of the view that it is also adequate that the NRAs decide on the appropriate notice period, taking into account the national circumstances, in particular the competitive situation. BEREC also wants to point out that the draft Report (section 5.5) informs in detail on the factors which have an impact on the notice period.

BEREC's response to Ecta's proposal that the shut-off date should apply equally for ANOs and for the SMPOs' own products (retail, wholesale, internal use) is that the draft Report (section 5.10) explicitly states that the NRAs typically impose on the SMPO also a non-discrimination obligation. However, Ecta's proposal has been included in the final Report as an example.

BEREC's response to ETNO's proposal that in case of special external circumstances, a shorter notice period than officially communicated should be possible is that these are very specific cases, difficult to foresee and, therefore, general rules may be difficult and a case-by-case treatment may be necessary.

BEREC welcomes that ETNO agrees with the draft Report that "SMPOs may be allowed to stop selling legacy copper-based wholesale access products already earlier (the switch-off)". Regarding ETNO's proposal to rephrase this into "SMPOs should be allowed", BEREC wants to point out that the entire migration process needs to be considered and such a possibility for SMPOs may result in a longer notice period, at least the period between the announcement of the copper switch-off and the end for ANOs to order SMPO's copper-based wholesale access products needs to be sufficient long. Again, BEREC considers that this is best decided by the NRAs at national level, taking into account the national circumstances, in particular the competitive situation.

With respect to ETNO's proposal that the SMPO should have the possibility to force a migration at the end of the notice period and a "guard period" can be used as a structural measure to further postpone the migration, BEREC wants to reiterate that the entire migration process and the duration of the individual steps must be taken into account. Therefore, also in this case, BEREC considers it best if this is decided by the NRAs at national level, taking into account the national circumstances.

BEREC's response to ETNO's view that the SMPO should have the possibility to agree with ANOs on prioritisation of the copper lines to be switched off is that if the SMPO can reach such an agreement with the ANOs, then the NRA will take it into account when setting the rules for the copper switch-off.

## 7 Alternative wholesale access products

### Stakeholder responses

#### **Full copper switch-off and copper network evolution differ and passive access products should be mandated**

Ecta notes that BEREC states (p. 26) that: “*There is no general need to impose on the SMPO the obligation to provide alternative wholesale access products only in case of copper switch-off*”. Ecta agrees that this statement is broadly correct where it comes to copper evolution scenarios (to VDSL CO, VDSL2 CO/Street Cabinet) but it is much less clear that this statement is correct where it comes to end-to-end fibre and real copper switch-off. Also, the regulatory obligations imposed by NRAs with regard to end-to-end fibre are often limited to Virtual Unbundled Local Access (VULA) or bitstream, with passive access (fibre unbundling) being less frequently imposed by NRAs. This is a matter of serious concern to Ecta and its members. Ecta asks BEREC to reconsider section 5.6 of the draft Report and in particular to conduct a more granular analysis, distinguishing between i) full closure of the copper network (FTTH, FTTO) and ii) copper network evolution (VDSL CO, VDSL2 StreetCab, g.fast, etc.).

Ecta also is of the opinion that all NRAs should mandate passive access products (alongside civil engineering access and active access products such as VULA and more centrally delivered offers). BEREC should be very careful not to position the remedies of duct access, passive access (unbundling) and VULA/bitstream in a way to suggest that only one of them is suitable in response to a particular state of affairs. These remedies are all relevant and complementary. They do not depend on the SMPO’s architecture choices alone, but on the willingness of the NRA to promote competition and ensure non-discrimination in both technical and economic terms.

#### **Alternative wholesale products from other operators than the SMPO**

ETNO points out that alternative wholesale products could come from other operators than the SMPO (in particular if symmetric obligations apply to all operators alike) and other technologies than FTTH. In case alternatives are available from various operators, there is no need to impose onto the SMPO a specific ex-ante mandatory provision of alternative products.

#### **Alternative products should be comparable but not identical**

Deutsche Telekom is of the view that an alternative wholesale access product is sufficient. There is no economic justification why access to passive infrastructure should be mandated in the presence of a comparable active product, given the fact that passive infrastructure can also be provided by other entities than the SMPO (e.g. utilities operators). Substitution of access to one wholesale product on legacy network (unbundled local loop) with multiple ones on the fibre network is disproportionate and reduces the incentives of the SMPO to invest in fibre rollout.

