
Economic Replicability Testing for NGA Services

A consistent and proportionate approach to promote
efficient investment and safeguard competition

Prepared for

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EXECUTIVE SUMMARY

Introduction

1. ETNO has commissioned CRA to prepare this report on economic replicability testing in the context of the Commission's *Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment* (the 2013 Recommendation)¹ and the BEREC guidance on accounting approaches to economic replicability testing.² The purpose of this report is to analyse these two documents and recommend a consistent and proportionate approach regarding the parameters and procedures of economic replicability tests in the context of next generation access (NGA) services.
2. The concept of an "economic replicability test" (ERT) was first introduced by the 2013 Recommendation and is specifically intended to apply to NGA services. The Commission has clarified that the ERT concept is distinct not only from margin squeeze tests under competition law, but also from margin squeeze tests applied to current generation access (CGA) services by national regulatory authorities (NRAs) under sector regulation powers.
3. Where economic replicability testing of NGA services does take place, it will only be in circumstances where there already exists a "demonstrable retail price constraint" either from CGA-based competitors or alternative infrastructures (or both). Given that the circumstances in which economic replicability testing will occur are narrowed in this way, it is reasonable to expect a fair degree of harmony across countries in the procedures and parameters used in economic replicability testing. A largely consistent approach to economic replicability testing is also desirable from the perspective of the internal market and in the interests of predictable regulatory conditions for access providers and access seekers operating throughout Europe.
4. The consistent and proportionate approach that we recommend is guided by the aim of the 2013 Recommendation, which we interpret to be the promotion of efficient investment in NGA infrastructure while simultaneously safeguarding the degree of competition that already exists (including that based on CGA and alternative infrastructures such as cable). We offer our recommendations for a consistent and proportionate approach to economic replicability testing under the 2013 Recommendation in the hope that they will contribute to the achievement of the Commission's Digital Agenda for Europe (DAE) investment goals while safeguarding the competition and investment that has been fostered over many years under the Commission's regulatory framework for electronic communications.

Background

5. The Commission sees the widespread adoption of broadband and faster broadband speeds as a crucial factor to realise economic growth and have an impact on job creation.

¹ European Commission, *Recommendation of 11 September 2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment*, C(2013) 5761 (2013 Recommendation).

² Body of European Regulators for Electronic Communications (BEREC), *Guidance on the regulatory accounting approach to the economic replicability test (i.e. ex-ante/sector specific margin squeeze tests)*, BoR (14) 190, 5 December 2014.

The Commission's DAE has set three goals in relation to broadband coverage and take-up: the entire EU to be covered by broadband by 2013; the entire EU to be covered by broadband above 30Mbps by 2020; and 50% of EU households to subscribe to broadband above 100Mbps by 2020.

6. As the first of the DAE broadband goals has been largely achieved, the focus is now on the deployment and take-up of faster broadband technologies. In many European countries there exists substantial competition in the supply of broadband between traditional telephone network infrastructure (CGA and NGA) and alternative infrastructures (in particular, cable). However, the latest data suggests that, nearing the half-way mark, there is still some way to go for each of the DAE's remaining broadband targets.
7. Since cable networks have already largely upgraded to NGA technology and traditional telephone networks tend to have wider coverage than cable networks (although not in all countries), achieving the remaining DAE targets will likely require substantial further investment to partially or wholly replace the copper in traditional telephone networks with fibre.

The 2013 Recommendation and economic replicability testing

8. We interpret the aim of the 2013 Recommendation to be the *promotion of efficient investment in NGA infrastructure* by affording NGA investors pricing flexibility while simultaneously *safeguarding the degree of competition that already exists* (including competition based on price regulated CGA networks and alternative infrastructures such as cable).
9. Specifically, the 2013 Recommendation allows NRAs to refrain from imposing a cost-orientation obligation on NGA wholesale access prices when there exist the safeguards of (a) a "demonstrable retail price constraint" and (b) non-discrimination obligations of equivalence of inputs (EOI), technical replicability and "economic replicability". Economic replicability means that "the margin between the retail price of the relevant retail products and the price of the relevant NGA-based regulated wholesale access inputs covers the incremental downstream costs and a reasonable percentage of downstream common costs".³
10. It follows that the context in which economic replicability testing arises under the 2013 Recommendation is one in which there is already a "demonstrable retail price constraint" based upon either cost-oriented CGA wholesale access or alternative infrastructures (such as cable). This is significant. The existence of a demonstrable retail price constraint implies that there are *already effective established retail competitors* (either copper based or based on alternative infrastructure that is not in the control of the access provider) at the time that the imposition of economic replicability testing is considered. As we explain below, this is a key consideration that should influence choices of the parameters and procedures of economic replicability tests.
11. The concept of economic replicability is familiar from margin squeeze contexts. Margin squeeze testing examines whether the difference between a vertically integrated firm's retail and wholesale prices covers efficient downstream costs. However, economic replicability testing is a unique creation of the 2013 Recommendation and applies specifically in the context of the regulation of NGA services. As the Commission states, it

³ 2013 Recommendation, Annex II.

applies in “different circumstances than ex ante margin squeeze tests applied on regulated wholesale access prices” (such as in the context of CGA inputs) and is “entirely without prejudice to application of the competition rules”.⁴ The Commission further clarifies that NRAs may apply an ex ante margin squeeze test (note the different terminology) to copper-based access products *in addition to* (and therefore quite separate from) an economic replicability test for NGA services.

12. The 2013 Recommendation provides that to impose an economic replicability obligation in the context of NGA regulation, an NRA should set out details of the parameters of the economic replicability test (ERT) that the NRA will apply. The Commission sets out guidance on the details of a number of ERT parameters in Annex II of the 2013 Recommendation.
 - a. **Relevant downstream costs.** The costs of the SMP operator’s own downstream businesses (i.e. an equally efficient operator (EEO) approach) with adjustments for scale where “market entry or expansion has been frustrated in the past” or where “objective conditions do not favour the acquisition of scale by alternative operators”.
 - b. **Relevant downstream cost standard.** LRIC+ including sunk costs and a mark-up for common costs related to the downstream activities.
 - c. **Relevant wholesale inputs.** The “most relevant regulated inputs used or expected to be used by access seekers” within the time frame of the review period in view of the SMP operator’s rollout plans, chosen network topologies and take-up of wholesale offers, which may be an active, passive or virtual input, and which may vary by geographic area.
 - d. **Relevant wholesale prices.** The access price that the SMP operator charges third-party access-seekers, giving “due weight to the presence of volume discounts and/or long-term access pricing agreements between the SMP operator and access seekers”.
 - e. **Relevant retail products.** The “most relevant retail products including broadband services (‘flagship products’) offered by the SMP operator on the basis of” NGA wholesale inputs where “flagship products” are identified taking into account relevance for current and future competition and including an assessment of retail market shares of the products and advertising expenditure on the products. A niche or lower quality retail product may be included in the “flagship products” if it is particularly relevant to competition with access seekers that focus on such products.
 - f. **Modelling approach and time period.** A dynamic multi-period analysis such as a discounted cash flow (DCF) approach over an average customer lifetime (ACL) with “downstream costs that are annualised according to a depreciation method that is appropriate to the asset in question and the economic lifetime of the corresponding assets required for the retail operations (including network costs that are not included in the wholesale NGA access service)”.⁵

⁴ 2013 Recommendation, Annex II.

⁵ The Commission adds that “[w]hen estimating the average customer lifetime, NRAs should take due account of the different characteristics and competitive conditions of the provision of services over NGA networks compared to the legacy copper network, where these are likely to result in users of NGA networks having different average customer lifetimes compared to users of the copper network”.

13. Annex II of the 2013 Recommendation also provides that when determining the parameters of the ERT “NRAs should ensure that the SMP operator is not put at a disadvantage vis-à-vis access seekers regarding the sharing of the investment risk”.⁶

The BEREC guidance

14. The BEREC guidance sets out to interpret the 2013 Recommendation’s guidance on the parameters of the ERT in the context of the “current practice of ex-ante margin squeeze tests as applied by NRAs”.⁷
15. Reliance on the current practice of NRAs (much of which has been developed in the context of ex-ante margin squeeze regulation of CGA services) may have a tendency to downplay the aim of the 2013 Recommendation of promoting efficient NGA investment while safeguarding competition. As mentioned, the ERT is a creation of the 2013 recommendation and is specifically intended to apply to the regulation of *margins between NGA wholesale and retail services*. It should therefore be distinguished from current (and future) NRA practice regarding margin squeeze testing in relation to the regulation of CGA services.
16. The BEREC guidance perhaps also underplays the important fact that under the 2013 Recommendation a pre-condition for the lifting of wholesale price regulation of NGA inputs and for an ERT to be applied is that there exists already a “demonstrable retail price constraint”. The fact that an ERT will only apply when there is a “demonstrable retail price constraint” is a fundamental reason why the ERT for NGA services should be implemented differently from ex-ante margin squeeze tests that apply to CGA services. Underplaying this context may lead to recommendations on parameters and procedures for economic replicability testing that are too strict to be consistent with the aim of the 2013 Recommendation.

Parameters for economic replicability testing

17. The following recommendations on consistent and proportionate parameters to be used in economic replicability testing seek at all times to reflect the aim of the 2013 Recommendation, in the context of demonstrable retail price constraints from CGA-based products and from alternative infrastructure operators.

Relevant downstream costs

18. On the question of the relevant downstream costs, we recommend the use of an equally efficient operator (EEO) approach with no adjustments. The context of demonstrable retail price constraints implies risks for NGA investment incentives if the access provider is not allowed to compete on its downstream merits. The demonstrable retail price constraint will come either from established CGA-based competitors that are likely to already have substantial scale, or from alternative infrastructure operators that will also likely enjoy substantial scale. Requiring the access provider to hold an umbrella over the heads of inefficient access seekers when they will still face competition from efficient competitors seems likely only to dampen competition (either intra-infrastructure or inter-infrastructure competition) and reduce incentives for NGA investment.

⁶ 2013 Recommendation, Annex II.

⁷ BEREC guidance, page 5.

19. As mentioned, the guidance in the 2013 Recommendation allows that adjustments for scale may be made where “market entry or expansion has been frustrated in the past” or where “objective conditions do not favour the acquisition of scale by alternative operators”. Both conditions appear to assume a need to *promote* competition, which is inconsistent with (a) the 2013 Recommendation’s aim of promoting efficient NGA investment incentives while *safeguarding* competition and (b) the context of demonstrable retail price constraints.

Relevant downstream cost standard and level of aggregation

20. Regarding the relevant downstream cost standard and the level of aggregation at which testing should occur, we make the following recommendations.
- a. To be consistent with the aim of the 2013 Recommendation, the emphasis in economic replicability testing should be on preserving the viability of existing competitors rather than promoting new entrants. This suggests that NRAs should prefer avoidable costs over incremental costs for economic replicability testing of NGA services.
 - b. The level of aggregation should reflect the arena of competition over which important entry and exit decisions are made. For example, if competition will largely occur in relation to dual-play and triple-play bundles, then the relevant level of aggregation would be across the portfolio of dual-play and triple-play products. This could be reconciled with the Commission’s recommendation for testing “flagship” products, as in this case dual-play and triple-play products would be the “flagship” products even though the access provider may also supply, for example, single-play and quadruple-play products. Testing individual products in the sense of individual tariff plans (such as a dual-play tariff for a particular broadband speed or download limit among many speed/download limit options) is likely to be excessive and unnecessary and would not allow for legitimate loss-leading pricing strategies (e.g. pricing an entry level product low to encourage tentative consumers to experience NGA with a strategy of migrating them in a short time to a more profitable NGA product). Testing individual business contracts would likewise be excessive and distort the playing field unduly.
 - c. Cost standards used in economic replicability testing should exclude allocations of shared costs. Avoidable cost or incremental cost standards without allocations of shared costs should be sufficient to *safeguard* existing levels of competition and at the same time provide *maximum pricing flexibility* to access providers. The latter is particularly important given the aim of the 2013 Recommendation to promote incentives for efficient NGA investments. Putting this in the context of the Commission’s recommendation to include a “reasonable percentage” of common costs, the “reasonable percentage” to include should be zero. This is a particularly important principle to observe if testing occurs at the individual product level.
 - d. If, contrary to the previous recommendation, a cost standard that includes shared costs (e.g. LRIC+ or FAC) is used at any level of aggregation, the results should be treated with great caution (i.e. little weight should be placed on a finding of a negative margin without further investigation).
 - e. If there are concerns as to whether shared costs are recovered somewhere, a combinatorial approach may be applied in which higher levels of aggregation are tested (again using avoidable cost or incremental cost, where the increment is the higher level of aggregation).

Bundles

21. In the NGA context, the arena of competition is likely to be for portfolios of *bundles* of NGA broadband and other services such as mobile services and TV services (as well as other services such as cloud services, email accounts, etc.). As long as the access provider's bundles are technically replicable by access seekers (i.e. as long as access seekers can source all the inputs needed to provide the components of the bundles)⁸ there is no need to test the NGA broadband component service on its own. Indeed, there is no economically non-arbitrary way to allocate bundle discounts among the various bundle components in order to do so – any such test is prone to produce unreliable results.
22. In principle, when testing bundles that are technically replicable by competitors, all of the incremental revenues and costs of the bundles should be included in the test.
 - a. Other than the regulated NGA inputs (or other inputs that are indispensable and only available from the access provider – see below) the costs of inputs required to provide the bundles should be treated like other downstream costs and included on the basis of the access provider's avoidable or incremental costs of those inputs.
 - b. If to provide the bundle requires the use of other inputs that are indispensable and that an access seeker must acquire from the access provider (e.g. call termination on the access provider's fixed and/or mobile networks) the prices charged by the access provider for those inputs should be the costs imputed in the test with respect to those inputs.

Relevant upstream inputs

23. A further issue is which upstream input(s) to use in the test. In the NGA context, NGA bitstream, virtual unbundled access (VUA), sub-loop unbundling (SLU) and duct access may be alternatives. We generally agree with the Commission's guidance in its 2013 Recommendation on this issue, but emphasise that the assessment of the "most relevant regulated inputs" should reflect an efficient mix of NGA wholesale inputs that it is realistic for access seekers to use during the market review period. This might be guided by the mix of inputs expected to be used by the most efficient access seeker.
24. Ensuring that downstream competition is possible on the basis of *any* upstream input would be unnecessary and disproportionate, send poor signals to access seekers and compromise the ability of the access provider to compete downstream (with consequential impacts on its incentives to invest in NGA in the first place). The use of an efficient mix of NGA wholesale inputs is therefore preferable to send signals to access seekers to make their own investments, preserve a level playing field for the access provider with respect to efficient access seekers and minimise distortions to the access provider's ability to compete with operators using alternative infrastructure.

Modelling approach and time frame for a DCF analysis

25. Regarding the modelling approach, in principle either a discounted cash flow (DCF) approach or a period-by-period approach (or both) could be used for economic replicability testing. The key to using a period-by-period approach, however, is to ensure that sensible

⁸ Situations where access seekers cannot technically replicate a bundle offered by an access provider (for example, because the access provider has exclusive access to a scarce bundle input that is not regulated) raise complex issues that are not covered in this report.

allocations of fixed costs are made to the various periods and not to place undue weight on margins in any particular period or group of periods shorter than the life of the relevant investments unless there is high confidence in the period-by-period allocations. Where a DCF approach is used we make the following recommendations regarding the time frame for the assessment.

- a. The appropriate time frame for a DCF assessment should reflect the length of time over which relevant investments are expected to be recovered. This will depend on the facts of the case at hand and the level of aggregation that is being tested.
- b. When testing at the individual product level it is normally sensible to do so over the average customer life (ACL), however see our comments below on introductory pricing. The ACL for testing NGA products should be an ACL that is anticipated or demonstrated *for NGA customers*. It is widely anticipated throughout the industry that NGA products will exhibit lower churn and higher ACLs than CGA products.
- c. When testing at the NGA portfolio level, there may be assets and investments that are incremental at that level that have longer lives than the ACL (including where a fixed upfront charge is included as part of the terms for access to the NGA input and the business case on which this is based anticipates recovery of that fixed charge over a longer period than the ACL). The access provider should not be required to recover the entirety of such investments over the ACL if the investments will serve the retail business and generate revenues for a longer period. One option would be to perform the DCF analysis over a longer period than the ACL, reflecting the longer life of those investments. An alternative would be to perform a DCF assessment over the ACL, but either include a terminal value for the longer lived assets or amortise the cost of the longer lived investments on an annual basis and allocate only a portion of the investment costs to the years included in the DCF analysis.⁹

Introductory retail pricing to generate benefits beyond the lifetime of early adopters

26. Introductory retail pricing may be an important issue in the context of economic replicability testing of NGA services. Retailers may wish to set retail prices low to early adopters of NGA services in order to generate retail-specific bandwagon or network effects or in order to benefit from “learning by doing” cost reductions. These can be legitimate motivations for prices that may fail an ERT if the ERT is tested simplistically using a DCF analysis over an ACL.
27. The problem is not with the introductory retail price strategy, but with the limitations of a simplistic DCF analysis over an ACL. Such an analysis ignores the future benefits to retailers of low introductory prices for early adopters. Where the benefits are retail-level benefits (rather than benefits for the access provider’s upstream network), they are, in principle, achievable not only by the access provider’s retail operation, but also by access seekers. If such future benefits are ignored in economic replicability testing, and recovery of the costs is required over the ACL, there is likely to be a negative impact on the access provider’s incentives to invest in NGA in the first place. The 2013 Recommendation acknowledges the importance for promoting NGA investment that NGA access providers

⁹ We recognise that including allocated amortised costs in place of investment cash flows would be a departure from a pure DCF analysis.

be allowed the flexibility to “conduct appropriate penetration pricing”.¹⁰ In this situation it may be justified to reflect the additional future benefits that the retail operation could legitimately expect from the low introductory pricing strategy.

Prospective and retrospective analysis

28. There is also a question whether economic replicability testing should be conducted on a prospective or retrospective basis, or both. A prospective test is conducted on the basis of the information available at the time the pricing is or was implemented in the market. A retrospective test occurs on the basis of information that becomes available after this point in time. Retrospective testing is therefore conducted on the basis of actual out-turns, whereas a prospective test relies on forecasts of the future.
29. Prospective testing should be preferred to retrospective testing when there is significant uncertainty about the future and forecasting plays a major role in wholesale or retail pricing decisions. In such a case, an access provider should not be found to have breached an ex ante SMP obligation to pass an ERT just because demand forecasts that were reasonable to make at the time turned out to be incorrect. For this reason also, prospective testing should be preferred to retrospective testing if an ERT is applied to wholesale agreements involving commitments of fixed upfront charges by the access seeker, as discussed below.

Risk sharing arrangements

30. In some countries, efficient NGA investments may not occur unless the risk of those investments is shared among a number of players, either in the form of agreements that include some form of commitment by access seekers (e.g. minimum volume commitments or fixed access charges) or arrangements in which a number of players invest jointly in fibre deployments. In these contexts, providing incentives for efficient NGA investments may boil down to providing incentives to offer commitment agreements or to enter into joint ventures.
31. When performing economic replicability testing in the context of risk sharing agreements the challenge for NRAs is to ensure that competition is safeguarded while maintaining a *level playing field* between the access provider and risk sharing access seekers. If the parameters of the ERT are such that the access provider is placed at a disadvantage downstream with respect to those access seekers that enter into risk sharing agreements, the access provider’s incentives to invest in NGA will be diminished. As mentioned, the Commission recommends that when determining the parameters of the ERT “NRAs should ensure that the SMP operator is not put at a disadvantage vis-à-vis access seekers regarding the sharing of the investment risk”.¹¹
32. Where the access provider offers a *schedule of discounts* on access charges dependent on volume, there is the question of which level of discount to model in the test. We recommend modelling the ERT on the basis of the discount level that is achievable by the largest access seeker. This would ensure that the access provider is placed on a level playing field with the largest access seekers and is not dis-incentivised from making NGA investments. Regarding the safeguarding of competition, it may be that the discount level achievable by the largest access seeker is in fact achievable by several access seekers,

¹⁰ 2013 Recommendation, recital 49.

¹¹ 2013 Recommendation, Annex II, page 27.

or is only achievable by one or two access seekers, but these are sufficient to safeguard competition, particularly if there is also competition from alternative infrastructure. If that is not the case, the slope of the discount schedule below the level achievable by the largest access seeker should not be so steep as to reduce competition, taking into account that NGA services are supplied in a differentiated product market and a steep discount schedule may incentivise large CGA access seekers to make the investments necessary to expand and become larger in the supply of NGA services.

33. Where there are *commitment arrangements* to share risk (e.g. fixed upfront charges or long-term contracts with volume commitments) we make the following recommendations.
- a. We expect that in a regulated environment the NRA would normally review any such arrangement in advance to ensure that it will allow for effective competition downstream. The NRA should review the arrangement in a swift manner to ensure that competition with alternative platforms is not distorted and that the process does not generate undue regulatory burdens. This assumes that the uncertainty can be safely and sensibly modelled by the NRA. If the nature of the uncertainty is such that the NRA considers that it cannot be sensibly or safely reduced to an ERT calculation, then other mechanisms for assessing the arrangement (not evaluated in this report) should be considered.
 - b. Ideally any ERT of commitment arrangements should be conducted using a time period that reflects the length of the commitments being made by the access seekers (rather than the average customer life) and at an aggregated level across all products that the access provider intends to supply over the NGA infrastructure (as the commitments being made are at the NGA portfolio level rather than at the individual product or customer level). NRAs should not insist on the commitment being set at a level that all possible access seekers could expect to recover.
 - c. If an ERT is to include the fixed as well as the variable components of commitment arrangements, it will only make sense to test margins on a *prospective* basis, using reasonable assumptions in terms of forecasts of demand and other future variables. If *retrospective* testing is conducted on the basis of actual out-turns, then the ERT should test only the *variable* charge components.
 - d. There is no need for an NRA to apply an ERT to higher “no-commitment” wholesale charges if the NRA considers that the commitment level in the risk sharing arrangement is such that, together with alternative infrastructure operators, a sufficient number of access seekers will be viable to provide effective competition. Further competition from “no-commitment” access seekers would be of marginal value in that context, particularly when set against the aim of incentivising the investment in the first place and in the context of demonstrable retail price constraints from other technologies.
 - e. If an ERT were nonetheless applied to higher “no-commitment” wholesale charges, then it would be *critical* that the ERT reflect the *option value* for such access seekers of not making a commitment. Ignoring this option value would create an uneven playing field: it may force the access provider to price higher than access seekers that make the commitment and benefit from lower wholesale charges, and may jeopardise the NGA investment in the first place. In short, disregarding the option value for “no-commitment” access seekers in an ERT of no-commitment wholesale charges would fail to reflect the Commission recommendation that “NRAs should

ensure that the SMP operator is not put at a disadvantage vis-à-vis access seekers regarding the sharing of the investment risk”.