Deutsche Telekom also considers the requirement that active product(s) provided via fibre network should be identical and not comparable with the products provided over the legacy networks is objectively disproportionate. Such requirement would objectively constrain switchover to fibre, as differences are given by the very nature of new, fibre-based access

products (e.g. Ethernet-based access lines compared to SDH leased lines). Art.81 EECC also imposed the duty to offer "... alternative products of at least comparable quality."

**It should be possible to migrate customers to alternative technologies (e.g. satellite, wireless, coaxial)**

Deutsche Telekom points out that for many technical and economic reasons it may not be possible to roll-out fibre network to every customer presently being served via legacy copper-based network. In this case it should be acceptable that comparable alternatives may be offered to such customers, such as satellite, coaxial-cable or wireless broadband, provided by the SMPO or by the universal service operator.

**BEREC response**

With regard to Ecta's view that full copper switch-off and copper network evolution differ, BEREC refers to its response on this issue in section 2 above. Ecta also refers to the following statement in the draft Report, namely that: "there is no general need to impose on the SMPO the obligation to provide alternative wholesale access products only in case of copper switch-off". Ecta considers that it is much less clear whether this is also correct in the context of end-to-end fibre and real copper switch-off. In this respect, BEREC wants to further clarify that this statement follows from the previous statement in the draft Report that the fibre-based wholesale access products (e.g. based on FTTC/B/H) the NRAs imposed in a market analysis procedure on the SMPO as a "usual" remedy are typically sufficient for the copper switch-off. BEREC wants to point out that the NRAs typically set the rules for the migration process and copper switch-off in a market analysis procedure and consider the SMPO's planned copper switch-off, irrespective whether it is a partial or a full copper switch-off.

BEREC notes the following contrary views. On the one hand, Ecta proposes that all NRAs should mandate passive access products and, on the other hand, Deutsche Telekom does not consider it economically justifiable to mandate access to passive infrastructure in the presence of a comparable active product. BEREC wants to clarify, that, as already mentioned above, the NRAs set the rules for the migration process and copper switch-off typically in a market analysis procedure and impose on the SMPO the most appropriate wholesale access products which depend on the national circumstances (competition, availability of ducts, point-to-point fibre etc.). Therefore, the wholesale access products imposed on the SMPO differ between countries. BEREC wants to clarify that the market analysis will also consider the relevant alternative wholesale access products offered by other operators, if there are any (see draft Report section 3.5), but from this does not necessarily follow that there is no need to impose wholesale access products on the SMPO, as suggested by ETNO. The market analysis may also consider alternatives for end-users such as satellite, coaxial-cable or wireless broadband provided by the SMPO or the universal service provider. However, whether this would allow a copper switch-off in areas where the SMPO does not roll-out a fibre network, as suggested by Deutsche Telekom, depends on the outcome of the market analysis procedure.

## 8 Legacy copper-based wholesale access products

### Stakeholder responses

#### **Copper switch-off must mean copper switch-off for all including the SMPO**

Ecta agrees with BEREC's findings, i.e. the consistent approach is to maintain the copper-based wholesale access products until the SMPO copper network is switched off. Ecta emphasizes that copper switch-off must mean copper switch-off for all, including the SMPO's own retail, wholesale and any internal or other use. Ecta would find it acceptable for commercial switch-off to precede technical switch-off, i.e. that SMPOs can stop provisioning new copper lines commercially, prior to switch-off, but it is essential that this occurs on a fully non-discriminatory basis, i.e. also the SMPO's own retail/wholesale/internal use must cease to receive new copper activations.

### BEREC response

BEREC wants to refer to its response to this issue in section 6 above. BEREC understands that the copper switch-off needs to apply equally to both SMPO and ANOs. If in a switch-off area ANOs can no longer order or use the SMPO's copper-based wholesale access products, then also the SMPO should no longer have the possibility to order or use copper lines at retail and wholesale level, and for internal use. BEREC wants to point out that the EECC (Art. 70) explicitly foresees obligations of non-discrimination and the Commission Recommendation on non-discrimination provides further guidance.<sup>3</sup> Therefore, this aspect will be considered in a market analysis procedure and the draft Report (section 5.10) explicitly states that the NRAs typically impose on the SMPO also a non-discrimination obligation. Nonetheless, Ecta's proposal has been included in the final Report as an example.

## 9 Migration costs

### Stakeholder responses

#### **A price regulation of the copper switch off needs to be adopted which ensures that the cost of the copper migration does not fall on the ANOs**

VATM is of the view that BEREC should consider adoption of price regulation of the copper switch off, which ensures that the cost of the copper migration does not fall on the ANOs and access seekers. VATM would like to put forward the methodology implemented in Italy. VATM sees the general outline as a good starting point regarding the copper switch-off and migration to VHCN, especially if there is a non-discriminatory approach towards migration costs independent of the ownership of the receiving VHCN.

VATM would like to emphasize that tariff regulation regarding the migration from the legacy copper network is very important for the VATM member companies and should be duly

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<sup>3</sup> Commission Recommendation of 11 September 2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (2013/466/EU)



established well before the actual start of the migration. It is VATM's view that the additional payments made by the ANOs and access seekers over the years to encourage a new network roll-out can be used as a wedge in the context of the copper migration to ensure that no additional costs for the transition would fall on the VATM member companies. VATM sees the use of a wedge as a means to promote competition.

### **More specific guidelines from BEREC to NRAs could be beneficial**

Vodafone Group is of the opinion that more specific guidelines from BEREC to NRAs could be beneficial, for example:

- Where the wholesale provider is requiring access seekers to remove equipment and migrate services due to closure of exchanges, the costs should not be passed onto access seekers. Forced changes to the wholesale network should not result in large costs for access seekers buying an existing wholesale service but should be borne by the wholesale provider.
- Wholesale providers should also be required to select the most cost-efficient scenarios for the migration.
- Indirect migration cost of access seekers (i.e. administrative/IT cost) should be at least partially reimbursed.
- Wholesale providers should not impose one-off switch-off/migration fees on access seekers or consumers.

### **Alternative wholesale access products should be of comparable price**

Sky Ireland highlights that alternative wholesale access products should be of at least comparable quality and comparable price, which in Sky Ireland's view is mandated by Article 81 of the EECC. Therefore, a comparable price needs to be guaranteed and any attempt by an SMPO to increase the price of alternative wholesale access products would ultimately be to the detriment of the copper switch-off process and to consumers and end-users.

Sky Ireland considers it crucial to the copper switch-off process that NRAs impose measures to allow access seekers to switch to alternative products without having to incur additional costs. Similarly, in circumstances where customers are being forced to migrate to another product or service there should not be additional cost for the customer.

### **The examples that no further rules are needed for migration costs are rare and the examples of such rules represent best practice**

Ecta points out that the mentioned examples in section 5.8 of the draft Report (i) the SMPO already offers free migration and (iii) the notice period is long (e.g. 5 years) are (extremely) rare. Ecta therefore asks BEREC to revise section 5.8 of the draft Report and its conclusion. Ecta does welcome BEREC's statement (p. 28, para 2) that "*However, in order to avoid competitive distortions it could also be useful under specific circumstances and the national context that the NRA sets further rules on the migration costs as e.g. that the SMPO covers some migration costs (see section 3.6)*". This statement refers to the Italian and Swedish case. In Ecta's view these measures are clearly justified and represent important best practice which Ecta asks BEREC to highlight in its final Report, including in the conclusions.

### **SMPOs should be allowed to increase the monthly rental fees of regulated copper-based products in FTTH deployed areas**

ETNO points out that the more customers will be migrating to FTTH and other VHCN access networks, the more expensive it will be to maintain existing copper-based access lines. Operating a duplicate legacy network will be increasingly expensive per access, and increasingly unprofitable unless increased costs are reflected in higher wholesale access prices for legacy access. Therefore, SMPOs should be allowed to increase the monthly rental fees of regulated copper-based products in FTTH deployed areas in order to further stimulate migration to fibre-based products.

ETNO is of the view that the unbundling tariff must always ensure that the investor recovers its efficient cost, even during the migration from copper to fibre and facilitate a smooth transition to fibre. The cost per unbundled access can increase gradually over the market analysis cycle. Four cumulative effects can lead to such an increase, that should be effectively translated into an increase of the tariff:

- the decline in the total access base in service due to increased infrastructure-based competition (alternative FTTH networks, cable, mobile only), which has a direct impact on the average cost of the assets and on the average cost of operation;
- the deformation of the customer base, with a greater weighting of rural areas following the migration from copper to fibre, which has a direct impact on the average cost of operation and the average cost of after-sales service;
- increasing pressure to maintain quality of service, coupled with an increase in particularly violent weather events, which has a direct impact on the average cost of after-sales service and on the average cost of operations,
- increasing input prices due to shortages for civil engineering capacities or general inflation.