34. Where there is a proposal for a joint venture arrangement, each joint venture partner will become a co-owner of the NGA network and have a claim on the returns of that network. Co-ownership of the network gives each joint venture party access to the network. That access will be on terms included in the joint venture agreement freely entered into by each party. It is therefore unlikely that a joint venture arrangement could be construed as a vehicle to exclude any of the co-owners. Therefore the terms of joint venture arrangements do not require economic replicability testing.

Summary of our recommendations on parameters for economic replicability testing

35. The following table summarises our recommendations on parameters for economic replicability testing under the 2013 Recommendation.

Parameter	CRA Recommendation
Relevant downstream costs	EEO with no adjustments
Relevant downstream cost standard	Avoidable cost (but if incremental cost is used, then use LRIC <i>excluding</i> shared costs and, if necessary, a combinatorial approach to confirm shared cost recovery)
Relevant wholesale inputs	The “most relevant regulated inputs” should reflect an <i>efficient</i> mix of NGA inputs that it is realistic for access seekers to use during the market review period
Relevant wholesale prices	Where there are volume discounts, model the discount achievable by the largest access seeker Where there are commitment arrangements: if an ERT is to be conducted it should be at an aggregated level and use a time period that reflects the length of the commitments; if fixed wholesale charges are modelled an ERT should only be conducted on a prospective basis; and there is no need to apply an ERT to “no-commitment” wholesale charges if the commitment arrangements allow for effective competition
Relevant retail products	Test the “arena of competition” over which important entry and exit decisions are made – this may be consistent with the concept of “flagship products”, but the testing of individual products or contracts is likely to be excessive and unnecessary and preclude legitimate pricing strategies

Parameter	CRA Recommendation
	When testing bundles that are technically replicable by competitors, all of the incremental revenues and costs should be included in the test
Modelling approach and time period	Either DCF or period-by-period may be used, but: period-by-period requires sensible allocations of fixed costs across periods; the timeframe for DCF analysis should depend on the relevant investments at the level of aggregation of the test; and terminal values or other adjustments may be required to reflect benefits not reflected within the time frame used (including bandwagon or network or learning by doing effects)

Procedures for economic replicability testing

36. A variety of procedures is currently in place for the testing of margins (and the setting of minimum margins) between wholesale and retail prices across Europe. We consider the merits of these alternative procedures in light of the aim of the 2013 Recommendation and the context of economic replicability testing. We have classified the procedures into the following four broad categories, which encompass both relatively “light handed” procedures and more “heavy handed” interventionist procedures.
- A. An ex ante obligation to pass the ERT with ex post testing in the event of a complaint or an investigation initiated by the NRA.
 - B. An ex ante obligation to pass the ERT with ex post testing at regular intervals.
 - C. Ex ante economic replicability testing prior to product or tariff/promotion launches (pre-launch testing).
 - D. Ex ante determination of minimum margins.
37. The procedure chosen for economic replicability testing should be *proportionate*, in the sense of having the least impact on NGA investment incentives and placing the least burdens on the NRA and the access provider while achieving the aim of safeguarding competition. This should be assessed in the context of the demonstrable retail price constraints that must already constrain NGA services if economic replicability testing is to occur.
38. We consider that Option D is unlikely to represent a suitable procedure for implementation of the ERT except in limited circumstances. Options A and B should also be preferred over Option C for economic replicability testing for four reasons. First, pre-launch testing would have significant adverse impacts on pricing flexibility for the access provider and, consequently, incentives for investment in NGA. Second, the risk of regulatory failure is higher under Option C compared to Options A and B. Third, pre-launch testing that involves testing every new product/tariff/promotion has the potential to impose a high regulatory burden on the NRA and the access provider and is likely to be uninformative about competitive effects. Finally, pre-launch testing to safeguard competition may not be proportionate to the risks to competition and consumers in the context of demonstrable retail price constraints.

39. The choice between Options A and B should also be informed by the context in which economic replicability testing will occur. NGA services are fast-moving and dynamic and the high likelihood of significant changes in demand, prices, products and costs over the course of a market review period suggests that the risk of regulatory failure (and of adverse impacts on commercial flexibility for the access provider) is high unless there is a procedure that can adequately account for such changes. This points to a preference for Option A over any heavy handed form of Option B that involves detailed testing against rigid guidance.
40. Ex post testing only when there is a complaint (or an issue identified independently by the NRA) is furthermore likely to be sufficient to safeguard competition in circumstances where competitors are already well-established and likely to complain quickly if they believe that the margins implied by the access provider's offerings are inadequate. In this context Option B may impose an unnecessary burden on the NRA and the access provider as it involves testing not only in situations that might be problematic, but also in situations where margins are not controversial.
41. Option B may, however, be a reasonable option if the procedure is constructed in a way that minimises the risks of regulatory failure and the regulatory burdens on the NRA and the access provider: for example, a procedure in which the NRA conducts a relatively brief high level review on a regular basis and only if that high level review uncovers grounds for concern will the NRA conduct a full investigation to determine if there is likely to be any harm to competition and consumers.

1. INTRODUCTION

42. ETNO has commissioned CRA to prepare this report on economic replicability testing in the context of the Commission's *Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment* (the 2013 Recommendation)¹² and the BEREC guidance on accounting approaches to economic replicability testing.¹³ The purpose of this report is to analyse these two documents and recommend a consistent and proportionate approach regarding the parameters and procedures of economic replicability tests in the context of next generation access (NGA) services.
43. The concept of an "economic replicability test" (ERT) was first introduced by the 2013 Recommendation and is specifically intended to apply to NGA services. The Commission has clarified that the ERT concept is distinct not only from margin squeeze tests under competition law, but also from margin squeeze tests applied to current generation access (CGA) services by national regulatory authorities (NRAs) under sector regulation powers.¹⁴
44. The consistent and proportionate approach that we recommend is guided by the aim of the 2013 Recommendation, which we interpret to be the promotion of efficient investment in NGA infrastructure while simultaneously safeguarding the degree of competition that already exists (including that based on CGA and alternative infrastructures such as cable).
45. According to the 2013 Recommendation, where economic replicability testing of NGA services takes place, it will only be in circumstances where there already exists a "demonstrable retail price constraint" either from CGA-based competitors or alternative infrastructures (or both).¹⁵ Given that the circumstances in which economic replicability testing will occur are narrowed in this way, it is reasonable to expect a fair degree of harmony across countries in the procedures and parameters used in economic replicability testing. A largely consistent approach to economic replicability testing is also desirable from the perspective of the internal market and in the interest of predictable regulatory conditions for access providers and access seekers operating throughout the Union.
46. This report is structured as follows.
 - a. In the following section we provide some background on the Digital Agenda for Europe (DAE) and a picture of the NGA landscape in Europe. We observe that the achievement of the DAE's goals requires further investment in NGA, and in particular, the replacement of copper networks, partially or wholly, with fibre.
 - b. In Section 3 we introduce the 2013 Recommendation and economic replicability testing and discuss the aim of the 2013 Recommendation, the context and role of

¹² European Commission, *Recommendation of 11 September 2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment*, C(2013) 5761 (2013 Recommendation).

¹³ Body of European Regulators for Electronic Communications (BEREC), *Guidance on the regulatory accounting approach to the economic replicability test (i.e. ex-ante/sector specific margin squeeze tests)*, BoR (14) 190, 5 December 2014.

¹⁴ See recital 63 and Annex II of the 2013 Recommendation, and for further discussion see Section 3.4 below.

¹⁵ 2013 Recommendation, Point 49. See also the discussion in Section 3.3 below.

- economic replicability testing and the Commission's guidance on the ERT parameters.
- c. In Section 4 we review the guidance on the regulatory accounting approach to economic replicability tests published by the Body of European Regulators for Electronic Communications (BEREC) on 5 December 2014 (the BEREC guidance).
 - d. In Section 5 we discuss the *parameters* to be used in economic replicability testing (for example, which downstream costs, which downstream cost standard, which level of aggregation, etc.) and provide our own recommendations on these in light of the aim of the 2013 Recommendation and in the context of demonstrable retail price constraints. Where relevant, we place our recommendations in context with the guidance provided by the Commission in the 2013 Recommendation and the BEREC guidance.
 - e. In Section 6 we discuss the *procedures* to be used for economic replicability testing, which may range from ex ante determination of margins by the NRA or pre-launch testing of NGA products, to ex post testing on the basis of parameters that have been specified ex ante. Again, we provide our own recommendation on procedures that best fit the aim of the 2013 Recommendation in the context of demonstrable retail price constraints.
 - f. Finally, in Section 7 we set out our conclusions and summarise our recommendations.
47. This report does not consider the question of whether ex ante regulation of NGA (including economic replicability testing) is appropriate or desirable. It is quite possible that in some cases – for example, where there is substantial infrastructure competition – it may be preferable to have no such regulation, and we understand that in some countries (for example, in Portugal) that is the case. However, this question is outside the scope of this report. We therefore proceed on the basis that economic replicability testing of NGA services is to take place in many countries, and ask what *form* it should take in order to promote efficient investment in NGA infrastructure while safeguarding competition.
48. Although we have surveyed and consulted with ETNO members, this is an independent report and does not necessarily represent the views of ETNO or its members. We offer our recommendations for a consistent and proportionate approach to economic replicability testing in the hope that they will contribute to the achievement of the Commission's DAE goals while safeguarding the competition and investment that has been fostered over many years under the Commission's regulatory framework for electronic communications.¹⁶

2. BACKGROUND

2.1. The Digital Agenda for Europe and fibre investment

49. The Digital Agenda for Europe (DAE) is one of seven flagship initiatives to support the objectives of the Commission's "Europe 2020" ten year growth and jobs strategy launched

¹⁶ Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services, OJ L 108, 24 April 2002, page 33.

in 2010.¹⁷ The Commission sees the widespread adoption of broadband and faster broadband speeds as a “crucial factor” to realise economic growth and have an impact on job creation.¹⁸

50. The DAE set three goals in relation to broadband coverage and take-up: the entire EU to be covered by broadband by 2013; the entire EU to be covered by broadband above 30Mbps by 2020; and 50% of EU households to subscribe to broadband above 100Mbps by 2020. As the first of the DAE broadband goals has been largely achieved, the focus is now on the deployment and take-up of faster broadband technologies. In this context the Commission stated that:

*To enjoy sustainable economic and social benefits, it is of utmost importance that advanced broadband networks and applications are available to all European business and consumers. This is the reason why the Digital Agenda for Europe as well as Europe 2020, the European growth strategy for the next decade, committed to achieve ambitious high-speed targets.*¹⁹

51. And:

*New services such as high definition television or videoconferencing need much faster internet access than generally available in Europe. To match world leaders like South Korea and Japan, Europe needs download rates of 30 Mbps for all of its citizens and at least 50% of European households subscribing to internet connections above 100 Mbps by 2020. The Digital Agenda aims to turn this ambition into reality by stimulating investments and proposing a comprehensive radio spectrum plan.*²⁰

52. The latest data suggests that, nearing the half-way mark, there is still some way to go for each of the DAE’s remaining broadband targets: according to the Digital Agenda Scoreboard 2014, only 62% of the EU is covered by broadband above 30Mbps and only 3% of EU households subscribe to broadband above 100Mbps.²¹ We discuss further the progress against the DAE targets in the following sub-section.
53. Since traditional telephone networks tend to have wider coverage than cable networks (although not in all countries), achieving the remaining DAE targets will likely require substantial further investment to partially or wholly replace the copper in those networks

17 European Commission, *Europe 2020: A strategy for smart, sustainable and inclusive growth*, Communication from the Commission, 3 March 2010, COM(2010) 2020.

18 See European Commission, *Chapter 2, Fast and ultra-fast internet access*, accessed at <http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/KKAH12001ENN-chap3-PDFWEB-3.pdf> on 16 December 2014. The Commission has also stated that “[t]omorrow’s digital services – from connected TV to cloud computing and e-Health – increasingly rely on fast, effective broadband connections” and that a “10% increase in broadband penetration brings up the GDP by 1-1.5%”: see <http://ec.europa.eu/digital-agenda/en/high-speed-broadband>, accessed on 16 December 2014.

19 European Commission, *Digital Agenda Scoreboard 2011, Pillar 4: fast and ultra-fast internet access*, page 1.

20 European Commission, *Pillar IV: Fast and ultra-fast Internet access*, accessed on 16 December 2014 at <http://ec.europa.eu/digital-agenda/our-goals/pillar-iv-fast-and-ultra-fast-internet-access>.

21 European Commission, *Digital Agenda Targets*, based on Digital Agenda Scoreboard 2014, accessed on 16 December 2014 at <https://ec.europa.eu/digital-agenda/node/637>.

with fibre.²² As of 2013, next generation access (NGA) coverage (meaning coverage with speeds above 30Mbps) of fibre networks (VDSL and FTTP) was limited to 37% of the EU.²³ A study for ETNO by the Boston Consulting Group (BCG) has predicted that by 2020 there could be a shortfall in investment needed to meet the DAE targets of between €110 billion and €170 million.²⁴

54. In many cases NGA fibre investments will be undertaken unilaterally by traditional telephone network operators, replacing copper with fibre either to the cabinet/node (FTTC/FTTN) or all the way to the home/building (FTTH/FTTB). In these situations the NGA investor assumes all the risk of the investment. In other cases, such investments may not occur unless some form of risk sharing agreement is entered into up front between the access provider and access seekers (e.g. minimum volume commitments, long-term access agreements or joint venture arrangements). The Commission has long acknowledged the desirability of risk sharing arrangements between access providers and access seekers in order to incentivise NGA investment.²⁵ Risk sharing arrangements will tend to be more significant for incentivising FTTH/FTTB deployments than FTTC/FTTN, because the former are associated with greater costs and risks.²⁶

2.2. The NGA landscape in Europe

55. As mentioned, economic replicability testing of NGA services will occur only in situations where there are already demonstrable retail price constraints from CGA-based offers and offers based on alternative infrastructures. In many European countries there exists substantial competition in the supply of broadband between traditional telephone network infrastructure (CGA and NGA) and alternative infrastructures (in particular, cable). The extent of this competition is illustrated in Figure 1 below.

²² Confirming this, the Commission has stated that: "Next Generation Access accounts for 27% of all EU fixed broadband subscriptions. Its sharp increase of the last two years is to a great extent because of the evolution of cable markets. Now that close to 80% of cable subscriptions have already been upgraded to DOCSIS 3.0, the growth can only continue with higher take-up of VDSL and FTTH/B". See European Commission, *Digital Agenda Scoreboard 2014 – Broadband Markets*, Slide 14, accessed on 16 December 2014 at <http://ec.europa.eu/digital-agenda/en/news/scoreboard-2014-trends-european-broadband-markets-2014>.

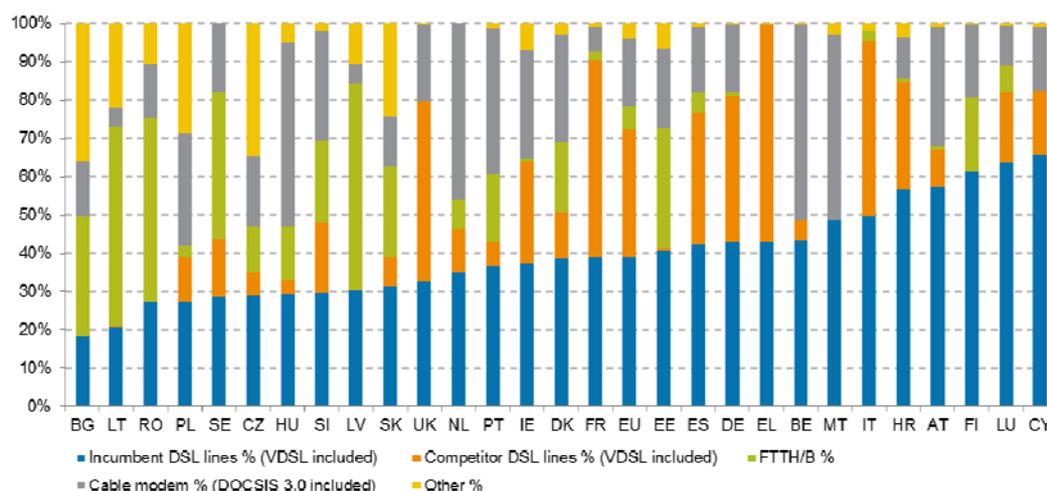
²³ See European Commission, *Digital Agenda Scoreboard 2013*, Commission Staff Working Document, 12 June 2013, SD(2013)217, Annex 2, page 43, where NGA is defined as technologies with speeds >30Mbps and it is reported that VDSL coverage was 24.9% and FTTP coverage was 12.2%.

²⁴ Boston Consulting Group, *Reforming Europe's Telecoms Regulation to Enable the Digital Single Market*, 2013.

²⁵ For example, the value of risk sharing arrangements is mentioned throughout the Commission's 2010 Recommendation on regulated access to next generation access networks: Commission recommendation of 20 September 2010 on regulated access to Next Generation Access Networks, 2010/572/EU, OJ L 251, 25 September 2010, page 35 (2010 Recommendation).

²⁶ As acknowledged by the Commission in its 2010 Recommendation, recital 23 and Annex I.

Figure 1: Broadband subscribers – market shares by technology, January 2014

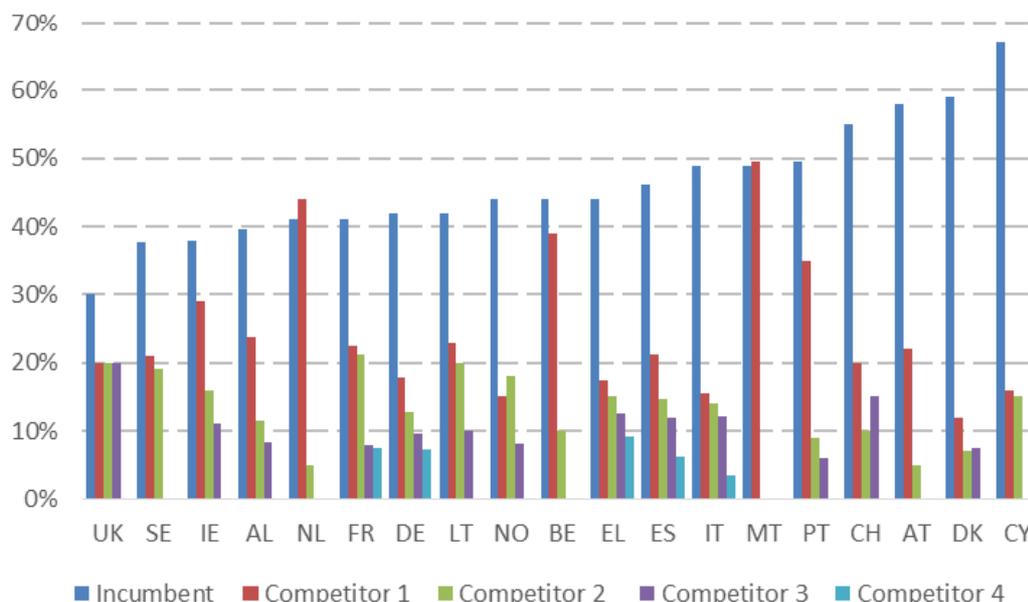


Source: European Commission, Digital Agenda for Europe - Broadband Indicators 2014 and CRA calculations

56. Moreover, in many countries there exist a number of competitors to the NGA access provider with significant scale. Figure 2 below illustrates competitors in each country with at least a 5% share of broadband subscriptions. As can be seen, in many countries there are at least three competitors with at least 10% of subscriptions. Many of these competitors have much larger scale retail operations than this figure suggests, as they have substantial mobile, TV or other retail business that they can take advantage of when offering broadband services.
57. In the UK, for example, BT has roughly a 30% share of broadband subscriptions and faces competition from three players with shares at or above 15%: Virgin Media, TalkTalk Group and Sky.²⁷ Virgin Media operates on its own cable platform, while TalkTalk Group and Sky have broadband business based largely on unbundled local loops, but are gradually moving to BT's virtual unbundled local access (VULA) NGA input. Virgin Media and Sky both come from the TV sector and have major retail operations based on supplying TV and other services for many years. TalkTalk Group is focused on telecommunications and broadband, but has been a large established player with a large share of broadband for many years. In other countries (Malta and The Netherlands) the NGA access provider is not even the largest broadband supplier, being eclipsed by cable rivals, and in Belgium cable is a very close second to Belgacom in terms of broadband subscribers.

²⁷ See Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraph 3.112, which reports the broadband subscriber market shares of Sky, Virgin and TalkTalk Group as 20%, 20% and 15%, respectively. Ofcom notes that each of these competitors “already operate significant retail broadband businesses on which to build” and that Sky and TalkTalk (the two largest access seekers) “also have large, well known multi-product operations with large customer bases”.

Figure 2: Competitors with at least a 5% share of broadband subscriptions, 2014



Source: NRA publications and responses to CRA's survey of ETNO members

58. While broadband competition is generally strong across Europe, NGA investments are in danger of failing to deliver the DAE targets. Figure 3 presents NGA subscriptions as a percentage of total broadband subscriptions across European countries, and illustrates that in most countries NGA subscriptions represent less than half of the total.