ETNO emphasises that for a smooth transition to FTTH it is important not to distort the market by regulatory price decisions on copper which would make copper-based products more attractive in relation to fibre based products. Copper price decreases would have such an effect. Copper price increases, on the contrary, would make fibre more attractive.

Finally, ETNO points out that under ex ante regulation, the NRA may still impose access obligations to the copper access network on the SMPO, but under no circumstances the NRA may impose a tariff on the operator that would not allow it to recover the efficient costs it incurs in providing the service. The method used to set the LLU price must lead to the recovery of efficient costs effectively and ensure that this is achieved by the end of the transition from copper to fibre. This review of the LLU price should be mentioned in the final Report as to be considered by the NRAs.

### **Possibility to reflect increased cost of operation of legacy network in the increase of ULL prices**

Deutsche Telekom points out that with increasing fibre rollout and corresponding migration of customers, it will be increasingly unprofitable to operate two networks simultaneously, due to decreasing revenues from legacy networks. The SMPO should have the possibility to reflect these higher costs in the increased price of legacy-based access products. Such increase would further serve as an additional incentive for ANOs to migrate to fibre-based products.

Deutsche Telekom is convinced that maintaining artificially low prices of legacy access by the NRA would be a wrong policy choice, as it would not create the incentives for ANOs to migrate, and would disregard objective increase in costs which also would send a wrong signal towards investors.

### **Costs of migration should be solved according to wholesale contracts which normally contain relevant provisions**

Deutsche Telekom points out that if timing of the migration is longer and commensurate to the period of depreciation of the infrastructure deployed by ANOs, there is no need for compensation at all, as there are no sunk costs. If, nevertheless, there are still outstanding costs, they should normally be addressed according to the relevant clauses in the wholesale contracts.

Deutsche Telekom is of the opinion that migration costs also arise for the SMPO and may not be covered by regulated charges. The parallel operation of networks results in higher operating costs for the operation of copper networks, which are usually not included in the regulated fees. Increased operating costs result from the fact that the stock of copper-based connections is likely to be concentrated in regions that are less densely populated and have higher operating costs. A factor for higher operating costs in less densely populated regions is also that there is a higher proportion of above-ground installations and they have a higher need for maintenance and upkeep. The longer the notice period lasts, the higher the operating costs for the copper lines per active connection.

### **BEREC response**

BEREC notes contrary views. On the one hand, VATM, Vodafone Group and Sky Ireland are of the opinion that it needs to be ensured that the cost of the copper migration does not fall on the ANOs. On the other hand, ETNO and Deutsche Telekom are of the opinion that the SMPOs should be allowed to increase the monthly rental fees of regulated copper-based wholesale access products in FTTH deployed areas. BEREC wants to point out that, as already mentioned above, the NRAs typically set the rules for the migration process and copper switch-off in a market analysis procedure. Therefore, the NRAs set the rules for migration costs under this market analysis procedure aiming at the promotion of effective competition on retail markets and taking into account the national circumstances, in particular the competitive situation. The NRAs might consider the effect, in particular on competition, of both proposals, the proposal of VATM, Vodafone Group and Sky Ireland and the proposal of ETNO and Deutsche Telekom. Based on these considerations and following the provisions in the EECC (Art. 74) and also in the Commission Recommendation on non-discrimination and costing methodologies,<sup>4</sup> the NRAs will have to find the appropriate balance and solution. BEREC is of the view that it is appropriate that the NRAs decide on the rules for the migration costs based on the national circumstances. In the future, the NRAs will also have to take into account the provisions in the revised Commission's Access Recommendation(s).

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<sup>4</sup> Commission Recommendation of 11 September 2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (2013/466/EU)

Regarding Deutsche Telekom's view that the costs of migration should be solved according to wholesale contracts which normally contain relevant provisions, BEREC wants to clarify that the ANOs and the SMPO may agree on the migration costs and then the NRAs may not need to set rules on migration costs. However, if this is not the case, the NRAs have to decide on the rules for the migration costs.