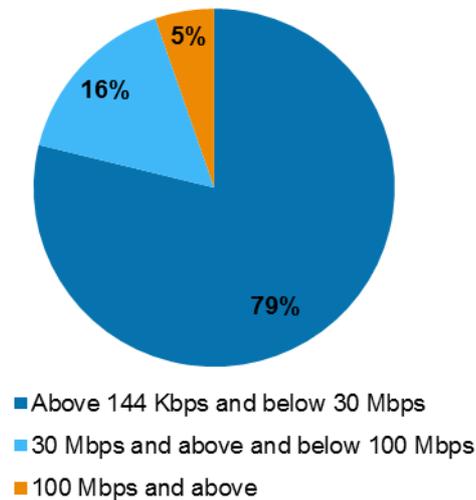
Figure 3: NGA (FTTH, FTTB, VDSL, Cable DOCSIS 3.0 and other NGA) subscriptions as a % of total fixed broadband subscriptions, January 2014



Source: European Commission, Digital Agenda for Europe - Broadband Indicators 2014

59. The danger of missing the DAE target of 50% of EU households subscribing to broadband above 100Mbps is illustrated in Figure 4, which breaks down broadband subscriptions according to the DAE speed classifications.

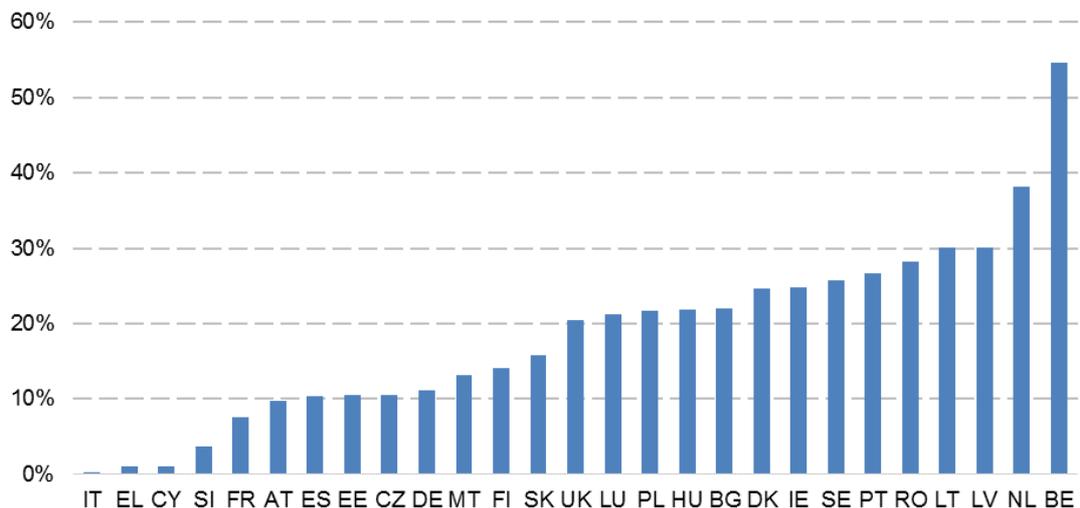
Figure 4: Fixed broadband subscriptions by speed at EU level (Digital Agenda speed classifications), January 2014



Source: European Commission, Digital Agenda for Europe - Broadband Indicators 2014

60. The proportions of households with broadband speeds above 30Mbps are also less than would be envisaged by the DAE, as illustrated in Figure 5.

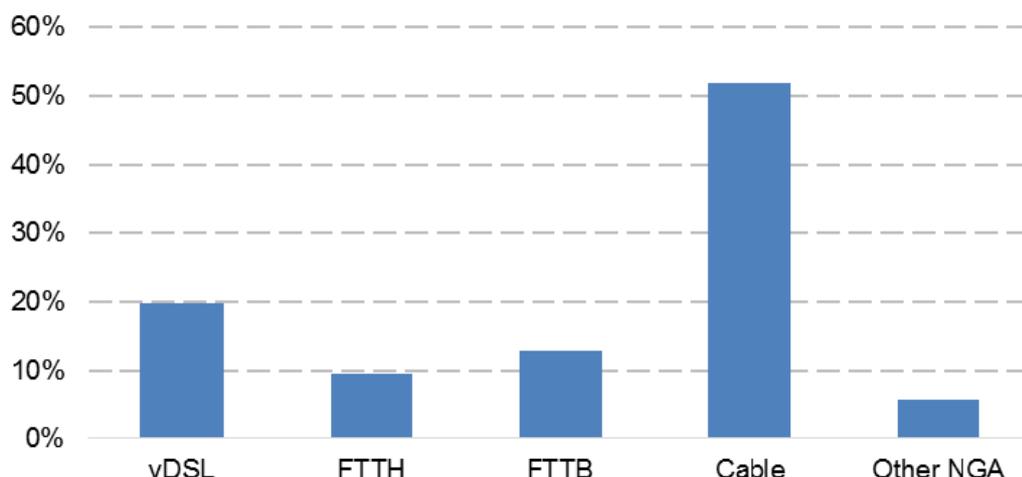
Figure 5: Fixed broadband subscriptions with speed of 30Mbps and above as a % of households, January 2014



Source: European Commission, Digital Agenda for Europe - Broadband indicators 2014, Eurostat data on households and CRA calculations

61. The NGA penetration that exists so far is predominantly the result of cable investments rather than conversions by traditional telephone incumbents from CGA to NGA. This is shown in Figure 6, which illustrates that cable is responsible for more NGA subscriptions than fibre technologies (including VDSL).

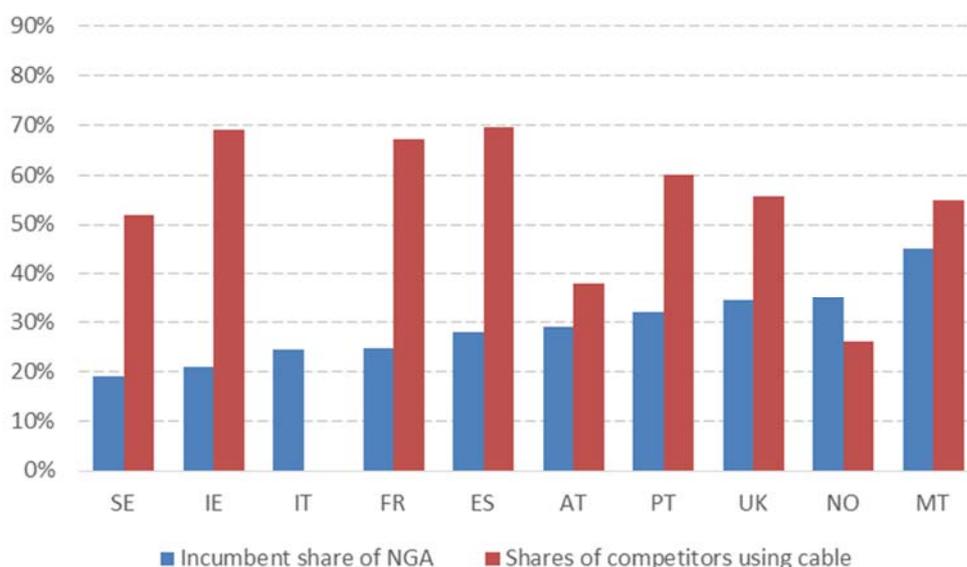
Figure 6: Share of different NGA technologies in total NGA subscriptions in the EU, January 2014



Source: European Commission, Digital Agenda for Europe - Broadband Indicators 2014

62. At the country level we see a similar picture, as shown in Figure 7, which presents incumbent and cable-based competitor shares of NGA subscriptions. In most Western European countries the incumbent telecommunications network operator is lagging well behind cable-based competitors in terms of NGA subscriptions.

Figure 7: Incumbent and cable-based competitor shares of NGA subscriptions, 2014



Source: NRA publications and responses to CRA's survey of ETNO members

Note: Shares of competitors using cable include use of fibre (own or third party) where cable competitors supplement cable networks with fibre, which is the case in France, Portugal, Spain and Sweden.

63. There is therefore clearly much more to do to achieve the DAE's targets and much of this work needs to be in the form of investments to upgrade traditional telecommunications networks from copper to fibre, given that cable networks are unlikely to expand their reach further and are already largely upgraded to DOCSIS 3.0.

3. THE 2013 RECOMMENDATION AND ECONOMIC REPLICABILITY TESTING

3.1. Background to the 2013 Recommendation

64. The background to the 2013 Recommendation is the Europe 2020 strategy and the DAE. As already discussed, the DAE has, as a key goal, the deployment of fast and super-fast broadband technologies, given the important role that this is anticipated to have in terms of growth and job creation.
65. Shortly after the DAE was launched, the Commission published a *Recommendation on regulated access to Next Generation Access Networks* (2010 Recommendation), which concerns remedies to be imposed on operators designated with significant market power (SMP) in relation to NGA. The 2010 Recommendation aims to “promote efficient investment and innovation in new and enhanced infrastructure, taking due account of the risks incurred by all investing undertakings and the need to maintain effective competition, which is an important driver of investment over time”.²⁸ The focus of the 2010 Recommendation is clear: to encourage NRAs to impose remedies on SMP operators with a view to promoting efficient investment in NGA in order to further the Europe 2020 strategy and achieve the DAE goals.

3.2. Purpose of the 2013 Recommendation

66. The 2013 Recommendation builds upon and extends beyond the 2010 Recommendation, setting out in more detail when cost-oriented wholesale access to NGA networks may not be necessary and providing further detail of how non-discrimination obligations should be implemented. As such, it has much the same aim as the 2010 Recommendation, with the focus being the improvement of regulatory conditions to foster NGA investments. This is clear from Point 1 of the 2013 Recommendation, which highlights its contribution to the Europe 2020 strategy and makes multiple references to NGA investment:

The aim of this Recommendation is to improve the regulatory conditions needed to promote effective competition, enhance the single market for electronic communications networks and services, and foster investments in next-generation access (NGA) networks. It contributes, in a technologically neutral manner, to the overall Europe 2020 Strategy objectives of boosting growth and jobs, stimulating innovation and ultimately more efficient digital services for end users in the Union, and furthering digital inclusion. It also aims to increase legal certainty and regulatory predictability in view of the long-term horizons for investment in NGA networks.

67. The focus on promoting NGA investment is also clear from the commencing recitals to the 2013 Recommendation, which are dominated by a discussion of the Europe 2020 strategy and the substantial investments required to achieve the DAE targets:²⁹

In order to encourage innovation and increase productivity, employment and competitiveness and, ultimately to create economic growth and achieve the goals of the Europe 2020 Strategy, it is essential to further develop the EU

28 2010 Recommendation, recital 2.

29 2013 Recommendation, recitals 1-3.

internal market for electronic communications networks and services, in particular through the roll-out of high-speed Internet networks. [...]

The deployment of high-speed broadband plays an important role in Union investment, job creation and overall economic recovery. The Commission and the European Council have thus set ambitious roll-out targets for high-speed broadband, as part of the Union's Digital Agenda for Europe (DAE), one of the flagship initiatives of Europe 2020.

One of the core objectives of the Digital Agenda for Europe is the deployment of next generation access networks (NGA Networks). The Digital Agenda for Europe aims to support the substantial investments, which will be required in the coming years. The present Recommendation aims to promote efficient investment and innovation in new and enhanced infrastructures whilst recognising the need to maintain effective competition, which is an important long term investment incentive. The present Recommendation seeks (i) to ensure a level playing field through the application of stricter non-discrimination rules, (ii) to establish predictable and stable regulated wholesale copper access prices, as well as (iii) to increase certainty on the circumstances which should lead to the non-imposition of regulated wholesale access prices for NGA services. Increasing legal and regulatory predictability in this manner should further help to trigger the investment needed in the near to medium-term future. [Emphasis added.]

68. The recitals further cement the investment focus by acknowledging that regulatory predictability (which the 2013 Recommendation seeks to provide) is a key ingredient for investment.³⁰ The recitals also acknowledge that risk sharing arrangements (such as volume discounts and long-term access pricing agreements) may be important for fostering NGA investment and seeks to clarify when these will be acceptable.³¹
69. Although fostering NGA investment is the main theme, the importance of competition is not overlooked. However, rather than the traditional regulatory emphasis on *promoting* competition (which has characterised the regulation of CGA services) the 2013 Recommendation (in the context of NGA services) is concerned with “safeguards” to “protect competition”.³² These “safeguards” are said to consist of equivalence of inputs (EOI), technical replicability, and a guarantee of “economic replicability” for NGA services *in conjunction with* price regulation of CGA networks.³³
70. In summary, we interpret the aim of the 2013 Recommendation to be the *promotion of efficient investment in NGA infrastructure* by affording NGA investors pricing flexibility while simultaneously *safeguarding the degree of competition that already exists* (including that based on price regulated CGA networks and alternative infrastructures such as cable).

3.3. The role of the ERT within the 2013 Recommendation

71. In addition to detailing a costing methodology for CGA and NGA wholesale access prices when cost-orientation is imposed as a remedy, the 2013 Recommendation includes

30 2013 Recommendation, recital 4.

31 2013 Recommendation, recitals 19 and 49.

32 2013 Recommendation, recital 50. Further references to “safeguarding” competition can be found in paragraphs 55 and 64.

33 2013 Recommendation, recital 50.

provision for the *non-imposition* of cost-orientation for NGA wholesale access prices. The conditions for this to occur in relation to passive NGA wholesale inputs (or non-physical or virtual wholesale inputs offering equivalent functionalities) are the following:³⁴

- a. Where the NRA can show “a demonstrable retail price constraint” from either a “legacy access network product” offered by the SMP operator subject to a cost-oriented price control constituting a “copper anchor”, or operators providing retail services over one or more alternative infrastructures that are not controlled by the SMP operator; and
 - b. Where the NRA imposes on the SMP operator non-discrimination obligations that provide for equivalence of inputs (EOI), technical replicability and economic replicability.
72. In short, the 2013 Recommendation recommends that NRAs provide NGA investors with *pricing flexibility* (rather than imposing cost-orientation on NGA wholesale access prices) where there exist the *safeguards* of (a) a “demonstrable retail price constraint” and (b) non-discrimination obligations of EOI, technical replicability and economic replicability.
73. It follows that the context in which economic replicability testing arises under the 2013 Recommendation is one in which there is already a “demonstrable retail price constraint” based upon either cost-oriented CGA wholesale access or alternative infrastructures (such as cable). This is significant. The existence of a demonstrable retail price constraint implies that there are *already effective established retail competitors* (either copper based or based on alternative infrastructure that is not in the control of the SMP operator) at the time that the imposition of economic replicability testing is considered. As we explain below, this is a key consideration that should influence choices of the parameters and procedures of economic replicability tests.

3.4. The Commission’s Guidance on the parameters of the ERT

74. As mentioned, economic replicability is one of the non-discrimination obligations that an NRA should impose if an SMP operator investing in NGA is to be allowed pricing flexibility. Economic replicability means that “the margin between the retail price of the relevant retail products and the price of the relevant NGA-based regulated wholesale access inputs covers the incremental downstream costs and a reasonable percentage of downstream common costs”.³⁵
75. This concept of economic replicability is familiar from margin squeeze contexts. Margin squeeze testing examines whether the difference between a vertically integrated firm’s retail and wholesale prices covers efficient downstream costs. However, as mentioned, economic replicability testing is a unique creation of the 2013 Recommendation and applies specifically in the context of the regulation of NGA services. As the Commission states, it applies in “different circumstances than ex ante margin squeeze tests applied on regulated wholesale access prices” (such as in the context of CGA inputs) and is “entirely without

³⁴ 2013 Recommendation, Point 49. Similar conditions apply in relation to active NGA wholesale inputs except that the “demonstrable retail price constraint” condition is modified to refer to take-up of upstream passive wholesale inputs or non-physical or virtual wholesale inputs offering equivalent functionalities or the presence of alternative infrastructures: 2013 Recommendation, Point 48.

³⁵ 2013 Recommendation, Annex II.

prejudice to application of the competition rules”.³⁶ The Commission further clarifies that NRAs may apply an ex ante margin squeeze test (note the different terminology) to copper-based access products *in addition to* (and therefore quite separate from) an economic replicability test for NGA services.³⁷

76. The 2013 Recommendation provides that to impose an economic replicability obligation in the context of NGA regulation, an NRA should set out details of the parameters of the economic replicability test (ERT) that the NRA will apply.³⁸ The Commission sets out *guidance*³⁹ on the details of a number of ERT parameters in Annex II of the 2013 Recommendation.
- a. **Relevant downstream costs.** The costs of the SMP operator’s own downstream businesses (i.e. an equally efficient operator (EEO) approach) with adjustments for scale where “market entry or expansion has been frustrated in the past” or where “objective conditions do not favour the acquisition of scale by alternative operators”.
 - b. **Relevant downstream cost standard.** LRIC+ including sunk costs and a mark-up for common costs related to the downstream activities.
 - c. **Relevant wholesale inputs.** The “most relevant regulated inputs used or expected to be used by access seekers” within the time frame of the review period in view of the SMP operator’s rollout plans, chosen network topologies and take-up of wholesale offers, which may be an active, passive or virtual input, and which may vary by geographic area.
 - d. **Relevant wholesale prices.** The access price that the SMP operator charges third-party access-seekers, giving “due weight to the presence of volume discounts and/or long-term access pricing agreements between the SMP operator and access seekers”.
 - e. **Relevant retail products.** The “most relevant retail products including broadband services (‘flagship products’) offered by the SMP operator on the basis of” NGA wholesale inputs where “flagship products” are identified taking into account relevance for current and future competition and including an assessment of retail market shares of the products and advertising expenditure on the products. A niche or lower quality retail product may be included in the “flagship products” if it is particularly relevant to competition with access seekers that focus on such products.
 - f. **Modelling approach and relevant time period.** A dynamic multi-period analysis such as a discounted cash flow (DCF) approach over an average customer lifetime (ACL) with “downstream costs that are annualised according to a depreciation method that is appropriate to the asset in question and the economic lifetime of the

³⁶ 2013 Recommendation, Annex II.

³⁷ 2013 Recommendation, Recital 63.

³⁸ 2013 Recommendation, Point 56.

³⁹ 2013 Recommendation, Point 56 refers to Annex II as providing “guidance” on the parameters.

corresponding assets required for the retail operations (including network costs that are not included in the wholesale NGA access service)".⁴⁰

77. Annex II of the 2013 Recommendation also provides that when determining the parameters of the ERT "NRAs should ensure that the SMP operator is not put at a disadvantage vis-à-vis access seekers regarding the sharing of the investment risk".

3.5. Differences between the Commission's Guidance on ERT parameters and competition law margin squeeze parameters

78. The main differences between the Commission's guidance on the ERT parameters (as set out in Annex II, and elsewhere in the Recommendation) and the approach to margin squeeze testing in competition law (as we understand the competition law precedents, including *Deutsche Telekom*, *Telefónica* and *TeliaSonera*, and the Commission's Article 102 Guidance on Enforcement Priorities) are that competition law testing is likely to occur on the basis of (i) an EEO approach without adjustments, (ii) a LRIC cost standard,⁴¹ and (iii) testing at a level of aggregation that reflects the arena over which competition occurs (rather than individual products). In each respect, competition law imposes *less* restriction and allows for *greater* pricing flexibility than the Commission's guidance on the ERT parameters.
79. It is not evident from the text of the Recommendation why divergences from the competition law approaches have been chosen for the ERT. As we discuss below, the ERT applies only when there is already an established "demonstrable retail price constraint" and it is contained within a Recommendation that is concerned with the promotion of NGA investment. It is therefore unclear why there is any need for greater restrictions on commercial flexibility than those that apply under competition law.

3.6. Overview of the implementation of ex ante margin squeeze testing of NGA services

80. Our survey of ETNO members has gathered information about the procedures for and parameters used in the context of ex ante margin squeeze testing of NGA services in a number of European countries. These tests, while applying to NGA services, have not always been developed with reference to the 2013 Recommendation and in many cases have preceded the 2013 Recommendation. The information in this sub-section and elsewhere in this report on the procedures and parameters currently in use in various countries therefore only speaks to the current forms of ex ante margin squeeze regulation of NGA services. It does not purport to provide a picture of how the 2013 Recommendation and economic replicability testing has been implemented so far.
81. As shown in Figure 8, the vast majority of NRAs in the countries that we reviewed have some form of ex ante margin squeeze regulation in place in relation to NGA services.

40 The Commission adds that "[w]hen estimating the average customer lifetime, NRAs should take due account of the different characteristics and competitive conditions of the provision of services over NGA networks compared to the legacy copper network, where these are likely to result in users of NGA networks having different average customer lifetimes compared to users of the copper network".

41 Although the European Commission refers to LRAIC in its Article 102 Guidance and in its *Telefónica* decision, a close reading of the context of each reference and surrounding statements suggests that the Commission in fact meant LRIC in each case.

Figure 8: Status of ex ante margin squeeze regulation for NGA services in countries surveyed (as at December 2014)

Ex ante margin squeeze regulation of NGA		No ex ante margin squeeze regulation of NGA
Regulation of CGA applies to NGA	NGA specific regulation	
Austria Germany Greece	Albania Ireland Italy Lithuania Malta Norway Spain Sweden The Netherlands United Kingdom	Denmark France Portugal Switzerland

Source: CRA survey of ETNO members and CRA own research

82. The countries where ex ante margin squeeze testing of NGA services already exists can be grouped into two categories: those in which the ex ante regulation to prevent margin squeeze in relation to NGA is specific to NGA services; and those in which the regulation is the same as applies to CGA services.
83. The countries that have ex ante margin squeeze regulation in relation to NGA services display significant variance in terms of the procedures for testing and the parameters applied in the tests. While this wide variance may be influenced to an extent by country specific market conditions, it is also likely the result of a lack of clear guidance to NRAs on a consistent and proportionate approach to economic replicability testing for NGA services.

4. THE BEREC GUIDANCE ON ECONOMIC REPLICABILITY TESTING

84. In this Section we review the guidance on the regulatory accounting approach to the economic replicability test published by the Body of European Regulators for Electronic Communications (BEREC) on 5 December 2014 (the BEREC guidance).⁴²

4.1. The BEREC guidance’s reliance on the current practice of NRAs and the relationship between the ERT concept and other forms of ex ante margin squeeze testing

85. The BEREC guidance sets out to interpret the 2013 Recommendation’s guidance on the parameters of the ERT in the context of the “current practice of ex-ante margin squeeze tests as applied by NRAs”.⁴³ The BEREC guidance further states that “the best practices

⁴² Body of European Regulators for Electronic Communications (BEREC), *Guidance on the regulatory accounting approach to the economic replicability test (i.e. ex-ante/sector specific margin squeeze tests)*, BoR (14) 190, 5 December 2014.

⁴³ BEREC guidance, page 5.

that this Guidance document proposes for public consultation have been arrived at by taking utmost account of NRAs' existing practices".⁴⁴ In a number of places the BEREC guidance also appears to conflate the ERT with other ex-ante margin squeeze testing.⁴⁵

86. Reliance on the current practice of NRAs (much of which has been developed in the context of ex ante margin squeeze regulation of CGA services) and conflation of the ERT concept with other forms of ex ante margin squeeze testing may have a tendency to downplay the aim of the 2013 Recommendation of promoting efficient NGA investment while safeguarding competition. As mentioned earlier, the ERT is a creation of the 2013 recommendation and is specifically intended to apply to the regulation of *margins between NGA wholesale and retail services*. It should therefore be distinguished from current (and future) NRA practice regarding margin squeeze testing in relation to the regulation of CGA services. To put this more generally, guidance on the implementation of the ERT should be considered independently of the practice of NRAs, except for situations where NRAs have developed ex ante margin squeeze tests that happen to have the same aim and context as the 2013 Recommendation: i.e. the promotion of NGA investment while safeguarding competition in the context of "demonstrable retail price constraints".
87. In other places the BEREC guidance suggests an appreciation of the distinction. For example in its Introduction the BEREC guidance states that:

*NRAs will also need to ensure that they act in accordance with Article 8(2)(b) by taking all proportionate and appropriate measures to promote competition in the provision of electronic communications networks and services by ensuring that there is no distortion or restriction of competition – this may require a stricter form of ex-ante margin squeeze test than the ERT.*⁴⁶

88. Similarly in its Conclusion the BEREC guidance states:

Both the ERT and the current ex-ante margin squeeze tests of NRAs aim at ensuring competition, however in the light of the objective of Article 8(2)(b) to

44 BEREC guidance, page 16.

45 For example, the full title of the guidance is: "Guidance on the regulatory accounting approach to the economic replicability test (i.e. ex-ante/sector specific margin squeeze tests)".

Apparent conflation of the ERT concept and other forms of ex ante margin squeeze testing also appears in the Introduction to the guidance (on page 5) where BEREC states that: "one of the purposes of the document is to establish clearly the distinction between the ex-ante sector specific margin squeeze test, economic replicability test [sic] on the one hand and the ex-post margin squeeze test on the other". BEREC also states (earlier on page 5) that: "[f]or the purposes of this document, the term 'ex-ante margin squeeze test' is reserved for the description of current practices, while the term 'economic replicability test' (ERT) is used in the meaning of the Recommendation as (future) 'ex-ante margin squeeze test' since the term 'margin squeeze test' is more commonly used for ex-post (competition law) procedures." But the 2013 Recommendation's meaning of the ERT is not simply as a "future" test; its meaning of the ERT is as a test for application to *NGA services*, distinct from tests for CGA services.

Apparent conflation of the concepts is also in other parts of the guidance. For example: "ex-ante margin squeeze test (= ERT)" (page 29); and "[t]he definition and usage of the ex-ante economic replicability test has been used for a number of years as the ex-ante margin squeeze regulatory tool" (page 38).

46 BEREC Guidance, page 6.

promote competition NRAs may apply stricter ex-ante margin squeeze tests.⁴⁷
[Emphasis in original.]

89. And further:

Conceptually the ERT is a “lighter” test meant to provide more price flexibility to the SMP operator while the ex-ante margin squeeze tests currently applied by NRAs mostly as a complementary tool are stricter with regard to the level of parameters within which NRAs would still be comfortable that alternative operators have enough space to breathe [...].⁴⁸

90. These statements appear to clarify that alongside an ERT for NGA services, NRAs may impose a stricter form of ex ante margin squeeze test in relation to CGA services in order to *promote* competition on the basis of access to CGA inputs. This suggests that the BEREC guidance appreciates that whereas the *promotion* of competition may be a goal when testing CGA services, it is not the goal of ERTs for NGA services. We agree that a stricter form of ex ante margin squeeze test for CGA services might be justified if there are grounds to expect that the promotion of competition on the basis of CGA inputs will ultimately lead to efficient competition that will deliver benefits that outweigh the costs of the stricter test. This stricter test for CGA services may be justified in part as there is not the same need to *promote investment* for CGA as there is for NGA.

4.2. The BEREC guidance and the context in which ERTs apply

91. The BEREC guidance perhaps also underplays the important fact that under the 2013 Recommendation a pre-condition for the lifting of wholesale price regulation of NGA inputs and for an ERT to be applied is that there already exists a “demonstrable retail price constraint”. For example, the requirement for there to be such a constraint is not mentioned when BEREC describes Point 49 of the Recommendation and the conditions for allowing wholesale pricing flexibility of NGA products:

In order to allow for wholesale pricing flexibility [footnote: to deal with demand uncertainty for NGA products thus providing investment incentives] of NGA products as specified in recommends 48/49 the Recommendation recommends the lifting or non-imposition of the price regulation pursuant to Art. 13 of Dir. 2002/19/EC in cases where the following conditions are in place: equivalence of inputs (EOI), technical replicability and economic replicability.⁴⁹

92. The fact that an ERT will only apply when there is a “demonstrable retail price constraint” is a fundamental reason why any ERT for NGA services should be implemented differently from ex ante margin squeeze tests that apply to CGA services. Underplaying this context may lead to recommendations on parameters and procedures for economic replicability testing that are too strict to be consistent with the aim of the 2013 Recommendation.

93. To give a specific example, when the BEREC guidance discusses the question of the “level of efficiency of the operator (EEO; REO; adjusted EEO)” it acknowledges that REO and adjusted EEO approaches facilitate market entry, but it does not mention that *when there are already demonstrable retail price constraints* the aim of safeguarding competition while preserving commercial flexibility for NGA investors may be served best by using the EEO

47 BEREC guidance, page 52.

48 BEREC guidance, page 52.

49 BEREC guidance, page 6.

approach (i.e. the REO and adjusted EEO approaches may not be necessary).⁵⁰ We discuss further the choice between EEO, REO and adjusted EEO approaches in Section 5.1 below.

5. PARAMETERS FOR ECONOMIC REPLICABILITY TESTING

94. In this section we discuss various parameters of economic replicability testing and provide recommendations on consistent and proportionate parameters that seek at all times to reflect the aim of the 2013 Recommendation, in the context of demonstrable retail price constraints from CGA-based products and from alternative infrastructure operators.

5.1. The relevant downstream costs (level of efficiency)

5.1.1. An introduction to the alternative approaches

95. A conceptual issue that arises in an economic replicability assessment is how efficient an access seeker must be in order to be protected. Clearly ERTs should not provide margins so large as to shelter every potential downstream competitor, including highly inefficient firms. This would not only encourage inefficient entry and productive inefficiency, but also either harm consumers through high prices or require the access provider to subsidise the inefficient entrant with low upstream prices, which would have adverse implications for upstream investment incentives.
96. One approach is to require that a downstream competitor be as *efficient* as the vertically integrated access provider's own downstream operation. This gives rise to the "as efficient" or "equally efficient" operator (EEO) approach: could a downstream competitor that is at least as efficient as the access provider at the downstream level cover its costs in the relevant downstream market, given the upstream charges set by the access provider? This formulation of the test requires a comparison of the margin available between the upstream and downstream prices set by the access provider with *the access provider's own downstream costs*. This formulation is also sometimes referred to as an imputation test, since it asks whether the access provider would be profitable if its upstream charges were imputed to it as a cost item in place of its actual upstream costs.
97. An alternative approach is known as the "reasonably efficient operator" (REO) approach. Under this approach, the access provider is expected to set its prices so as to allow room for a downstream competitor that is not as efficient as the access provider, but is considered "reasonably" efficient given a smaller scale or other cost disadvantages. To implement the REO approach, the margin between the upstream and downstream prices must be compared to *the actual or estimated costs of a "reasonably efficient" downstream competitor*.
98. Another alternative is known as the "similarly efficient operator" (SEO) approach. Whereas the REO approach is implemented with reference to the actual or estimated costs of a downstream competitor, an SEO is a particular hypothetical construction that has the same downstream cost function as the access provider, but operates at a smaller scale. The SEO approach therefore represents a particular type of adjustment to the EEO approach that adjusts for scale alone.

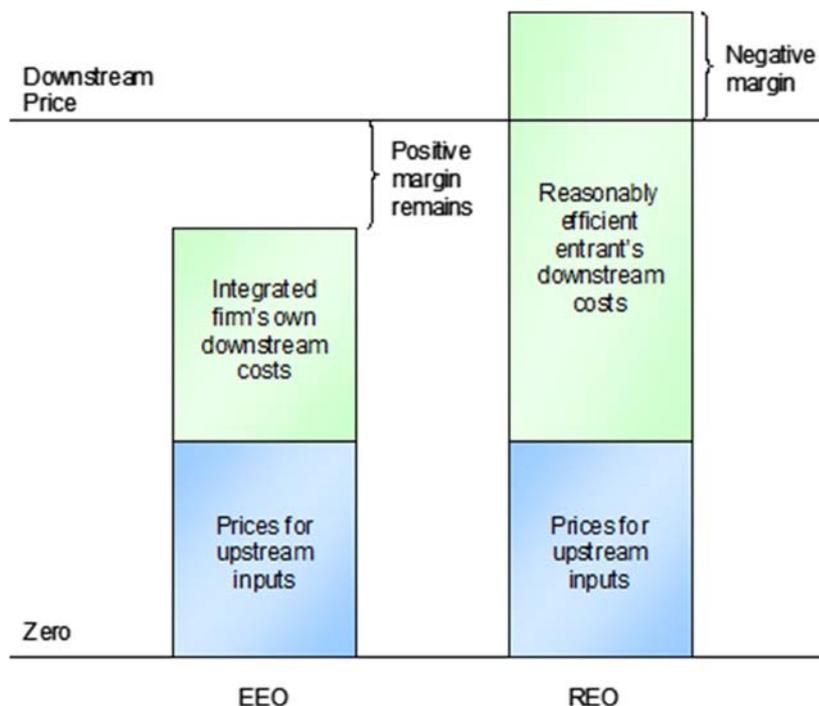
50 BERC guidance, page 18.

99. It is also possible to use an approach based on other adjustments to the EEO (instead of or in addition to adjustments to scale): for example, a different cost of capital or a shorter average customer life. We refer to an approach with adjustments for criteria other than scale as an “adjusted EEO” approach.⁵¹
100. If the access provider’s pricing would pass an EEO test, but fail an REO, SEO or adjusted EEO test, the selection of one of the latter approaches by an NRA would require that the access provider change its prices in order to accommodate firms that are, by definition, less efficient.⁵² This will lead to productive inefficiency (at least in a static sense) as firms that are less efficient than the access provider will be given headroom to enter. The figure below illustrates a situation in which an ERT would be passed under the EEO approach, but failed under the REO approach (a similar illustration could be prepared comparing the EEO approach with the SEO and adjusted EEO approaches). As the figure illustrates, the REO approach represents a stricter standard to hold the vertically integrated access provider to. Compared to the EEO approach, to pass an ERT under the REO approach requires the access provider either to set higher downstream prices or lower upstream prices, or both. Therefore, in addition to the introduction of productive inefficiency, the REO approach will result in higher prices to downstream consumers (with adverse consequences for allocative efficiency as consumers – possibly including the entire installed customer base of the access provider – pay more for the inefficient entry) or lower returns to upstream investment (with adverse implications for dynamic efficiency if incentives for upstream investment are diminished).

⁵¹ Adjustments to the EEO approach may also be adopted to compensate for additional costs that access seekers may experience if inputs are not provided on an equivalence of inputs (EOI) basis. In the remainder of this section we assume that NGA inputs will be provided on an EOI basis, as EOI is a condition that must apply when economic replicability testing is to occur under the 2013 Recommendation.

⁵² We understand references to the REO approach in the margin squeeze literature and regulatory practice to be references to situations where the REO is reasonably efficient, but *less efficient* than the vertically integrated access provider. In principle, access seekers might be *more efficient* than the access provider at the downstream level: in other words, access seekers might have advantages in the form of economies of scope or lower sales and marketing and customer management costs that mean they have lower downstream costs than the access provider (despite possibly having smaller scale or other disadvantages). Such access seekers might be called “more efficient operators” (MEOs).

Figure 9: Comparison of EEO and REO approaches



101. The EEO approach is typically preferred in ex post competition law contexts such as allegations under Article 102 of the Treaty for the Functioning of the European Union (TFEU) and national equivalents. Competition law is concerned with the maintenance of the competitive process and ensuring that firms produce as efficiently as possible and that consumers do not pay more than necessary. Competition law is therefore not typically interested in the promotion of initially inefficient competitors (with the potential for inefficient production and higher prices for consumers) in the hope of engineering a better competitive structure in the long term. Moreover, the courts have noted that only the EEO approach can provide the access provider with legal certainty: an access provider knows its own costs, but cannot be expected to know the costs of “reasonably efficient” competitors or the scale or other adjustments that might be used under the SEO and adjusted EEO approaches. It would be undesirable for competition law abuses to be found in situations where firms lack clarity around the parameters of the competition law standard at the time they engage in conduct.
102. The application of the REO, SEO and adjusted EEO approaches is therefore mainly restricted to ex ante rule settings by sector regulators. In principle the issue of legal certainty can be overcome in a regulatory context if the NRA provides sufficient guidance to the access provider with regard to the divergences from the EEO approach that it requires. From an economic perspective, these alternative approaches may be justified in ex ante settings if the goal of the regulatory authority is to promote entry and expansion by firms that initially might not be as efficient as the access provider, but are expected, over time, to contribute positively to competitive outcomes. However, in our opinion such divergences from the EEO approach, even in regulatory settings, should only be in exceptional circumstances. These exceptional circumstances are when *all* of the following conditions hold.
 - a. **There is limited or no competition from alternative infrastructures.** If there is a significant constraint on retail prices from alternative infrastructure (e.g. cable) then

there is no need to promote a sub-scale or otherwise inefficient competitor by diverging from the EEO approach. Indeed, in this case a divergence from the EEO standard would have the negative impacts of limiting the ability of the access provider to compete with offers based on the alternative infrastructure, and raising prices unnecessarily for the access provider's installed base of customers and/or lowering incentives to invest in NGA.

- b. **There are no access seekers that are currently able to realise a similar level of efficiency as the access provider at the downstream level.** If a number of access seekers already enjoy a similar level of downstream efficiency as the access provider, and these access seekers (alone or together with firms using alternative infrastructures) are likely to deliver competitive outcomes for consumers, they do not need any special protection and it is also not necessary to offer special protection to sub-scale or otherwise inefficient access seekers. Again, doing so would hamper the access provider in its ability to compete with the efficient access seekers and with alternative technologies, and impact adversely on retail prices and/or investment incentives, with no prospect of materially enhancing competition. Moreover, offering the protection will likely be either unnecessary or futile. If sub-scale or otherwise inefficient access seekers cannot quickly achieve a similar level of efficiency as the efficient access seekers then they will be squeezed by the efficient access seekers even if the access provider is required to maintain a large margin.
 - c. **There is confidence that initially sub-scale or otherwise inefficient access seekers will become equally or more efficient than the access provider in the medium term if provided with short term headroom.** If sub-scale or otherwise inefficient access seekers are not likely to become equally or more efficient or otherwise make a significant contribution to competition then they should not be supported by the regulatory regime, as this would only generate productive inefficiency and distorted prices upstream and/or downstream with harm to consumers and/or investment in NGA networks.
 - d. **The benefits of greater competition in the medium and long term outweigh the costs in terms of productive and allocative inefficiency and potential adverse impacts on incentives for NGA investment.** In principle, a cost-benefit analysis should be conducted to examine whether the benefits anticipated to arise in terms of more competitive outcomes in the medium and long term outweigh the costs that may be imposed on society in general and consumers in particular as well as the potential adverse impact on NGA rollouts.
103. This does not mean that a divergence from the EEO approach can never be justified when applying ex ante remedies. There may be occasions where the efficiency losses associated with a divergence from the EEO approach (i.e. productive inefficiency, potentially higher downstream prices and potentially lower returns to investment and lower investment incentives) are outweighed by expected medium and long-term gains from greater competition from the entry and expansion of initially inefficient firms that will quickly become efficient competitors.
104. This might occur when a sector is newly opened to competition and the downstream competitors have not yet achieved efficient scale (and there is no competing infrastructure). However, we would emphasise that this alone is not enough. It must also be the case that, if given some temporary headroom, the entrants would be likely to become efficient in the

medium term and the increase in competition expected as a result of this entry must be likely to outweigh the economic harm that will be incurred in providing the headroom.

105. It should also be recognised that in differentiated product markets the use of an EEO approach may not exclude even higher-cost competitors if they are able to supply differentiated products and thereby distinguish their offerings from those of the access provider sufficiently to compensate for any downstream cost disadvantage. In other words, the more access seekers can differentiate their offerings from those of the access provider, the less justification there is for a divergence from the EEO approach.

5.1.2. The Commission's recommendation

106. The Commission recognises that the EEO approach is optimal for promoting NGA investment:

The use of the EEO standard enables NRAs to support the SMP operators' investments in NGA networks and provides incentives for innovation in NGA-based services.⁵³

107. However, although the Commission's Annex II guidance has specified an EEO approach, it has qualified this by allowing that adjustments for scale may be made where "market entry or expansion has been frustrated in the past" or where "objective conditions do not favour the acquisition of scale by alternative operators".

5.1.3. Our recommendation

108. The EEO approach should be preferred for economic replicability testing of NGA services.⁵⁴ This recommendation reflects both the aim of the 2013 Recommendation to incentivise efficient NGA investments while safeguarding competition and the context in which economic replicability testing will occur (i.e. where there are "demonstrable retail price constraints"). The context of demonstrable retail price constraints implies risks for NGA investment incentives if the access provider is not allowed to compete on its downstream merits: a requirement to hold an umbrella over the heads of less efficient access seekers may render the access provider uncompetitive against alternative infrastructure operators or equally efficient access seekers. This may compromise the business case for NGA investments.
109. The exceptional circumstances for divergence from the EEO approach that we described above have more to do with the *promotion* of competition rather than *safeguarding* competition. These exceptional circumstances are in any event unlikely to apply in the context of economic replicability testing.

⁵³ 2013 Recommendation, recital 64.

⁵⁴ The main text explains why we recommend the EEO approach in preference to the REO, SEO and "adjusted EEO" approaches in the context of economic replicability testing. We also recommend the EEO approach in preference to an MEO approach that would reflect the costs of more efficient operators, as described in footnote 52 above. An MEO approach would allow the access provider to reap the benefits of the access seeker's greater efficiency, undermining productive and allocative efficiency (since customers would be served inefficiently and potentially at a higher retail price). Moreover, an EEO approach would provide the right incentives for efficient entry and expansion by MEOs and for the access provider to become more efficient at the downstream level.

- a. If the demonstrable constraint on retail prices comes from alternative infrastructures, the first condition – “limited competition from alternative infrastructures” – will not hold.
- b. If the demonstrable constraint on retail prices comes from competing offers based on CGA inputs then it is likely that there already exist a number of access seekers that have substantial scale or other compensating efficiencies that they can leverage into the supply of NGA services and that do not require any special protection in the form of a divergence from an EEO approach. Access seekers may also have particular *advantages* compared to the access provider – such as an ability to bundle NGA services with other services (e.g. pay TV or mobile services) – that compensate for any advantages that the access provider might enjoy. At the same time the access provider may experience legacy cost disadvantages compared to less-encumbered access seekers (e.g. old inefficient systems; inefficient sales and marketing channels; high labour costs that cannot easily be avoided). In this situation the second condition – access seekers unable to realise a similar level of efficiency as the access provider at the downstream level – will not hold.
- c. The third condition – confidence that initially sub-scale or otherwise inefficient access seekers will become equally or more efficient – is also unlikely to hold, as an initially sub-scale or otherwise inefficient access seeker would face intense competition from efficient alternative infrastructure operators or efficient access seekers even if the access provider were required to hold an umbrella over their heads.

In summary, given the aim of the 2013 Recommendation and that the ERT only applies in circumstances where there is a “demonstrable retail price constraint”, it is difficult to see much ground for divergence from the EEO approach. The demonstrable retail price constraint will come either from established CGA-based competitors that are likely to already have substantial scale, or from alternative infrastructure operators that will also likely enjoy substantial scale. Requiring the access provider to hold an umbrella over the heads of inefficient access seekers when they will still face competition from efficient competitors seems likely only to dampen competition (either intra-infrastructure or inter-infrastructure competition) and reduce incentives for NGA investment. The following box provides an illustration from the UK of a situation where, in our view, divergence from the EEO approach was neither necessary nor desirable.

Box 1: The UK landscape – no grounds for divergence from the EEO approach

At the time of launching next generation broadband offerings in 2010, BT was already experiencing intense competition in the supply of residential broadband, not only from players using regulated CGA inputs (Sky and TalkTalk Group), but also from Virgin Media, which operates its own cable network and was the clear market leader in terms of supplying next generation broadband (with and without TV).