BEREC's response to Sky Ireland's view that Article 81 EECC mandates that alternative wholesale access products should be of at least comparable quality and comparable price, is that Article 81 EECC demands alternative products of at least comparable quality, but is silent on the issue of comparable price.

With respect to Ecta's view that certain measures set in Italy and Sweden represent important best practices, BEREC wants to refer to its response to the topic "best practices" in section 2 above.

## 10 Information of the SMPO and monitoring

### Stakeholder responses

#### **Monitoring by NRAs of migration is essential and best practice for NRAs should be to monitor systematically**

Ecta considers that monitoring by NRAs of migration is essential, especially where it concerns the real transition to end-to-end fibre and actual copper network switch-off, in which case alternatives for wholesale access takers may be lacking or inappropriate, and this needs regulatory attention. Ecta calls on BEREC to change its conclusion, and to state explicitly that best practice is for NRAs to systematically monitor the migration process and copper switch-off. Ecta also calls upon BEREC itself to report, on an annual basis, on monitoring by NRAs. This should include not only whether NRAs monitor, but the outcome of such monitoring.

#### **Monitoring is an integral aspect of the copper switch-off process**

Sky Ireland considers the monitoring of the migration process is an integral aspect of the copper switch-off process for an NRA. Under the EECC, the NRAs must safeguard competition and the rights of end-users, which can only be done by monitoring the actions of the SMPO to ensure that it is adhering to the timetable and conditions.

#### **Monitoring of the migration process can be limited to situations where issues would occur**

ETNO is of the opinion that when adopting and imposing migration rules, NRAs are to take account of the SMPO's proposals in this respect and involve relevant stakeholders at the outset. Following the imposition of these rules, monitoring or supervising of the migration process can then be limited to situations where issues would occur.

#### **Switch-off projects that are entirely unexecuted or delayed need to be reported**

Open Fiber is of the view that the draft Report does not report any case of switch-off projects that are entirely unexecuted or delayed. In particular, BEREC did not investigate the actual progress of the switch-off plans declared by the incumbents. Any delays in the migration

process should be taken into account due to the relevant external impact that they may have on the market (buyers, competitors and end users).

### **How (and whether) the national switch-off plans have actually been implemented needs to be evaluated**

The FTTH Council Europe considers it essential to add to the scope of the draft Report an evaluation of how (and whether) the national switch-off plans have actually been implemented in order to understand what the challenges were and how they were overcome. The extended role of NRAs in defining and supervising the switch-off process should therefore also include an analysis of its implementation.

#### **BEREC response**

BEREC notes contrary views. On the one hand, Ecta and Sky Ireland are of the view that monitoring of the migration process is essential and, on the other hand, ETNO is of the view that monitoring of the migration process can be limited to situations where issues would occur. BEREC wants to point out that, according to the draft Report (section 5.9), in many countries the NRA does monitor the migration process, however, there are also national circumstances, mentioned in the draft Report, why NRAs do not (currently) monitor the migration process. The draft Report (section 5.9) also informs that in the future the need for monitoring may also arise from the transposition of Art. 81 (2) of the EEC. Regarding Ecta's proposal that best practice for NRAs should be to monitor systematically, BEREC also wants to refer to its response to the topic "best practices" in section 2 above.

Concerning FTTH Europe Council's and Open Fiber's view that the Report should also examine the actual progress of the SMPO's copper switch-off plans and how (and whether) they have actually been implemented, BEREC wants to clarify that, according to the draft Report (sections 2.2 and 2.3), in most countries the implementation of the SMPO's copper switch-off plan is still in the beginning and, therefore, it is not yet possible to examine whether the copper switch-off will be implemented according to plan.

## **11 Further rules**

### **Stakeholder responses**

#### **BEREC should develop the basic requirements and nature of the non-discrimination obligation in the context of migration**

Ecta agrees with BEREC's finding that the SMPO's reference offer, resulting from the remedies imposed through the market analysis, is where the alternative wholesale access products should materialize, and that the offer must be associated with key performance indicators (KPIs) and service level guarantees (SLGs). Evidently, a non-discrimination obligation is also appropriate. Ecta is disappointed that BEREC only mentions the non-discrimination obligation conceptually, without providing any details. Ecta urges BEREC to develop, in the final Report, the basic requirements and nature of the non-discrimination obligation in the context of migration. This could usefully be done in a format similar to that of the Best Practices for WLA, WBA, WLL, and should explicitly cover both B2C and B2B use cases of wholesale products. Whilst BEREC's draft Report is mostly generic, the situation for

leased lines and high-quality access connections transitioning from copper to fibre requires particular sensitivity, which BEREC could usefully recognize.