All three of these competitors were well-resourced and had large existing retail operations (sales, marketing, customer service, etc.) that could be mobilised to supply fibre broadband. Two of them (Sky and Virgin Media) also had their own advantages in terms of being able to bundle broadband with superior TV offerings compared to BT. While BT had the largest share in terms of total broadband (28%), the other three players had substantial shares of

their own (Virgin and TalkTalk Group had shares of 22% each and Sky had a 15% share).⁵⁵ In any event, when considering scale at the retail level it is relevant to consider the entire retail operations of the competitors, not just their broadband subscriber bases. This is a clear situation where there existed “demonstrable retail price constraints” on BT’s NGA offerings, from both CGA-based services and alternative infrastructure, and so a situation in which price flexibility and an ERT should apply under the 2013 Recommendation.

In a situation like this, where a number of competitors have substantial scale and other advantages, diverging from the EEO approach will constrain the access provider from competing effectively with these competitors. Moreover, it will not assist sub-scale competitors, because those sub-scale competitors will be competing with a number of large scale players that are not constrained by the regulation. In these circumstances, the risks of a divergence from the EEO approach in terms of higher retail prices and/or lower than necessary returns to investment for the access provider are unlikely to be matched (let alone outweighed) by enhanced competitive outcomes.

Nonetheless, Ofcom determined in 2010 to require BT to maintain margins between its virtual unbundled local access (VULA) wholesale offering and its retail super-fast broadband offerings on an REO basis.⁵⁶

In its recent draft statement in the context of its review of the VULA margin obligation, Ofcom is proposing to assess the VULA margin using an adjusted EEO approach with an adjustment for the average customer life (Ofcom proposes using five years for the ACL) and the imposition of a floor on unit bandwidth costs.⁵⁷ The adjustment for average customer life is despite the fact that one of the two largest access seekers (Sky) reports churn of 10.9%,⁵⁸ which translates into an ACL of more than eight years. The floor on unit bandwidth costs is a protection in case BT in the future recognises lower unit bandwidth costs than the largest access seekers due to its scale in non-broadband bandwidth services. However, this floor is not currently binding as BT’s unit bandwidth costs are currently *higher* than those of the two largest access seekers.

110. As mentioned, the Annex II guidance in the 2013 Recommendation allows that adjustments for scale may be made where “market entry or expansion has been frustrated in the past” or where “objective conditions do not favour the acquisition of scale by alternative operators”. Both conditions appear to assume a need to *promote* competition, which is inconsistent with (a) the 2013 Recommendation’s aim of promoting efficient NGA investment incentives while *safeguarding* competition, and (b) the context of economic replicability testing, which is where there are pre-existing demonstrable retail price constraints. Moreover, regarding the first of these conditions, NRAs should be careful not to provide assistance where it is not warranted: if alternative infrastructure or access seekers with substantial scale currently provide demonstrable retail price constraints, the past history of terms of access is no longer relevant. Regarding the second condition, a situation in which “objective conditions do not favour the acquisition of scale by alternative

⁵⁵ Market shares for 2010 have been taken from Ofcom, *Communications Market Report: UK*, Research Document, 4 August 2011, page 296. In 2014 all three of these competing operators enjoyed shares of around 20%.

⁵⁶ Ofcom, *Review of the Wholesale Local Access Market: Statement*, 7 October 2010, paragraph 8.132.

⁵⁷ Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraph 5.33 and paragraphs 6.436 – 6.467 (ACLs) and paragraphs 6.114 – 6.172 (unit bandwidth costs).

⁵⁸ British Sky Broadcasting Group plc, *Annual Report 2014*, page 10.

operators” implies that alternative operators will never achieve an efficient scale (i.e. they will always produce inefficiently). In our view, for the reasons just given, this is a situation in which an NRA should not diverge from the EEO approach, as the entry assistance is unlikely to lead to efficient production and improved outcomes for consumers. The only effect will be competition for the sake of competition. Higher prices and/or lower upstream investment will likely become entrenched rather than merely temporary, which would be to the disadvantage of consumers.

111. A final observation is that if a divergence from the EEO approach is chosen, the NRA should be clear that this divergence will only be temporary. If access seekers believe that protection in the form of greater headroom will be permanent they will not have the correct incentives to strive to become equally or more efficient in the medium and long term and the rationale of the divergence from the EEO approach will be defeated.

5.2. The relevant downstream cost standard and the level of aggregation

112. We deal with the relevant downstream cost standard and the level of aggregation together, as these two parameters of economic replicability testing are inextricably linked. We begin with an introduction to the various alternative cost standards that may be used, including avoidable cost and various alternative measures of incremental cost. We then discuss the economic principles that should guide an NRA’s decision whether to use an avoidable or incremental cost standard. This is followed by a discussion of the economic principles that apply to the decision of the level of aggregation at which margins should be tested. Finally, we consider the economically coherent treatment of shared costs at the different levels of aggregation.

5.2.1. An introduction to the alternative cost standards

113. For measuring downstream costs a number of different cost standards can be distinguished.⁵⁹
 - **Avoidable cost (“AC”).** Those costs that would be avoided if the increment being tested was not produced. This excludes any costs shared with other increments, and also *excludes any sunk costs*, as these cannot be avoided once they have been incurred (except in a long run sense).

⁵⁹ We have omitted (short-run) marginal cost (SRMC) from the list. This is partly because while SRMC is relevant to pricing decisions, margin squeeze investigations consider actual or potential exclusion of competitors. This implies that a broader measure of costs – in line with the entry/exit decisions being analysed – is appropriate. In addition, marginal cost can be unstable and difficult to calculate: i.e. when costs are lumpy marginal cost can be close to zero for many units, but then suddenly increase to a very large amount when capacity is reached and a further “lump” of cost is required to produce another unit of output. LRIC is typically used as an approximation for marginal cost as the question it answers is “what is the average (i.e. per unit) additional cost of an increment of output”, where the increment can be chosen so as to smooth the volatility that arises with marginal cost. We also exclude average variable cost (AVC). While this term was once popular in discussions of price-cost tests under competition law, it is now recognised that it suffers from being ill-defined (i.e. whether a cost is variable or not depends on the time frame being considered). We also exclude stand-alone cost (SAC), which includes all costs that are required to produce the increment on a stand-alone basis. SAC is equal to LRIC if the firm produces only one product. If the firm produces more than one product then it would be an unreasonable restriction of its commercial flexibility (and likely to be economically inefficient) to require that it recover *all* of the shared costs from just one of the products (which is what a SAC test for a product would require).

- **Long-run incremental cost (“LRIC”).** Only those costs that are directly attributable to the increment being tested and that vary with the addition of that increment. The reference to “long run” is to explain that all costs that are incremental with respect to the chosen increment of output are included in the measure, whether they are considered “variable” or “fixed” in nature, as in the long run all costs are variable. Incremental sunk costs are also included within LRIC as these also vary in the long run. However, LRIC does *not* include any costs that are shared in common between, or jointly caused by, the increment in question and other increments of volume (e.g. if the increment being tested is a particular product, costs such as general marketing, IT systems and overheads will likely be shared across products, and as such would be excluded using a LRIC standard). The choice of the increment is therefore crucial, and the term “LRIC” on its own is meaningless unless the increment is also specified. As a general rule, the larger the increment, the higher the unit cost estimate that is produced, as costs that are shared across smaller increments become included in the measure as the increment grows.
 - **LRIC+.** As above, but with a mark-up (“+”) representing an allocation of costs that are shared between the increment being tested and other increments (e.g. general marketing, shared networks, corporate overheads or a common IT system).
 - **Long-run average incremental cost (“LRAIC”).** This includes an allocation of costs directly associated with an increment that is larger than the increment being tested (e.g. all NGA products if the increment is an individual NGA product; or all broadband products if the increment is all NGA broadband products). This is therefore similar to LRIC+, as costs that are shared between the increment being tested and other products in the larger increment are allocated on an “average” basis to the increment being tested.
 - **Fully allocated cost (“FAC”) or average total cost (“ATC”).** These are cost accounting approaches that result in a portion of shared costs in a business being allocated to the increment being tested. In the case of a single-product business, or, more generally, where the increment being tested is the entire business, ATC is equal to LRIC.
114. The BEREC guidance suggests that there is value in “consistency with regard to the setting of wholesale prices and measurement of retail costs”.⁶⁰ We are not aware of an economic basis for this statement and we see no reason for there to be consistency. For example, an NRA that is concerned to promote investment in infrastructure may prefer to use LRIC+ instead of LRIC when regulating upstream prices on a cost-oriented basis, while at the same time preferring LRIC over LRIC+ for the measurement of downstream costs in an ERT so as not to limit the pricing flexibility of the access provider in competition with rivals that are free to price in a way that recovers little or no shared costs from NGA products. We discuss the treatment of shared costs in more detail in Section 5.2.5 below.

60 BEREC guidance, pages 10 and 32.

5.2.2. Avoidable costs or incremental costs?

115. As explained above, the difference between avoidable costs and incremental costs is that the former excludes sunk costs. Sunk costs are irrelevant to the pricing and exit decisions of access seekers once they have been sunk.⁶¹
116. The key to choosing between an avoidable cost standard and an incremental cost standard is to be clear about the competition that the test is seeking to protect: is the test seeking to secure the viability of *established downstream competitors* that have already sunk the relevant costs (and will therefore disregard them when competing to supply NGA products) or *potential entrants* that have not sunk these costs (and will therefore decide to enter only if they expect to be able to recover the sunk costs as well as avoidable costs)?
117. As we have explained in Section 3.2 above, we interpret the aim of the 2013 Recommendation to be to *promote efficient NGA investments* while *safeguarding* the competition that already exists. To be consistent with that aim, the emphasis in economic replicability testing should be on preserving the viability of existing competitors (i.e. those that are already established in supplying CGA and/or NGA services) rather than promoting new entrants. This suggests that NRAs should prefer avoidable costs over incremental costs for economic replicability testing of NGA services. This should safeguard the existing level of competition. At the same time it will do least harm to NGA investment incentives by affording access providers the maximum commercial flexibility to compete in the context of demonstrable retail price constraints and provide access providers with a level playing field with respect to both existing access seekers and operators using alternative infrastructures that have already sunk the relevant costs.⁶²
118. Moreover, in the context of demonstrable retail price constraints from established competitors (including alternative infrastructure operators) an incremental cost standard to protect potential entrants may be futile: if the potential entrant cannot survive if prices are near avoidable cost then it is exposed to being squeezed by the established competitors, even if the access provider is required to maintain a margin based on incremental cost.
119. In practice this means that costs that the access provider has sunk in order to supply CGA services and that the access provider would also use to supply NGA services (e.g. a billing IT system) should be excluded from the test, as competing access seekers that are already supplying CGA services will already have sunk similar costs. If there are sunk costs that are specific to the supply of NGA services (for example, new IT systems or additional investment in backhaul or core bandwidth) then if both the access provider and existing access seekers have already sunk these costs themselves, again these costs can be ignored.
120. If, despite this recommendation, an incremental cost standard is used, then it would be consistent to model incremental costs using current (i.e. replacement) costs rather than

⁶¹ It will only be more profitable for competitors to exit rather than remain in a market if their revenues from remaining in the market are less than the costs they would avoid if they exited.

⁶² Established access seekers using CGA or NGA inputs will be prepared to price down to their avoidable cost. Alternative infrastructure operators will also have sunk the types of costs that are necessary to operate a retail business and will be prepared to ignore those sunk costs when pricing retail offerings. As with divergences from the EEO standard, the use of an incremental cost standard in this context would be likely to hamper the access provider's ability to compete with established access seekers and alternative infrastructure operators, and lead to higher retail prices and/or reduced incentives to invest in NGA.

historic costs. If an incremental cost standard is being used, the concern must be for the viability of *potential* entrants. If that is the concern, there is no sense in modelling the access provider's historic costs. These may be higher or lower than the costs of replacing the assets that the access provider uses in its downstream operation, but it is the current cost that is relevant to the viability of the entrant.⁶³

121. The BEREC guidance states that for economic replicability testing it is important to use an incremental cost approach that “takes into account sunk costs for the other network costs in order to ensure that alternative operators can compete in the downstream market on an equal basis”.⁶⁴ We disagree with the BEREC guidance on this point and recommend that NRAs prefer avoidable over incremental costs for ERTs. As just discussed, the choice between avoidable cost and incremental cost standards (i.e. whether to include sunk costs or not) should depend on whether the concern is for established downstream competitors that have already sunk the relevant costs or potential entrants that have not. In our opinion, to be consistent with the aim of the 2013 Recommendation to promote efficient NGA investments while safeguarding the competition that already exists and in the context of demonstrable retail price constraints, the emphasis in economic replicability testing should be on preserving the viability of existing competitors rather than promoting new entrants.

5.2.3. A note on terminology

122. Before discussing the question of the level of aggregation it is helpful first to clarify our terminology with regard to “products”, “services” and “bundles”. In this report a “product” is an offering to a customer. It may comprise just a single “service” (e.g. just NGA broadband on its own), or it may comprise a number of service components bundled together (e.g. an NGA broadband service bundled with a TV service and a mobile service). A “bundle” is a product that contains more than one service. Note that products may be further differentiated if there are various tariff options (e.g. one tariff for low broadband speed and low download limits and another tariff for high broadband speed and high download limits). Each tariff option is a distinct product in our terminology.
123. We acknowledge that in some countries these terms may be understood differently. For example, what we call “services” may be referred to as “products” in some countries. This, however, is just a matter of terminology.

5.2.4. Level of aggregation

124. The issues that arise here concern what downstream products to include in the test. For example, should ERTs be conducted over all of the broadband products of the access provider (including CGA and NGA products), its portfolio of NGA products, or a portfolio of certain types of products (e.g. all dual-play and triple-play NGA products)? More narrowly, should the access provider have to pass an ERT on each and every product variant that it offers using the NGA input, where variants might be defined by the amount of bandwidth

⁶³ Although this may appear to be a divergence from the EEO approach of modelling the access provider's own downstream costs, it is not, for two reasons. First, the replacement cost question is: what would it cost the access provider to replace the asset that it uses in its own downstream operation? In this sense the question concerns the access provider's *own downstream costs*. The question is not: what would it cost an REO to deploy a different asset altogether with similar functionality? Second, if the asset is of a sunk nature then the access provider will already have sunk the costs of the asset and so a true EEO approach would ignore these costs altogether.

⁶⁴ BEREC guidance, page 52.

or download capacity offered or by the other services (e.g. telephony, pay TV, mobile services) included in a bundle? Alternatively, of relevance for retail offers to business customers, should the access provider have to pass an ERT on each and every business contract?

The arena of competition should determine the level of testing

125. From an economic perspective, good practice in margin squeeze testing (including economic replicability testing) requires testing at a level of aggregation that reflects the “arena of competition” – that is, the products and customers over which important entry and exit decisions are made. Margin squeeze is a concern regarding the potential exclusion of efficient competitors. There is therefore usually little to be gained by carrying out a margin squeeze test at a level that is more or less aggregated than the level at which efficient entry and exit decisions are made. If an efficient competitor can be profitable across the portfolio of products that it supplies (or intends to supply), the fact that it might not be profitable with respect to a particular product that is not, on its own, critical for its viability, is not determinative of whether it exits (or decides not to enter).
126. For example, if downstream competition takes place across the full range of NGA products, and downstream competitors (existing and potential) are unlikely to offer just one product, there is no need to test whether a margin squeeze test is passed at a highly disaggregated “product-by-product” level. Testing individual products is not only likely to be uninformative and unnecessary; it is also likely to be excessive and disproportionate in terms of the burdens it would impose on access providers and NRAs. Moreover, it is likely to create an uneven playing field between the access provider and alternative infrastructure operators that typically also offer a range of products and are free to price individual products as they wish.
127. Similarly, when ERTs are applied in business markets, testing every business contract is likely to be uninformative, unnecessary and burdensome when competitors compete across a range of contracts, and may significantly constrain the access provider’s commercial flexibility and incentives to invest in NGA. The situation in The Netherlands, where each business contract is tested, is described in the following box.

Box 2: Testing of every business contract in The Netherlands

The testing of business contracts in The Netherlands is explained in Box 5 below. As explained there, each contract (and each service within each contract) must be tested to ensure the minimum margin is covered.

This procedure imposes a significant burden on KPN as well as on the NRA: although the process does not involve the pre-launch testing of every offer, KPN typically has to assess thousands of contracts and services and report on these to the NRA.

The requirement that every contract must pass the test on an ongoing basis also significantly limits KPN’s commercial flexibility. It requires KPN either to price less aggressively or otherwise insist on contracts with customers that allow KPN to raise the prices in the contract at some future point in time if, due to forecasting errors or unforeseen developments, the contract would otherwise begin to fail the test. Clauses that allow for price changes to satisfy regulatory requirements are seldom accepted by customers, and all else equal, contracts that contain clauses like this are less attractive for customers than contracts without such clauses. For that reason, KPN does not face a level playing field

and is likely to tend to price less aggressively for each contract.⁶⁵ A more aggregated test (across the portfolio of business contracts) would allow KPN to price more aggressively and compete on the same terms as access seekers and alternative infrastructure operators.

Commercial flexibility is further limited in situations where invitations to tender are not fully specified by customers (e.g. where volumes, locations, etc. are not yet confirmed). While all competitors will face uncertainty in this situation, KPN must deal with the added uncertainty of whether its offer will pass the regulatory test once the full details of the contract are known. A more aggregated test would allow for this uncertainty to be “smoothed” over the customer base and for KPN to compete on a level playing field.

Competition law precedents support the arena of competition approach

128. We see no reason why the approach to the level of aggregation in the context of economic replicability testing should differ from the approach under competition law. Competition law precedents on the level of aggregation endorse the arena of competition concept that we have set out above. In the *Telefónica* case the Commission adopted an aggregated approach based on the principle that “competitors must be able to profitably replicate Telefónica’s product pattern”⁶⁶ and noted that:

*The aggregated approach is consistent with a new entrant’s internal decision making process in that it assesses the profitability of its investment in a network by considering the complete range of products that it is able to offer in the relevant downstream market.*⁶⁷

129. In its 2010 investigation into BT’s residential broadband pricing (*Freeserve*)⁶⁸ Ofcom similarly considered that the appropriate level of aggregation for the test was across all of BT’s consumer broadband products. In opting for an aggregate level test rather than individual product tests Ofcom referred to the arena of products over which competition occurs:

*BT’s competitors [...] typically offer a range of broadband services ranging from entry-level to more expensive broadband services. To assess profitability on the basis of an individual product would not reflect the underlying business model on which BT’s competitors base their pricing and investment decisions. In Ofcom’s view, the appropriate scope of the test depends on the range of products over which suppliers compete, since if all suppliers compete across a range of products, an apparent margin squeeze on just one or a subset of products may not harm competition.*⁶⁹

65 The requirement to pass the test on each individual contract, together with the inability to raise prices should a particular contract be about to fail the test, means that if KPN prices too aggressively in any instance the consequence may be that KPN would have to *lower its wholesale prices across the board* in order to continue to pass the test. This is obviously a serious consequence that KPN would wish to avoid.

66 European Commission, *Wanadoo España vs. Telefónica*, Case COMP/38.784, 4 July 2007, paragraph 388.

67 European Commission, *Wanadoo España vs. Telefónica*, Case COMP/38.784, 4 July 2007, paragraph 388.

68 Ofcom, *CW/00613/04/03: Investigation into BT’s residential broadband pricing*, 2 November 2010. See paragraphs 4.22 to 4.30.

69 Above note 68, paragraph 4.27.

130. In its *Wholesale Calls* decision,⁷⁰ which concerned supply to businesses rather than consumers, Ofcom considered that the appropriate level of aggregation was across all contracts, rather than at the level of individual contracts. Ofcom considered that competitors should, at a minimum, be able to compete for the whole portfolio of BT's contracts:

*While pricing below incremental cost on individual contracts could be considered distortionary and undesirable, the total product test is central to understanding whether such pricing behaviour is exclusionary and could lead to a stifling of competition.*⁷¹

Further considerations

131. In most countries the main competition is from players that offer a wide range of products including dual-play and triple-play bundles (and often also quadruple-play bundles). The relevant level of aggregation in these countries would therefore be at least as broad as the portfolio of dual-play and triple-play products.
132. If there are access seekers that choose to supply just a small or "niche" set of products, there should be no concerns about their exclusion if competition is driven by firms that compete across a fuller range of products. The access provider should not be in the position of having to provide competitive headroom for access seekers that elect to compete across an inefficiently narrow range of products.
133. Moreover, expecting positive margins to be earned on each individual product or contract would unduly limit the access provider's commercial freedom and ability to engage in rational non-exclusionary business strategies. For example, it may be a legitimate non-exclusionary strategy to "loss-lead" in the form of offering low prices on an entry-level NGA product, in order to provide tentative consumers with an opportunity to experience NGA products, as part of a coherent strategy to migrate those consumers in time up the value chain to more profitable higher specification NGA products.⁷² Similarly, testing temporary promotions on individual products is likely to be excessive and unnecessary.
134. Ofcom acknowledged this when preferring an aggregated approach in its *Freeserve* decision. Ofcom noted that BT's commercial strategy consisted of attracting customers to its lower-priced broadband products and then migrating them up to higher-priced products. Losses for a lower priced product could be justified to the extent that these are expected to be recovered from incremental profits attributable to migrating customers. Ofcom stated:

70 Ofcom, CW/00988/06/08: *Complaint from THUS plc and Gamma Telecom Limited against BT about alleged margin squeeze in Wholesale Calls pricing*, 20 June 2013.

71 Above note 70, paragraph 6.41.

72 Note that we distinguish "loss-leading" (as described here) from penetration pricing to achieve network, bandwagon or "learning by doing" effects (which we discuss in Section 5.7 on low introductory retail prices to generate benefits beyond the lifetime of the average customer). The loss-leading described here is a situation in which the losses are expected to be recovered from the same customer within the average customer life, whereas the penetration pricing discussed in Section 5.7 is a situation in which losses are made on early customers with the expectation of recovering those losses over later customers that are attracted by the network or bandwagon effects or that are served with the benefit of learning by doing efficiencies.

Other ISPs may also be willing to adopt a similar strategy. The potential for this casual relationship between profits and different products suggest that a consolidated view of profit may be more meaningful.⁷³

135. The dangers of testing on an individual product/tariff/promotion basis are exacerbated if this is done using a cost standard that includes an allocation of shared costs, as we discuss in Section 5.2.5 below.
136. Where the access provider offers NGA services under different “brands” with different retail costs (e.g. a premium brand and a discount brand) it might be appropriate to test (on a portfolio basis) the products of each brand against the retail costs of each brand. In other words, in such a situation there may be more than one “EEO” downstream cost structure, as the access provider’s discount brands may have lower retail costs (e.g. lower sales and marketing, customer service and billing/collection costs if these operations are performed mainly online). It would not be appropriate to test the portfolio of the access provider’s discount brand offers against its premium brand costs.⁷⁴ It might, alternatively, be appropriate to test only the access provider’s total portfolio across all brands if that better reflects the arena of competition (i.e. if competitors also tend to offer services using a number of differentiated brands).

5.2.5. The treatment of shared costs

137. The question of whether to allocate shared costs (i.e. whether to use a LRIC+, LRAIC or FAC cost standard rather than avoidable cost or LRIC) is a question that, in principle, should only arise if an SEO or adjusted EEO approach is adopted.
 - a. If an EEO approach is adopted, it follows that the testing should be performed on an avoidable cost or LRIC basis at the appropriate level of aggregation (reflecting the arena of competition). For example, suppose that the level of aggregation for testing is the full portfolio of NGA products. Costs that are shared in common with a wider set of products (e.g. with CGA products) should not be included in the test, as equally efficient competitors will decide whether to supply NGA products on the basis of the avoidable or incremental costs of that portfolio. Since we recommend the use of an EEO approach in economic replicability testing (see Section 5.1.3 above) it follows that we recommend the use of a cost standard that does not include any allocation of shared costs.
 - b. If an REO approach is adopted, the *existence* of shared costs is determined by the choice of REO. For example, if part of the inefficiency of the REO is that it lacks economies of scope – for example, if it supplies only NGA products – then the test at the NGA portfolio level should be on the basis of the REO’s LRIC of supplying the portfolio of NGA products (which would be equivalent to its stand-alone cost since it supplies only NGA products).
138. In our opinion, *even if* an SEO or adjusted EEO approach has been adopted, economic replicability tests of NGA services under the 2013 Recommendation should use cost

⁷³ Above note 68, paragraph 4.26.

⁷⁴ Similarly, if an SEO, adjusted EEO or REO approach is used, there may be more than one SEO / adjusted EEO / REO downstream cost structure to be tested: a premium brand cost structure and a discount brand cost structure. It would not be appropriate to test the portfolio of the access provider’s discount offers against the costs of a premium brand SEO / adjusted EEO / REO.

standards that exclude allocations of shared costs. Economic replicability testing occurs in the context of *demonstrable retail price constraints* either from established CGA-based competitors or from alternative infrastructure operators (or both). In each case these competitors are likely to enjoy similar (if not greater) economies of scale and scope to the access provider and are likely to reference either avoidable cost or LRIC when deciding whether it is worthwhile to supply NGA products. This has two implications.

- a. Cost standards that exclude allocations of shared costs should be sufficient to *safeguard* the existing level of competition and allow for migration of that competition from CGA services to NGA services: CGA-based competitors enjoying reasonable scale in CGA services should have a similar capacity to recover shared costs from CGA services as the access provider.
 - b. At the same time, cost standards that exclude allocations of shared costs provide *maximum flexibility* to the access provider when it is deciding how to price at the retail level and a level playing field for the access provider with respect to both access seekers and alternative infrastructure operators. This is particularly important given that pricing flexibility will promote incentives for NGA investment and that the promotion of incentives for efficient NGA investments is an important goal of the 2013 Recommendation.
139. Moreover, requiring an access provider to recover a portion of shared costs in the margins between its retail and wholesale prices risks either higher than necessary retail prices or reductions in wholesale prices that may compromise NGA investment incentives.
140. We are aware of concerns that an access provider might choose to price its portfolio of NGA products close to avoidable or incremental cost while recovering shared costs from CGA products. It is not clear to us why this should be a concern. Equally efficient competitors and competitors that are already themselves established in the supply of CGA services should be able to match these prices. Moreover, pricing NGA products close to avoidable or incremental cost may be a legitimate commercial strategy given consumer elasticities of demand for CGA and NGA services at a time of transition: low prices for NGA products may be necessary to entice consumers to take up these products. It would be a concern, in fact, if a regulatory regime were to limit the ability of an access provider to price in this way and thereby discourage the transition of households from CGA to NGA services. This would run counter to the DAE goals. It may also dampen incentives to invest in NGA, contrary to the aim of the 2013 Recommendation.
141. If there is a concern that an access provider may not be recovering its shared costs anywhere (and therefore pricing in a way that even an equally efficient competitor could not profitably match), then the best answer is for the NRA to specify a “combinatorial” approach to testing. This involves testing using a LRIC standard also at a higher level of aggregation (e.g. across the portfolio of CGA and NGA products). The shared costs become incremental at the higher level of aggregation and are therefore included in a LRIC assessment at that higher level (e.g. costs that are shared across CGA and NGA products are not incremental to either the CGA or NGA portfolios on their own, but are incremental to the full portfolio of CGA and NGA products). The use of the combinatorial approach also has the benefit of avoiding difficult issues about how to allocate shared costs in an economically meaningful way. As discussed above, it is correct to omit shared costs when considering whether firms are excluded from operating at a particular level, because shared costs do not determine a firm’s decision whether to operate at that level. As long as a firm can cover its avoidable or incremental costs it will choose to operate at that level.

142. The UK's Office of Fair Trading has explained the combinatorial approach as follows:

When examining pricing issues in the telecommunications sector, LRIC is generally therefore a more satisfactory cost base than marginal or average variable cost. However, the existence of economies of scope means that if the prices of each of an undertaking's services are all equal to each service's LRIC, the undertaking will not recover its common costs. To ensure that such a situation could not have an anti-competitive effect, the undertaking would need to be able to demonstrate two things, first, that its individual prices are set at or above LRIC and secondly, that the combined prices of services in groups that share common costs cover both LRIC and the common costs of supplying those services. OFTEL usually refers to this as a 'combinatorial' test.⁷⁵

143. If testing occurs at the individual product level or individual contract level (despite our recommendation that this is unnecessary and likely to be excessive) it is particularly important that this be on the basis of a cost standard that excludes shared costs (e.g. avoidable cost or LRIC). It is unlikely that any access seeker (equally efficient or otherwise) will contemplate a business model that involves supplying a single product or a single contract. Decisions by access seekers whether to offer an equivalent product to the product being tested will be made with reference to avoidable cost or incremental cost and not on the basis of a measure that includes a certain allocation of shared costs. Moreover, in order for access providers to have incentives to invest in NGA, a significant factor will be whether they have the ability to price flexibly at the retail level to recover shared costs as efficiently as possible.⁷⁶ This is particularly an issue where there are alternative infrastructure operators that are free to price individual products down to avoidable or pure incremental cost – access providers that are required to recover a certain contribution to shared costs on each individual product will not be on a level playing field with such operators. Again, if there is a concern that shared costs may not be recovered, this can be resolved by testing on a combinatorial basis at higher levels of aggregation (e.g. across the full portfolio of NGA products).
144. If a cost standard that includes shared cost (e.g. LRIC+ or FAC) is used at any level of aggregation, the results should be treated with great caution and little weight should be placed on a finding of a negative margin without further investigation.

5.2.6. The Commission's recommendation

145. The Commission recommends testing "flagship" products using a LRIC+ cost standard including sunk costs and "a mark-up for common costs related to the downstream activities". In the recitals to the 2013 Recommendation the Commission refers to the mark-up as a "reasonable percentage of common costs".
146. Regarding "flagship" products, the Commission says that these are the "most relevant retail products including broadband services [...] offered by the SMP operator on the basis of the

⁷⁵ OFT, *The Application of the Competition Act in the Telecommunications Sector*, OFT Guidance Paper 417, paragraph 7.11.

⁷⁶ Although Ofcom has rejected testing on an individual product basis, it takes the view that if such testing were to occur it should be using a cost standard (LRIC) that excludes shared costs. According to Ofcom, "individual product tests carried out on the basis of LRIC+ would provide insufficient flexibility for BT to decide how it recovers common costs": see Ofcom *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraph 5.130 and footnote 334.

identified NGA-based wholesale access layer” and that they should be identified taking into account the relevance of the various products for current and future competition and including an assessment of retail market shares of the products and advertising expenditure on the products.⁷⁷

147. The Commission also notes:

Flagship products are likely to be offered as a bundle. NRAs should assess innovative variations of such bundles, if they are likely to replace the flagship product. In addition, NRAs should consider whether a particular retail product, which may not be among the most relevant products of the SMP operator, is particularly attractive to alternative operators that may focus on a certain niche or lower quality retail products. NRAs may decide to include such a product among the flagship products.⁷⁸

148. The Commission therefore acknowledges that NGA services are typically sold in bundles and anticipates that a number of “flagship” bundles may be tested. The Commission also allows for the testing of niche or lower quality products of the SMP operator if these are products that competitors focus on.

5.2.7. Our recommendation

149. The foregoing discussion of economic principles in relation to the choice between avoidable and incremental cost standards, the level of aggregation and the treatment of shared costs leads us to the following recommendations.

- a. To be consistent with the aim of the 2013 Recommendation, the emphasis in economic replicability testing should be on preserving the viability of existing competitors rather than promoting new entrants. This suggests that NRAs should prefer avoidable costs over incremental costs for economic replicability testing of NGA services.
- b. The level of aggregation should reflect the arena of competition over which important entry and exit decisions are made. For example, if competition will largely occur in relation to dual-play and triple-play bundles, then the relevant level of aggregation would be across the portfolio of dual-play and triple-play products. This could be reconciled with the Commission’s recommendation for testing “flagship” products, as in this case dual-play and triple-play products would be the “flagship” products even though the access provider may also supply, for example, single-play and quadruple-play products. Testing individual products in the sense of individual tariff plans (such as a dual-play tariff for a particular broadband speed or download limit among many speed/download limit options) is likely to be excessive and unnecessary and would not allow for legitimate loss-leading pricing strategies (e.g. pricing an entry level product low to encourage tentative consumers to experience NGA with a strategy of migrating them in a short time to a more profitable NGA product). Testing individual business contracts would likewise be excessive and distort the playing field unduly.
- c. Cost standards used in economic replicability testing should exclude allocations of shared costs. Avoidable cost or incremental cost standards without allocations of shared costs should be sufficient to *safeguard* existing levels of competition and at

⁷⁷ 2013 Recommendation, Annex II.

⁷⁸ 2013 Recommendation, Annex II.

the same time provide *maximum pricing flexibility* to access providers. The latter is particularly important given the aim of the 2013 Recommendation to promote incentives for efficient NGA investments. Putting this in the context of the Commission's recommendation to include a "reasonable percentage" of common costs, the "reasonable percentage" to include should be zero. This is a particularly important principle to observe if testing occurs at the individual product level.

- d. If, contrary to the previous recommendation, a cost standard that includes shared costs (e.g. LRIC+ or FAC) is used at any level of aggregation, the results should be treated with great caution (i.e. little weight should be placed on a finding of a negative margin without further investigation).
- e. If there are concerns as to whether shared costs are recovered somewhere, a combinatorial approach may be applied in which higher levels of aggregation are tested (again using avoidable cost or incremental cost, where the increment is the higher level of aggregation).

5.3. Bundles

150. In the NGA context, retail competition typically occurs for bundles of services (i.e. for bundles containing various combinations of NGA broadband, telephony, TV, mobile and other services) rather than for NGA broadband as a service on its own.⁷⁹ This means that the arena of competition will be for portfolios of bundles, rather than for the NGA broadband service on its own. NGA broadband will be just one component service of the bundles in which it is sold.
151. As long as the access provider's bundles are technically replicable by access seekers (i.e. as long as access seekers can source all the inputs needed to provide the components of the bundles)⁸⁰ there is no need to test the NGA broadband component service on its own as access seekers will be earning revenues (and incurring costs) across the bundles, not for NGA broadband on its own. Indeed, there is no economically non-arbitrary way to allocate bundle discounts among the various bundle components in order to test the NGA broadband service on its own when sold within a bundle. Any such test is prone to produce unreliable results.
152. The BEREC guidance largely leaves open how NRAs should approach the assessment of bundles and how to evaluate the non-regulated components of bundles.⁸¹ In principle, when testing bundles that are technically replicable by competitors, all of the incremental revenues and costs of the bundles should be included in the test.
 - a. Other than the regulated NGA inputs (or other inputs that are indispensable and only available from the access provider – see below) the costs of inputs required to

⁷⁹ In Section 5.2.3 we explained the terminology that we use in this report with regard to "product", "service" and "bundle". As we explained there, in this report a "product" is an offering to a customer. It may comprise just a single "service" (e.g. just NGA broadband on its own), or it may comprise a number of service components bundled together (e.g. an NGA broadband service bundled with a TV service and a mobile service). A "bundle" is therefore a product that contains more than one service.

⁸⁰ Situations where access seekers cannot technically replicate a bundle offered by an access provider (for example, because the access provider has exclusive access to a scarce bundle input that is not regulated) raise complex issues that are not covered in this report.

⁸¹ BEREC guidance, page 36.

provide the bundles should be treated like other downstream costs and included on the basis of the access provider's avoidable or incremental costs of those inputs. Examples of such inputs may include non-exclusive TV content, cloud services, installation services, mobile access and call origination and international calls.

- b. If to provide the bundle requires the use of other inputs that are indispensable and that an access seeker must acquire from the access provider (e.g. call termination on the access provider's fixed and/or mobile networks) the prices charged by the access provider for those inputs should be the costs imputed in the test with respect to those inputs.

5.4. Relevant upstream inputs

153. This issue is relevant when there are multiple upstream inputs that downstream competitors may use to supply downstream services. In the NGA context, for example, NGA bitstream, virtual unbundled access (VUA), sub-loop unbundling (SLU) and duct access may be alternatives. Some of these may be more efficient to use than others, and some may not even be in the control of the access provider (e.g. a competitor's own fibre networks in certain geographic areas). In such a case, the question is: which inputs should be modelled in the ERT?

5.4.1. The Commission's recommendation

154. In the past in the CGA context the European Commission has taken the view that an adequate margin should exist for competitors using every conceivable regulated upstream input, in order to preserve the "ladder of investment" principle. In the ERT context for NGA services the Commission appears to take a different position, recommending that the ERT be based on the "most relevant regulated inputs used or expected to be used by access seekers" in the market review period.

NRAs should identify the most relevant regulated inputs used or expected to be used by access seekers at the NGA-based wholesale layer that is likely to be prevalent within the time-frame of the current market review period in view of the SMP operator's rollout plans, chosen network topologies and take-up of wholesale offers.

Such an input may consist of an active input, a passive input or a non-physical or virtual input offering equivalent functionalities to a passive input. [...]

In addition, where justified, in particular when a retail product [...] is launched based on a different input than the one previously identified, or when there is a substantial demand for access at a new NGA-based wholesale layer, NRAs should also assess the margin earned between the retail product and the new NGA-based regulated wholesale input.

If the SMP operator's network characteristics and the demand for wholesale offers vary greatly throughout the territory of a Member State, the NRA should assess the feasibility of differentiating the most relevant NGA-based regulated wholesale layer per geographic area and adapt the test accordingly.⁸²

82 2013 Recommendation, Annex II.

5.4.2. Our recommendation

155. We generally agree with the Commission on this issue. The assessment of the “most relevant regulated inputs” should reflect an *efficient* mix of NGA wholesale inputs that it is realistic for access seekers to use during the market review period. The BEREC guidance concurs on this point.⁸³ This might be guided by the mix of inputs expected to be used by the most efficient access seeker.
156. Ensuring that downstream competition is possible on the basis of *any* upstream input would be unnecessary and disproportionate, send poor signals to access seekers and compromise the ability of the access provider to compete downstream (with consequential impacts on its incentives to invest in NGA in the first place). For example, an approach of testing on the basis of 100% use of NGA bitstream as the wholesale input for NGA products is likely to lead to under-investment by access seekers in their own infrastructure. Moreover, such an approach would risk rendering the access provider uncompetitive with access seekers that make their own investments and use a more efficient mix of inputs, as well as with alternative infrastructure operators. The use of an efficient mix of NGA wholesale inputs is therefore preferable to send signals to access seekers to make their own investments, preserve a level playing field for the access provider with respect to efficient access seekers and minimise distortions to the access provider’s ability to compete with operators using alternative infrastructure.
157. The recommendation of differentiating the most relevant NGA-based regulated wholesale input by geographic area is therefore sensible, as in some areas it may be more efficient for access seekers to use VUA, SLU or duct access rather than NGA bitstream.

5.5. Modelling approach: DCF versus period-by-period

158. There are essentially two modelling methods to be considered. A discounted cash flow (DCF) approach models the lifetime profitability of a product or business, taking into account the expected costs and benefits (revenues) over the lifetime of an investment while allowing for the time value of money. By contrast, a period-by-period approach makes explicit allocations of costs and revenues to a number of periods. Both methods can be used prospectively (on the basis of forecasts) or in retrospective analysis (on the basis of actual out-turns). We discuss prospective and retrospective analysis further in Section 5.7 below.
159. The Commission recommends a DCF approach to modelling margins. Businesses typically use DCF models to assess the economics of business activities that extend over multiple accounting periods. A benefit of a DCF approach is that it recognises that costs and revenues may be uneven across the lifetime of an investment, and that from a business perspective what matters is overall profitability rather than profitability in any particular period.
160. It is also possible for period-by-period approaches to be used in economic replicability testing of NGA products (in prospective or retrospective contexts). The key to using period-by-period approaches, however, is to ensure that sensible allocations of fixed costs are made to the various periods and not to place undue weight on margins in any particular

⁸³ BEREC guidance, page 34: “If a mix of relevant wholesale services is used, this should reflect the approach of an efficient operator on the specific national market, i.e. the mix of wholesale services that an efficient operator would chose to provide the downstream service”.

period or group of periods shorter than the life of the relevant investments unless there is high confidence in the period-by-period allocations. For example, if revenues are not expected to be linear, a linear allocation of fixed costs to the periods (e.g. using straight line depreciation) may produce negative margins in certain periods and positive margins in others, despite there being profitability over the life of the relevant investments.

161. The BERC guidance perhaps mischaracterises the advantages and disadvantages of a period-by-period approach (compared to a DCF approach). It asserts that a period-by-period approach is based on actual data,⁸⁴ however as just discussed a period-by-period approach could be based on actual data or on forecast data. It also asserts that an advantage of the period-by-period approach is that “it shows whether or not the SMP operator’s offerings have been profitable in the short run”.⁸⁵ However, short run profitability may be misleading unless fixed costs have been allocated appropriately across the periods to reflect the incidence of revenues over the periods.
162. The BERC guidance also observes (presumably with reference to period-by-period modelling) that “[m]ost NRAs opt for straight line depreciation for practical reasons”.⁸⁶ It is important that NRAs that apply straight line depreciation in period-by-period models are aware of the dangers of such an approach if negative margins in particular periods are to be the basis for a finding of a breach of the non-discrimination obligation.

5.6. Relevant time frame for a DCF assessment

163. The appropriate time frame for a DCF assessment should reflect the length of time over which relevant investments are expected to be recovered. This will depend on the facts of the case at hand and the level of aggregation that is being tested.

5.6.1. Our recommendation on testing at the individual product level

164. When testing at the individual product level, the relevant investments that are incremental at that level are typically in customer acquisition, including subsidies for customer premises equipment (CPE) and promotional discounts (e.g. “first three months free” offers). These are investments that businesses look to recover over the life of the customer. Therefore when testing at the individual product level on an avoidable cost or LRIC basis, it is normally sensible to do so over the average customer life (ACL), however see our comments regarding the Commission’s recommendation on testing flagship products using a LRIC+ cost standard (Section 5.6.3) and also our comments on introductory pricing in the following section (Section 5.7).
165. The ACL for testing NGA products should be an ACL that is anticipated or demonstrated *for NGA customers*. It is widely anticipated throughout the industry that NGA products will exhibit lower churn and higher ACLs than CGA products. Indeed, this is often an important feature of NGA business cases. This is because NGA products are capable of providing customers with greater satisfaction and a wider set of services, both of which may contribute to reducing churn and increasing the average customer lifetime. Therefore when performing ERTs in relation to NGA services NRAs should use longer ACLs than those

84 BERC guidance, page 23.

85 BERC guidance, page 23.

86 BERC guidance, page 32.

experienced for CGA services. This is reflected in the 2013 Recommendation, which states:

When estimating the average customer lifetime, NRAs should take due account of the different characteristics and competitive conditions of the provision of services over NGA networks compared to the legacy copper network, where these are likely to result in users of NGA networks having different average customer lifetimes compared to users of the copper network.⁸⁷

166. Some evidence of NGA products experiencing higher levels of customer satisfaction and lower churn (and therefore higher ACLs) than CGA products was produced by BT in its submission in response to Ofcom's 2014 consultation on setting the VULA margin.⁸⁸ BT pointed to Ofcom's 2013 Communication Report, which stated that "[o]verall satisfaction levels, along with satisfaction with downstream and upstream connection speeds, and the value for money of their service, were higher among superfast than non-superfast users in almost all cases".⁸⁹ BT also noted that one of the largest access seekers in the UK (TalkTalk Group) has acknowledged the benefits that fibre will bring in terms of reducing churn. For example, TalkTalk Group has stated that fibre customers have reduced churn and costs to serve.⁹⁰

5.6.2. Our recommendation on testing at an aggregated level

167. When testing at the NGA portfolio level, there may be assets and investments that are incremental at that level that have longer lives than the ACL. Examples might be investments in IT systems, backhaul networks or content for TV offerings. Another example (which may be of particular relevance where the NGA input is based on FTTH) would be where a fixed upfront charge is included as part of the terms for access to the NGA input and the business case on which this is based anticipates recovery of that fixed charge over a longer period than the ACL.
168. Where there are such longer lived investments it would not be appropriate to include the full cost of those investments in a DCF analysis over the ACL. The access provider should not be required to recover the entirety of such investments over the ACL if the investments will serve the retail business and generate revenues for a longer period. One option would be to perform the DCF analysis over a longer period than the ACL, reflecting the longer life of those investments. An alternative would be to perform a DCF assessment over the ACL, but either include a terminal value for the longer lived assets or amortise the cost of the longer lived investments on an annual basis and allocate only a portion of the

87 2013 Recommendation, Annex II.