### **KPIs, in particular for fibre orders and installation, are necessary**

Sky Ireland is of the view that KPIs, in particular for fibre orders and installation, are a vital component of the copper switch-off process. In order to ensure that there is minimum disruption for consumers and end-users and to guarantee a smooth transition from copper to fibre, NRAs must put in place binding KPIs.

### **Copper switch-off tests could be identified as best practice**

Ecta points out that the draft BEREC Report discusses that copper switch-off tests were conducted in France and Italy. Ecta members have considered such tests/experiments very useful, to be able to identify practical problems in good time, and work towards their resolution before the problem hits with full force in an operational environment. Such testing could usefully be identified by BEREC as best practice in the final Report.

### **There are other significant impacts on end-customers besides the change of CPE**

Open Fiber is of the view that the draft Report assesses the impact of switch-off plans exclusively mentioning the change of CPE as the main impact of switch-off on end-customers. Open Fiber believes that there are other significant impacts on end-customers besides the change of CPE, that need to be better investigated. In the stakeholders' involvement, Open Fiber believes that associations of end-customers should play a significant role, which has not happened so far.

### **“Fault to fibre” migrations in existing fibre locations**

Vodafone Group supports in principle the “fault to fibre” process Openreach has been implementing in UK. However, Vodafone Group has found certain issues for the consumer with this process and propose that any “fault to fibre” migration adopted by wholesale operators should require the following as the minimum:

- Fibre orders must be expedited to ensure the end user's loss of service period is minimised.
- End users should not be required to pay for the upgrade to fibre which they did not order.
- A free connection to fibre and a free 12-month speed uplift, as a recompense for the delay to service restoration, delivered at a wholesale level in order to be reflected in all retail terms.
- Copper services must be properly maintained until actual migration occurs.

### **BEREC response**

BEREC welcomes that Ecta agrees that the SMPO's reference offer imposed in a market analysis is where the alternative wholesale access products should materialize. Regarding Ecta's proposal to develop the basic requirements and nature of the non-discrimination obligation in the context of migration in a format similar to that of the best practices for WLA, WBA, and WLL, BEREC wants to refer to its response to the topic “best practices” in section 2 above.

Concerning Sky Ireland's view that KPIs, in particular for fibre orders and installation, are a vital component of the copper switch-off, BEREC wants to clarify that the draft Report (section 5.10) explicitly informs that the NRAs typically impose on the SMPO also the obligation to offer the (fibre-based) alternative wholesale access products with KPIs.

Regarding Ecta's view that the copper switch-off tests in France and Italy were useful and could be identified as best practice, BEREC wants to clarify that, according to the draft Report (section 3.8), in these two countries the NRA did allow the SMPO a copper switch-off to some extent for test purposes. Therefore, these tests depend on whether the SMPO asks the NRA to permit copper switch-off tests. BEREC also wants to refer to its response to the topic "best practices" in section 2 above.

With respect to Open Fiber's view that associations of end-customers should play a significant role in the involvement of stakeholders, BEREC wants to clarify that, according to the draft Report (section 3.2), nearly all NRAs which set rules for the migration process and copper switch-off involved stakeholders by means of a public consultation which is open for all stakeholders, including associations of end-customers. Concerning Open Fiber's view that there are other significant impacts on end-customers besides the change of CPE, BEREC wants to point out that Open Fiber did not provide any further information (e.g. examples) on this.

BEREC notes Vodafone Group's view on the "fault to fibre" process Openreach has been implementing in UK and that Vodafone Group did not make any proposal in this regard for the Report.

## 12 Follow-up activities

### Stakeholder responses

#### **Key Ecta points to ensure non-discrimination and promote competition during the transition to end-to-end fibre**

Ecta considers that BEREC could and should do much more to ensure that migration and eventual copper switch off are a success, safeguarding a pro-competitive and non-discriminatory transition. Elements that need to be urgently and explicitly addressed in BEREC's future output, preferably in the form of Guidelines or a Common Position, or updates to the Best Practices on WLA/WBA/WLL and Best Practices on Reference Offers, include the following:

- Definition of the architecture and especially the wholesale access/hand-over points of the VHCN network of the SMPO, jointly with wholesale access takers migrating to it;
- Active involvement of wholesale access takers in the definition of the transition/migration arrangements of the SMPO and related timetables;
- Definition, monitoring and enforcement of Key Performance Indicators (KPIs) and Service Level Guarantees (SLGs);
- Imposition of a strict non-discrimination obligation on the SMPO and active supervision thereof by the NRA;
- Guidance to the effect that NRAs seek signed commitments from SMPOs that ALL copper lines will be adequately addressed in the transition/migration, notably to ensure

that the SMPO cannot continue self-supplying resources whilst denying continued access to them to third parties;

- Reference Offers, subject to explicit approval and modification powers by NRAs, covering all elements of the transition/migration arrangements of the SMPO; and
- Stability of wholesale charges for copper-based network access.

### **Follow-up activities**

Ecta believes that BEREC would make very useful contributions to the sector and to improving regulatory practice by:

- Publishing a consultation report, summarizing the responses and comments received to this draft BEREC Report;
- Publishing annual updates of the Report on a consistent approach to migration and copper switch-off, and to open these systematically to public consultation;
- Organizing at least one workshop with stakeholders per year, to ensure a close monitoring progress, aimed at detecting problematic issues that are likely to arise and to consider how to correct such issues;
- BEREC should recommend and ensure, as a best practice, that all NRAs monitor copper shut-down and related issues, and BEREC's future Reports should emphasize the results of such NRA monitoring.

### **A public workshop on copper switch-off and migration should be organised**

VATM would like to point out that there is an overall need of a follow-up event at least once a year, which also includes representatives of the telecommunications sector. In our view, the complete omission of private sector VHCN deployments is a result of this restricted dialogue and information gathering. It is paramount to lead an effective dialogue, which includes all relevant stakeholders and gives the opportunity for exchange of views and experiences.

### **BEREC response**

BEREC wants to reiterate (see section 2 above) that, according to the BEREC Work Programme 2022, the type of deliverable of the project is a "Report", not "Guidelines", a "Common Position" or "Best practices". BEREC may decide to include a follow-up project in the BEREC 2023 Work Programme, e.g. public workshops, however, this will be decided in the process of the preparation of this BEREC Work Programme, which will also include stakeholder involvement. BEREC also wants to emphasise that the NRAs (and also the Commission) have to take the utmost account of any guideline, common position, recommendation and best practices adopted by BEREC, according to Article 4(4) of the BEREC Regulation.<sup>5</sup> Therefore, careful consideration needs to be given to whether measures that have proven useful in one or a few countries should be considered as a guideline, common position, recommendation or best practices. BEREC also wants to point out, that the rules set by the NRA in the future also have to take into account the relevant provisions of the

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<sup>5</sup> Regulation (EU) 2018/1971 of the European Parliament and of the Council of 11 December 2018 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Agency for Support for BEREC (BEREC Office), amending Regulation (EU) 2015/2120 and repealing Regulation (EC) No 1211/2009



Commission's revised Access Recommendation(s) currently being prepared by the European Commission.

Regarding Ecta's proposal that BEREC should publish a consultation report, summarizing the responses and comments received to the draft Report, BEREC wants to clarify that this report is this consultation report.

## 13 Abbreviations

ANO	Alternative Network Operator
B2B	Business to Business
B2C	Business to Customer
CPE	Customer Premises Equipment
EECC	European Electronic Communications Code
FTTB	Fibre To The Building
FTTC	Fibre To The Cabinet
FTTH	Fibre To The Home
FTTO	Fibre To The Office
FWA	Fixed Wireless Access
KPI	Key Performance Indicator
LLU	Local Loop Unbundling
MDF	Main Distribution Frame
NGA	Next Generation Access
NRA	National Regulatory Authority
SDH	Synchronous Digital Hierarchy
SLG	Service Level Guarantee
SMP	Significant Market Power
SMPO	SMP Operator
ULL	Unbundled Local Loop
VDSL	Very High-Speed Digital Subscriber Line
VDSL CO	Very High-Speed Digital Subscriber Line Central Office
VHCN	Very High Capacity Network

VULA	Virtual Unbundled Local Access
WBA	Wholesale Broadband Access
WLA	Wholesale Local Access
WLL	Wholesale Leased Lines