88 BT Group, *BT Group plc's response to Ofcom's Consultation of 19 June 2014 "Fixed Access Market Reviews: Approach to the VULA Margin"*, 5 September 2014, paragraphs 8.36-8.41 and 8.47-8.50.

89 Ofcom, *International Communications Market Report*, 12 December 2013, page 246.

90 Dido Harding, Chief Executive of TalkTalk Telecom Group PLC, stated: "*although the gross margin on fibre is lower in the percentage level than copper, fibre customers are a lower cost to serve and lower churning*". See TalkTalk Telecom Group PLC, *Interim 2012 TalkTalk Telecom Group PLC Earnings Conference Call*, 13 November 2012. See also *Interim Management Statement for the 3 months to 30 June 2014 (Q1 FY15)*, 23 July 2014.

investment costs to the years included in the DCF analysis.⁹¹ In order to reflect expectations of growth in NGA services over time, it would be preferable to use economic assessments of either the terminal value or the recovery of the investment that is required over the period covered by the DCF analysis, rather than accounting approaches.

5.6.3. The Commission's recommendation

169. Our views on the relevant time frame for a DCF assessment (described in the previous two sub-sections) are broadly consistent with the 2013 Recommendation on this subject, in that the Commission agrees with us that the life of the relevant investments should be reflected.
170. However, the formulation of the Commission's recommendation for testing "flagship" products is more complicated than our recommendation for testing at the product level because the Commission has recommended the use of a LRIC+ cost standard, rather than our recommendation of a cost standard that does not include any "+". The difference between the Commission's recommendation and ours is therefore to deal with the "+" in the Commission's formulation, where the "+" may include investments that are longer-lived than the ACL.
171. To elaborate, the Commission recommends the testing of "flagship" products using a DCF approach over an ACL with "downstream costs that are annualised according to a depreciation method that is appropriate to the asset in question and the economic lifetime of the corresponding assets required for the retail operations (including network costs that are not included in the wholesale NGA access service)".⁹² This recognises that there are some assets involved in a retail business that may be longer-lived than the ACL and recommends that the costs of these assets be annualised so as to include only a portion of them in the "+" part of the LRIC+ test of "flagship" products over an ACL. The Commission's reference to a "depreciation method that is appropriate to the asset in question" allows for annualisation of the costs of the longer lived assets on an economic basis that reflect expectations of growth in NGA services over time rather than a straight-line accounting basis.

5.7. Low introductory retail prices to generate benefits beyond the lifetime of early adopters

172. Retailers (i.e. access seekers and retail operations of access providers) may wish to set retail prices low to early adopters of NGA services in order to generate retail-specific bandwagon or network effects (i.e. greater future demand)⁹³ or in order to benefit from "learning by doing" cost reductions (i.e. lower future costs as the retailer gains experience). These can be legitimate motivations for prices that may fail an ERT if the ERT is tested simplistically using a DCF analysis over an ACL. In other words, in the presence of bandwagon, network or learning by doing effects, retail margins that do not deliver

91 We recognise that including allocated amortised costs in place of investment cash flows would be a departure from a pure DCF analysis.

92 2013 Recommendation, Annex II.

93 For example, a particular retailer might hold a reasonable expectation that early adopters will encourage others to adopt/upgrade to products that may be offered over NGA or there may be some retail-specific application that generates network effects for the retailer (i.e. where each subscriber's valuation of the retail offer increases with the number of other subscribers). Therefore the profitability of the retail pricing strategy may derive in part from revenues earned from early adopters and in part from revenues from later adopters.

profitability over the ACL for early adopters of the product may not be harmful to competition, as retail business cases over a longer time frame including later adopters may be profitable.

173. The problem is not with the introductory retail price strategy, but with the limitations of a simplistic DCF analysis over an ACL. Such an analysis ignores the future benefits to retailers of low introductory prices for early adopters. Where the benefits are retail-level benefits (rather than benefits for the access provider's upstream network), they are, in principle, achievable not only by the access provider's retail operation, but also by access seekers. Such benefits should not be ignored.
174. The 2013 Recommendation acknowledges the importance for promoting NGA investment that NGA access providers be allowed the flexibility to "conduct appropriate penetration pricing".⁹⁴ In this situation it may be justified for the test to reflect the additional future benefits that the retail operation could legitimately expect from the low introductory pricing strategy. If the access provider is constrained to price in a way that passes an ERT using a simplistic DCF analysis over an ACL, the access provider will either (i) be placed at a competitive disadvantage vis-à-vis access seekers and alternative infrastructure operators that can freely set low introductory prices or (ii) have to lower wholesale prices for the NGA input to subsidise low introductory prices of its own retail operation and those of its competitors. In either case, there is likely to be a negative impact on the access provider's incentives to invest in NGA in the first place.
175. To be clear, we must distinguish between bandwagon, network and learning by doing effects at the *upstream NGA network level* and these effects at the *downstream retail level*. The former effects might justify access providers setting prices for the *upstream NGA network inputs* below cost for some time in order to generate the future benefits. Only the latter effects could justify retail prices below cost over the lifetime of early adopters.

5.8. Prospective versus retrospective analysis

5.8.1. Introduction

176. Margin squeeze assessments (including ERTs) can be conducted on a prospective or retrospective basis, or both. A prospective test is conducted on the basis of the information available at the time the pricing is or was implemented in the market. A retrospective test occurs on the basis of information that becomes available after this point in time. Retrospective testing is therefore conducted on the basis of actual out-turns, whereas a prospective test is based on forecasts of the future.
177. If a test is conducted ex ante (before a product or portfolio is launched or before upstream charges for the NGA input are determined) then by necessity the test must be prospective, as actual out-turns are not available at that point. If the test is conducted ex post, then it may be conducted on either a prospective basis (i.e. on the basis of reasonable forecasts at the time that the products or portfolios were launched or the upstream charges were determined) or a retrospective basis (i.e. on the basis of actual outcomes).
178. The choice of a prospective or retrospective analysis does not determine whether a DCF or period-by-period approach is used for the testing. Although prospective testing and DCF analysis typically go hand in hand, and retrospective testing often takes the form of period-

94 2013 Recommendation, recital 49.

by-period analysis, it is possible for prospective testing to be on a period-by-period basis and for retrospective testing to be on a DCF basis.

5.8.2. Our recommendation

Prospective testing should be preferred to retrospective testing when forecasting plays a role in pricing decisions

179. When testing ex post, retrospective testing can play a valuable role in identifying exclusionary squeezes *when uncertainty is limited and forecasting does not play a significant role* in upstream or downstream pricing decisions (e.g. where demand for products is reasonably predictable and where prices can be adjusted rapidly as conditions change).
180. However, when there is significant uncertainty as to future conditions and forecasting plays a major role in pricing decisions (e.g. when prices are fixed for long periods under long term contracts), prospective testing should be preferred. In these situations, a retrospective test may reveal negative margins, but little weight should be placed on this observation if the initial forecasts can be shown to have been reasonable at the time they were made.
181. This has been recognised by the Commission in its Article 102 Guidance (albeit in the context of a discussion of the Commission’s approach to predatory pricing):⁹⁵
- undertakings should not be penalised for incurring ex post losses where the ex ante decision to engage in the conduct was taken in good faith, that is to say, if they can provide conclusive evidence that they could reasonably expect that the activity would be profitable.*
182. Translating this principle to the context of the 2013 Recommendation, an access provider should not be found to have breached an SMP condition to pass an ERT just because demand forecasts that were reasonable to make at the time turned out to be incorrect. If this was a possible outcome of forecasting error, it could lead to excessively conservative forecasts being used to avoid the risk of regulatory breaches being found ex post, with the likely effects of higher prices being charged to consumers in the early stages of market development and competitive disadvantages for access providers compared to access seekers and alternative infrastructure operators (with consequential negative impacts on incentives to invest efficiently in NGA).⁹⁶
183. In the interests of certainty and pricing flexibility for the access provider, the forecasts used in the ERT when testing ex post on a prospective basis should be the forecasts made by the access provider at the time that the pricing was implemented (as long as those forecasts are judged by the NRA to be “reasonable” in the sense of being within the range of plausible forecasts that an equivalent competing retail business would have made at that time).

⁹⁵ European Commission, *Guidance on the Commission’s enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings*, 2009/C 45/02, Official Journal of the European Union, 24 February 2009, C45/17, footnote 3.

⁹⁶ We recognise that there could be an opposing risk: that of the access provider deliberately inflating demand forecasts in its business planning in order to justify lower margins for access seekers. This potential issue, if it is thought to be significant, might be dealt with by comparing the access provider’s internal demand forecasts with external forecasts, in order to assess whether the access provider’s business plan was in line with or radically out of line with market expectations at the time.

Prospective testing should be preferred to retrospective testing when there are fixed upfront components of upstream charges

184. A particular situation in which prospective testing should be preferred to retrospective testing is where upstream charges include risk sharing elements such as large fixed upfront components or minimum volume commitments. As we discuss in the following section, these arrangements are most likely to occur in the context of FTTH investments, which require greater capital expenditure and are subject to greater demand uncertainty than FTTC investments, and where risk sharing arrangements may be required for the investment to take place.
185. Whether downstream competitors will achieve sufficient volumes and ongoing margins to recover these fixed upstream charges cannot be known for certain at the time that these wholesale agreements are entered into. Here, forecasting is central to the pricing decisions. If testing of such agreements is to occur,⁹⁷ it should be on a prospective basis using reasonable forecasts of demand and profitability.
186. A finding on a retrospective basis that demand turned out to be lower than expected, and insufficient for the downstream competitor to be profitable, should not be the basis for any finding of a breach of the SMP condition by the access provider. If this were to be the case then once again there would be a risk of discouraging investment in NGA as the risk sharing properties of the fixed components of upstream charges would be negated. That is, if an access provider must always maintain a margin for an access seeker to be profitable on a retrospective basis, the access seeker does not actually take on any risk when agreeing to pay a fixed upfront charge, and all of the risk of lower than expected demand remains with the access provider. We discuss risk sharing arrangements further in the following section.

5.9. Risk sharing arrangements

5.9.1. Introduction

187. FTTH investments differ from FTTC investments in that the former require significantly larger capital investments. There is also greater uncertainty in terms of the demand for broadband speeds that FTTH can deliver: at the moment there are few applications that require such speeds and little demand for such speeds. Therefore, potential FTTH investors face the risk of deploying an expensive technology that may not deliver significant additional value to consumers (beyond FTTC or CGA-based services) for many years, if at all.
188. In some countries, efficient NGA investments may not occur unless the risk of those investments is shared among a number of players, either in the form of agreements that include some form of commitment by access seekers (e.g. minimum volume commitments or fixed access charges) or arrangements in which a number of players invest jointly in fibre deployments. In these contexts, providing incentives for efficient FTTH investments may boil down to providing incentives to offer commitment agreements or to enter into joint ventures.
189. When performing economic replicability testing in the context of risk sharing agreements the challenge for NRAs is to ensure that competition is safeguarded while maintaining a

⁹⁷ As discussed below in Section 5.9.3, this assumes that the uncertainty can be safely and sensibly modelled by the NRA.

level playing field between the access provider and risk sharing access seekers. If the parameters of the ERT are such that the access provider is placed at a disadvantage downstream with respect to those access seekers that enter into risk sharing agreements, the access provider's incentives to invest in NGA will be diminished. It should not be assumed that there will be sufficient incentives for access providers to invest in NGA purely on the basis of upstream revenues from the wholesaling of access. An important part of many NGA business plans is the ability to earn retail revenues as well as wholesale revenues. Critical to achieving this is a level playing field in competition for subscribers.

190. The Commission has for some time acknowledged the desirability of risk sharing arrangements between access providers and access seekers in order to incentivise NGA investments.⁹⁸ The 2010 Recommendation acknowledged the significantly higher risk profile of FTTH compared to FTTC due to greater demand uncertainty and larger capital requirements⁹⁹ and that risk sharing arrangements that diversify the risks of FTTH deployment may lead to "more timely and more efficient deployment of NGA networks".¹⁰⁰ The 2010 Recommendation also encouraged NRAs not to view access arrangements involving long-term or volume commitments in return for lower variable access prices as unduly discriminatory if the lower variable prices "appropriately reflect an actual reduction of the investment risk"¹⁰¹ and noted that arrangements for co-investment in FTTH may lead to effective competition where there is a sufficient number of co-investors and the structure of the jointly controlled network aims at ensuring effective competition downstream.¹⁰² The 2010 recommendation also included an Annex entitled "Pricing principles and risk" that contained recommendations on how to assess long-term access pricing and volume discounts in the case of FTTH.
191. The 2013 Recommendation similarly acknowledges the demand uncertainty regarding the provision of "very high speed broadband services" and that to promote efficient investment and innovation it is important to allow access providers and access seekers to "share some of the investment risk by differentiating wholesale access prices according to the access seekers' level of commitment".¹⁰³ The 2013 Recommendation acknowledges that this "could result in lower prices for long-term agreements with volume guarantees, which could reflect access seekers taking on some of the risks associated with uncertain demand".¹⁰⁴
192. Moreover, in Annex II of the 2013 Recommendation, when discussing relevant wholesale prices the Commission recommends that:

in order to ensure the right balance in national circumstances between incentivising efficient and flexible pricing strategies at the wholesale level and at the same time

⁹⁸ For example, the value of risk sharing arrangements is mentioned throughout the Commission's 2010 Recommendation on regulated access to next generation access networks: Commission recommendation of 20 September 2010 on regulated access to Next Generation Access Networks, 2010/572/EU, OJ L 251, 25 September 2010, page 35, (2010 Recommendation).

⁹⁹ 2010 Recommendation, recital 23 and Annex I.

¹⁰⁰ 2010 Recommendation, recital 24.

¹⁰¹ 2010 Recommendation, recital 25.

¹⁰² 2010 Recommendation, recital 28.

¹⁰³ 2013 Recommendation, recital 49.

¹⁰⁴ 2013 Recommendation, recital 49.

*ensuring a sufficient margin for access seekers to maintain sustainable competition, NRAs should **give due weight to the presence of volume discounts and/or long-term access pricing agreements between the SMP operator and access seekers.***¹⁰⁵ [Emphasis added.]

193. Importantly, the Commission also recommends that when determining the parameters of the ERT “NRAs should ensure that the SMP operator is not put at a disadvantage vis-à-vis access seekers regarding the sharing of the investment risk”.¹⁰⁶ We interpret this as a reference to the importance of ensuring a level playing field between the access provider and access seekers that share the risk.
194. With these recommendations in mind, the following sub-sections consider economic replicability testing in relation to a number of alternative forms of risk sharing arrangements. The approach to such arrangements in the context of economic replicability testing depends on the form that the arrangements take – there is no “one size fits all” approach. However, in each case we apply the common principle of aiming to maintain a level playing field downstream while safeguarding competition.

5.9.2. Volume discounts

195. Where volume discounts do not reflect cost savings they may represent a form of price discrimination, but price discrimination can have many legitimate pro-competitive justifications (including incentivising marketing efforts by downstream distributors) and is not anti-competitive per se.
196. Where the access provider offers a schedule of discounts on access charges dependent on volume, there is the question of which level of discount (which level of the variable charge) to model in the test.
197. Modelling margins on the basis of the highest discount level (the lowest variable charge) would be subject to manipulation by the access provider if the access provider is the largest downstream operator: the access provider may set a high discount for a volume that only the access provider’s own downstream operation is likely to achieve. This would undermine the nature of the test, which is to test the upstream charges that are offered to access seekers.
198. At the other extreme, using the undiscounted variable charge would protect not only efficient access seekers, but also access seekers operating at inefficient scale. Moreover, the access provider would be forced to price at the retail level as if it did not benefit from any discount while in competition with large access seekers that do benefit from significant discounts. This would discourage the access provider from offering volume discounts in the first place. Discouraging the access provider from offering volume discounts would be contrary to the Commission’s goal of encouraging risk sharing arrangements in order to incentivise investments in NGA.
199. A compromise between these extremes would be to model the ERT on the basis of the discount level that is achievable by the largest access seeker. This would ensure that the access provider is placed on a level playing field with the largest access seeker and is not dis-incentivised from making NGA investments. Regarding the safeguarding of

¹⁰⁵ 2013 Recommendation, Annex II, page 28.

¹⁰⁶ 2013 Recommendation, Annex II, page 27.

competition, it may be that the discount level achievable by the largest access seeker is in fact achievable by several access seekers, or is only achievable by one or two access seekers, but these are sufficient to safeguard competition, particularly if there is also competition from alternative infrastructure. If that is not the case, the slope of the discount schedule below the level achievable by the largest access seeker should not be so steep as to reduce competition, taking into account that:

- a. NGA services are supplied in a differentiated product market and are typically bundled with other services such as mobile services and TV, and access seekers with large scale in those other services may make profitable use of the NGA input even if they do not achieve the discount level achieved by the largest access seeker; and
- b. Smaller access seekers with respect to NGA services may be large with respect to CGA services and capable of achieving the highest discount level with respect to the NGA input if they were to change their sales and marketing focus from CGA to NGA. Therefore, a steep discount schedule may incentivise large CGA access seekers to make the investments necessary to expand and become larger in the supply of NGA services, which would assist towards achievement of the DAE goals.

200. The Commission provides some guidance in its 2013 Recommendation:

*Volume discounts and/or long term access pricing agreements are an important tool to foster NGA investment, in particular where take-up by consumers is still low, and can be compatible with an EoI or EoO approach. However, in order to ensure that market entry by efficient competitors is possible, NRAs should accept volume discounts by SMP operators to their own downstream business, for example their retail arm, only if they do not exceed the **highest volume discount offered in good faith to third party access seekers.**¹⁰⁷ [Emphasis added.]*

201. This is a little confused: it should not matter what discount the SMP operator's own downstream business achieves, as this is a notional transfer price and not relevant to the ERT assessment. What matters is whether there is an insufficient margin between the prices (after discounts) charged to *access seekers* and the access provider's downstream prices. However, from this statement it can be inferred that the Commission agrees with us that an ERT based on the *highest level of discount achievable by access seekers* would be appropriate.

5.9.3. Commitment arrangements

Background

202. While volume discount schemes provide incentives to access seekers to increase their demand for upstream inputs, NGA investors may sometimes require greater levels of commitment by access seekers in order to be incentivised to invest in NGA, particularly if the investment is in FTTH.
203. Two largely equivalent forms of commitment arrangements are long-term contracts with minimum volume commitments and upfront fixed charges: a long-term contract with a minimum volume commitment is essentially equivalent to a commitment to pay a fixed

107 2013 Recommendation, recital 19.

charge regardless of actual volume achieved.¹⁰⁸ Upfront fixed charges and minimum volume commitments may also be combined within the same arrangement: an example of such an arrangement exists in Germany, as discussed in the box below.

204. Fixed upfront fees or long-term contracts with volume commitments give the NGA investor a greater degree of certainty regarding returns on the investment, and share the investment risk between the NGA investor and the access seekers (as the Commission has contemplated in its 2010 and 2013 Recommendations). Access seekers will typically be offered lower variable (per unit) wholesale charges in return for making these commitments. Moreover, for an access seeker to make a long-term commitment it must expect to achieve lower average wholesale charges overall (i.e. allocating the fixed element across the expected number of customers). Lower charges may be particularly attractive when access seekers face competition from alternative infrastructures with low variable costs.

Testing of commitment arrangements

205. We expect that in a regulated environment the NRA would normally review any such arrangement in advance and confirm to its satisfaction on a *prospective* basis – using best available forecasts of future demand and other conditions (including competition from alternative infrastructures) – that the arrangement will allow for effective competition downstream. The NRA should review the arrangement in a swift manner to ensure that competition with alternative platforms is not distorted and that the process does not generate undue regulatory burdens. This assumes that the uncertainty can be safely and sensibly modelled by the NRA. If the nature of the uncertainty is such that the NRA considers that it cannot be sensibly or safely reduced to an ERT calculation, then other mechanisms for assessing the arrangement (not evaluated in this report) should be considered.
206. Ideally any ERT of commitment arrangements should be conducted using a time period that reflects the length of the commitments being made by the access seekers (rather than the average customer life) and at an aggregated level across all products that the access provider intends to supply over the NGA infrastructure (as the commitments being made are at the NGA portfolio level rather than at the individual product or customer level).
207. NRAs should not insist on the commitment being set at a level that all possible access seekers could expect to recover. This would be likely to result in small commitment levels and defeat the purpose of the risk sharing arrangement and discourage the NGA investment.
208. If an ERT is to include the fixed as well as the variable components of commitment agreements, it will only make sense to test margins on a *prospective* basis, using

¹⁰⁸ Indefeasible rights of use (IRU) arrangements represent another form of commitment arrangement that can be analysed similarly.

reasonable assumptions in terms of forecasts of demand and other future variables.¹⁰⁹ This is for a number of reasons.

- a. The reasonableness of fixed charge components can only be assessed prospectively with reference to forecasts that were reasonable at the time the agreements were entered into. The fixed charges cannot be varied after the agreement has been entered into (e.g. if demand turns out much lower than forecast) without undermining the risk sharing quality of the agreement. Therefore, retrospective testing that includes the fixed components will be uninformative as to whether there was exclusionary intent on behalf of the access provider.
 - b. Furthermore, to require an access provider retrospectively to preserve the profitability of access seekers by providing margins that allow for recovery of the fixed charge components – no matter how demand develops – would *leave all the risk with the access provider and defeat the risk sharing concept*.
 - c. It would also preclude the access provider from responding dynamically if needed to competition from alternative infrastructure, creating an uneven playing field vis-à-vis the access seekers that will not be constrained from lowering their prices towards the variable wholesale charge component.
209. If retrospective testing is conducted on the basis of actual out-turns, then the ERT should test only the *variable* charge components, as only these can be varied after the agreement is entered into without destroying the risk sharing properties of the agreement. Retrospective testing using just the variable charge components will preserve the risk sharing concept and the access provider's pricing flexibility. Moreover, from an access seeker's perspective, once it has made the commitment the fixed charge components are sunk costs; they should not factor into its considerations of how to price going forward.

Testing of "no-commitment" wholesale charges

210. There is no need for an NRA to apply an ERT to higher "no-commitment" wholesale charges if the NRA considers that the commitment level in the risk sharing arrangement is such that, together with alternative infrastructure operators, a sufficient number of access seekers will be viable to provide effective competition.
211. Further competition from "no-commitment" access seekers would be of marginal value in that context, particularly when set against the aim of incentivising the investment in the first place and in the context of demonstrable retail price constraints from other technologies. In any event, for a number of reasons no-commitment access seekers may remain viable even if the variable charges they face failed an ERT (with option values fully accounted for – see below).
- a. Since NGA services are likely to be provided in a differentiated product market and are typically bundled with other services such as mobile services and TV, no-

¹⁰⁹ Again, this assumes that the uncertainty can be safely and sensibly modelled by the NRA. A recent paper by Laure Jauniaux and Marc Lebourges argues that the cost standard for economic replicability testing for NGA services should include only the variable part of wholesale prices and that an additional transitory "competition migration test" could be used to prevent foreclosure strategies: see Laure Jauniaux and Marc Lebourges, "Economic Replicability Tests for Next-Generation Access Networks", EUI Working Paper RSCAS 2014/75, European University Institute, Robert Schuman Centre for Advanced Studies, forthcoming in *Telecommunications Policy*.

commitment access seekers with large scale in those other services may make profitable use of the NGA input even if they face higher wholesale charges.¹¹⁰

- b. CGA will remain regulated on a cost-oriented basis. A no-commitment access seeker may therefore build a retail business on the basis of CGA wholesale inputs (alone or in combination with NGA wholesale inputs where these are available under standard agreements).
212. If an ERT were nonetheless applied to the higher “no-commitment” wholesale charges, then it would be *critical* that the ERT reflect the *option value* for such access seekers of not making a commitment: i.e. the value of being able to build up a retail customer base for NGA products without having to make any commitment, thereby retaining flexibility in a world of highly uncertain demand. In principle, this option value might be incorporated in the form of a higher terminal value in the DCF analysis or in some other way (such as a *negative* fixed “cost”).
213. Ignoring this option value would create an uneven playing field: it may force the access provider to price higher than access seekers that make the commitment and benefit from lower wholesale charges. Knowing in advance that it will be hamstrung in terms of competing at the retail level with access seekers that make the risk sharing commitments that are necessary for the NGA investment to occur, the access provider is unlikely to make the investment in the first place. In short, disregarding the option value for “no-commitment” access seekers in an ERT of no-commitment wholesale charges would fail to reflect the Commission recommendation that “NRAs should ensure that the SMP operator is not put at a disadvantage vis-à-vis access seekers regarding the sharing of the investment risk”.¹¹¹

Box 3: Risk sharing arrangements in Germany

Germany’s NRA (BNetzA) has authorised Deutsche Telekom to offer access seekers discounts on the monthly variable charge for wholesale access to NGA inputs (including VDSL vectoring) in return for a fixed upfront fee together with commitments to purchase a minimum volume over ten years (“Kontingentsmodell”). The commitments are based on local geographic divisions and on an efficient market share of 6% of homes passed by the technology in a division, so that the extent of commitment of any access seeker is in proportion to the extent of the access seeker’s geographical presence: for example, an access seeker that makes a commitment in ten local divisions will commit ten times more than an access seeker that makes a commitment in just one division (assuming that in each division there is an equal number of homes passed by the technology).

When it comes to testing margins, BNetzA defines the efficient operator as an operator having a sufficient number of customers to use the Kontingentsmodell. BNetzA does not test the (higher) wholesale charges that apply to access seekers that do not make any commitment, because these are not considered to be running an efficient business model. BNetzA tests only the fixed and variable charges under the risk sharing arrangement, conducting both prospective and retrospective tests.

110 The ERT tests the access provider’s retail offerings, which may be differentiated from the offerings of the “no-commitment” access seekers.

111 2013 Recommendation, Annex II, page 27.

5.9.4. Joint venture arrangements

214. It may be that in some situations NGA investments (in particular, FTTH investments) will not occur unless it is in the form of a joint venture arrangement among a number of players.
215. Where there is a proposal for a joint venture arrangement, each joint venture partner will become a co-owner of the NGA network and have a claim on the returns of that network. Co-ownership of the network gives each joint venture party access to the network. That access will be on terms included in the joint venture agreement freely entered into by each party. It is therefore unlikely that a joint venture arrangement could be construed as a vehicle to exclude any of the co-owners. Therefore the terms of joint venture arrangements do not require economic replicability testing.

6. PROCEDURES FOR ECONOMIC REPLICABILITY TESTING

216. In this section we discuss and assess alternative *procedures* for economic replicability testing in light of the aim of the 2013 Recommendation and the context in which economic replicability testing will occur.

6.1. Introduction to the alternative procedures

217. A variety of procedures is currently in place for the testing of margins (and the setting of minimum margins) between wholesale and retail prices across Europe. We consider the merits of these alternative procedures in light of the aim of the 2013 Recommendation and the context of economic replicability testing. We have classified the procedures into the following four broad categories, which encompass both relatively “light handed” procedures and more “heavy handed” interventionist procedures.
 - A. An ex ante obligation to pass the ERT with ex post testing in the event of a complaint or an investigation initiated by the NRA.
 - B. An ex ante obligation to pass the ERT with ex post testing at regular intervals.
 - C. Ex ante economic replicability testing prior to product or tariff/promotion launches (pre-launch testing).
 - D. Ex ante determination of minimum margins.
218. Figure 10 below illustrates how the countries that we surveyed currently test margins in relation to NGA services.

Figure 10: Procedures in surveyed European countries (as at December 2014)¹¹²

A: Ex ante obligation + ad hoc ex post testing	B: Ex ante obligation + regular ex post testing	C: Pre-launch testing	D: Minimum margin setting
Albania	Austria	Greece	The Netherlands
Germany		Ireland	
Lithuania		Italy	
Sweden		Spain	
United Kingdom ¹¹³			

Source: CRA survey of ETNO members and CRA own research

6.2. Dimensions for assessment of the options

219. Before considering and assessing alternative procedures it is important to have in mind criteria for choosing among them. The choice among alternative procedures should be guided by Article 8(4) of the Electronic Communications Access Directive (Directive 2002/19/EC), which provides that obligations imposed as a result of an SMP designation should be based on the nature of the problem identified and *proportionate*. We therefore consider that the procedure chosen should be the one that in line with the 2013 Recommendation best achieves the aim of enhancing NGA investment while safeguarding competition with the least burdens on the NRA and the access provider, and in the specific context of economic replicability testing (i.e. where there is a demonstrable retail price constraint). Enhancing investment incentives may manifest in a number of ways, including commercial flexibility regarding pricing, transparency and certainty regarding whether the access provider's prices are compliant with the regulation, and the minimisation of burdens imposed on the access provider.
220. In this section we consider the various procedures with reference to their performance along the following five dimensions.
- Safeguarding competition.** As discussed, the aim of an ERT regime should be to promote NGA investment while safeguarding competition. Different ERT procedures may provide different degrees of protection for access seekers.
 - Flexibility for the access provider to compete downstream.** It is also important that access providers are not prevented from competing effectively downstream with access seekers and alternative infrastructure operators. This includes being able to respond promptly to changes in the market (including competitor price changes). Restrictions on the commercial flexibility of access providers may weaken competition as well as discourage NGA investments.
 - Transparency and certainty for market participants.** Both access providers and access seekers stand to benefit from clarity and certainty in regulatory procedures.

¹¹² Those countries that we surveyed that do not currently have margin squeeze regulation of NGA services (see Figure 8) have been excluded from this figure. Other countries (e.g. Malta and Norway) are not included in this figure as they have not yet settled on the procedure to use to test margins.

¹¹³ The current situation in the UK is Option A. However, Ofcom has recently issued a draft statement that proposes the introduction of an element of "high level" ex post assessment by Ofcom every six months. If this draft statement becomes final, the UK would move from Option A to Option B. See Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraphs 4.48 – 4.106.

If procedures lead to uncertainty, market participants may not compete effectively or make efficient investment decisions, including entry and exit decisions. An access provider that is uncertain whether its prices pass or fail the ERT may compete less aggressively on price at the retail level or set wholesale prices that are lower than necessary. At the same time, an access seeker that lacks clarity may avoid entering a market if it cannot be sure whether it will be able to earn adequate margins. Transparency and certainty are therefore beneficial for both promoting efficient investment in NGA and safeguarding downstream competition.

- d. **Flexibility for the NRA to avoid regulatory failure.** By “regulatory failure” we mean a test that either overstates or understates the required margin. Electronic communications markets are fast-moving and converging, and demand and business models are often not mature. In this context the appropriate parameters and approaches for economic replicability testing may change over time (for example as new products and bundles develop). It is therefore important that the chosen ERT procedure offers flexibility to the NRA to adapt the details of the obligation as circumstances require. An inflexible procedure that continues to impose an outdated obligation on an access provider’s offerings could harm either the access provider or access seekers (depending on whether the obligation requires margins that are too large or too small in the changed circumstances), distorting competition and damaging investment incentives.
- e. **Regulatory burdens on the access provider and the NRA.** Any ERT procedure will require resources to be devoted by the access provider, and at least oversight, if not active involvement from the NRA. All else equal, these burdens should be minimised, since they are ultimately borne by the industry, consumers and/or taxpayers. A procedure that places higher burdens on the access provider and/or the NRA should be adopted only if the benefits clearly outweigh the additional regulatory costs.

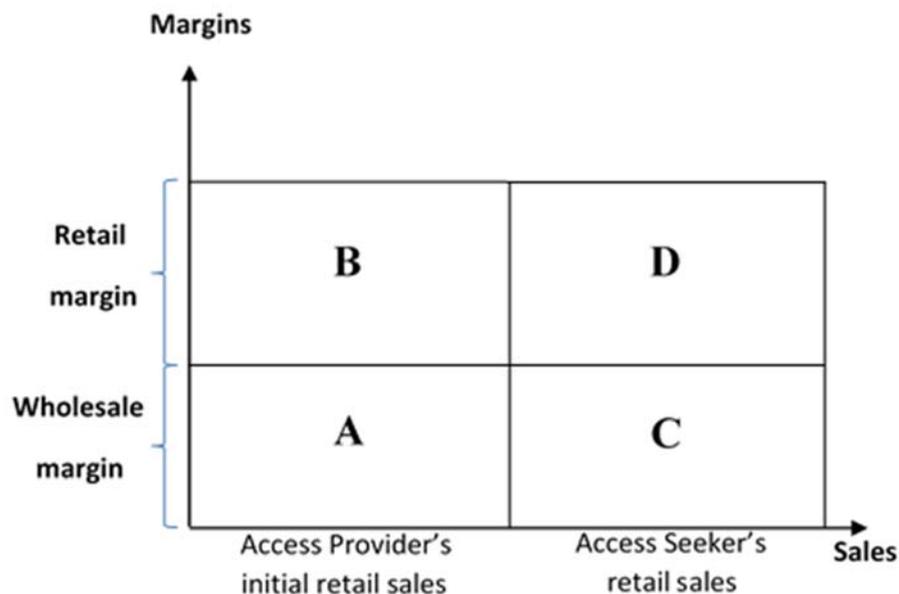
6.3. Incentives to squeeze may be low

- 221. Before assessing each option and reaching a recommendation on which should be preferred for economic replicability testing, it is useful to consider the likelihood of a failure of the ERT in the absence of testing. Whether heavy-handed interventionist procedures to safeguard competition (e.g. pre-launch testing) are proportionate should be informed by the likelihood of a failure of the ERT in the absence of testing: the lower the likelihood, the lower the justification for such procedures.
- 222. The likelihood of a failure of the ERT in the absence of testing will depend on whether the access provider has an *incentive* to squeeze. The access provider’s incentives can be modelled with reference to what is known in economics as “vertical arithmetic”. In this subsection we assess the incentives of an access provider that is supplying NGA inputs and competing downstream in the context of demonstrable retail price constraints on NGA services (either from CGA-based services or alternative NGA infrastructures).
- 223. The economic concept of “vertical arithmetic” considers the benefits and costs to an access provider of conducting a squeeze that impedes an access seeker’s ability to compete downstream. The access provider *benefits* from increased retail sales for its own downstream division, since it “steals” subscribers that would otherwise have subscribed to the “squeezed” NGA offerings of access seekers. But there is also a *cost* to the access provider: if the access provider is unable to capture all of the subscribers that are diverted

from the competing NGA offerings of access seekers, then upstream (wholesale) sales will be reduced. These two conflicting considerations are illustrated in the following figures. In the longer run, reduced downstream competition may also lead to higher retail prices. Although this third effect is not illustrated in the following figures, it also needs to be borne in mind.

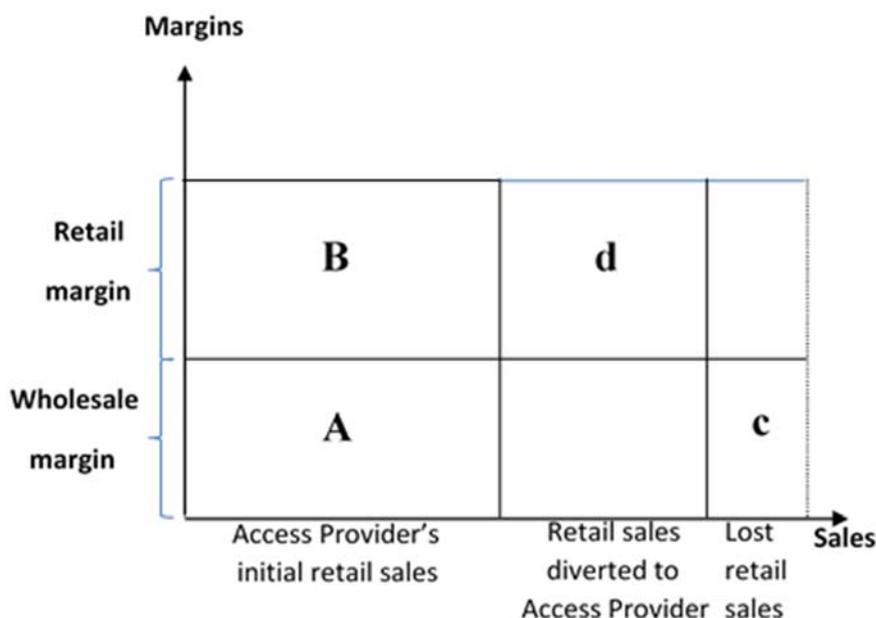
224. Figure 11 illustrates the margins for an access provider when there is no squeeze. The access provider earns wholesale and retail margins on sales by its own retail operation (areas A and B) and earns wholesale margins on sales of the upstream input to access seekers (area C). Those access seekers earn retail margins on their sales (area D).

Figure 11: Vertical arithmetic – margins for the access provider in the absence of a squeeze



225. Figure 12 below illustrates a generic situation in which there is a squeeze that causes the access seeker to withdraw its NGA offerings from the market (and assumes no retail price effect). This figure illustrates the *gain* for the access provider from the diversion of retail sales from the NGA offerings of access seekers to the access provider's own retail offerings (area d). It also illustrates the *loss* to the access provider from making fewer wholesale sales of the upstream input assuming that the access provider does not capture 100% of sales diverted from the NGA offerings of access seekers (area c). In this illustration, area d is greater than area c, which suggests that a margin squeeze here would be profitable. However, this is only a generic illustration. Below we discuss the factors that determine the sizes of areas c and d in the specific context of NGA and demonstrable retail price constraints.

Figure 12: Vertical arithmetic – generic representation of margins for the access provider when there is a squeeze



226. In contemplating whether a margin squeeze would be a profitable strategy, an access provider must consider several factors.
227. **First, the proportion of retail subscribers that would divert to the access provider (the “diversion ratio”).** The fewer subscribers that are diverted from the “squeezed” access seeker to the access provider, the less likely it is that a margin squeeze will be profitable (i.e. the smaller will be area d and the larger will be area c).¹¹⁴
- a. Subscribers that continue to purchase broadband might divert to offerings based on alternative infrastructures (e.g. offerings of cable operators or competing fibre network operators) or offerings from access seekers based on CGA inputs, which continue to compete effectively with NGA based offerings in many countries. In the former case (diversion to alternative infrastructures) the access provider would lose all margins on the subscriber. In the latter case (diversion to CGA-based offerings), CGA sales are likely to represent lower wholesale margins for the access provider, as CGA inputs tend to be priced on a cost-oriented basis whereas in the context of economic replicability testing of NGA inputs the access provider may price the NGA inputs freely subject to an ERT. Diversion to competing offerings rather than to the access provider’s own downstream offerings is more likely to be the case the more

¹¹⁴ In the NGA context, offerings based on NGA inputs may be highly differentiated (for example, in terms of additional components in bundles such as mobile services and TV and differentiated sales, and different marketing strategies) and so the NGA offerings of the access seeker may in fact lose few sales even if there is a failure of the ERT. This alone would tend to render an attempted squeeze ineffective.

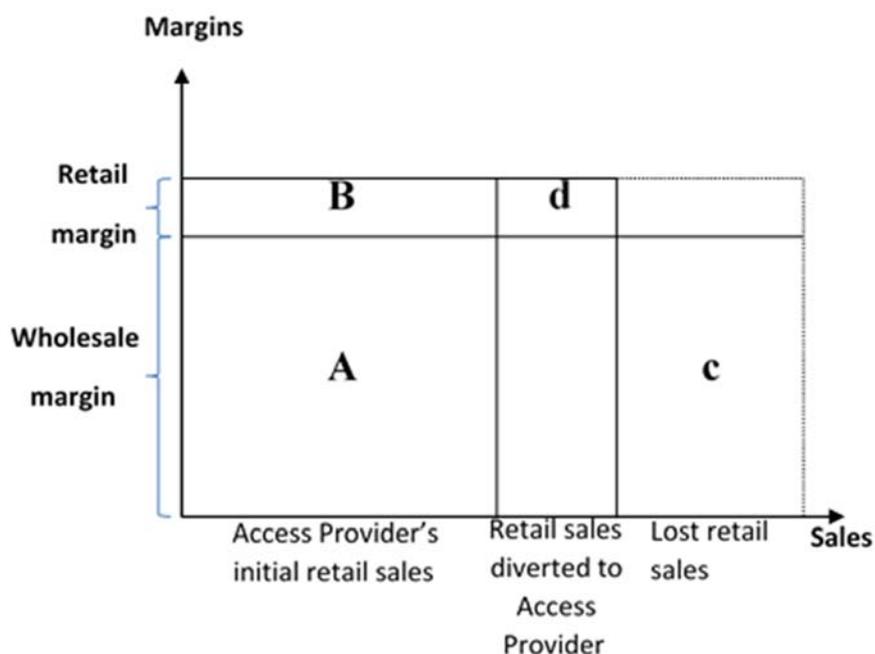
differentiated are the access seeker's downstream offerings from the access provider's downstream offerings.¹¹⁵

- b. Subscribers that no longer purchase a "squeezed" NGA offering of an access seeker may choose not to purchase broadband altogether (rather than divert to the access provider's downstream offerings). This is likely to be the case where the access seeker would otherwise serve subscribers that the access provider would not serve (e.g. through low-cost low-frills offerings). This might also occur when an access seeker is more efficient at the retail level than the access provider. The lower prices that this access seeker can set due to its efficiency may attract subscribers into the market that the access provider would not be able to attract. This will deliver wholesale margins to the access provider that it would not otherwise earn. Squeezing such an access seeker would not be in the interests of the access provider as it would simply lose the wholesale margins altogether without gaining anything.
228. Hence a margin squeeze is *less* likely to be profitable when there is a high degree of differentiation at the downstream level and where there are other downstream offerings that are substitutable and not impacted by the margin squeeze. Economic replicability testing applies in exactly these circumstances: i.e. in the context of NGA services where there is a high degree of product differentiation in the downstream offerings and where there is a "demonstrable retail price constraint" based on non-fibre technology (e.g. cable and/or CGA). This means that the ERT applies only in scenarios where incentives to margin squeeze are diminished by outside options for subscribers (i.e. where there is an inability of the access provider to capture all the rents).
229. **Second, retail margins relative to wholesale margins.** If retail margins are relatively large, an increase in downstream sales will be relatively valuable compared to the value of the decrease in sales of the upstream input, making a margin squeeze more likely to be profitable. But if retail margins are small and wholesale margins large, the more likely it is that the gain to the access provider from capturing extra retail business will be outweighed by the loss of wholesale margins (i.e. again, the more likely it will be that area c will outweigh area d). Again, "demonstrable retail price constraints" implies that, all else equal, retail margins are likely to be relatively small. At the same time, the lack of a cost-orientation on the NGA inputs when they are subject to an ERT suggests wholesale margins could be large. This is therefore exactly the sort of situation in which incentives to squeeze may be low.
230. Figure 13 illustrates a plausible situation in the context of NGA services where there is a "demonstrable retail price constraint" (i.e. the context for economic replicability testing

115 For example, suppose that there is an access seeker that is a significant pay TV distributor and wishes to bundle NGA broadband with pay TV. Suppose also that it competes closely for pay TV subscribers with a cable operator. Suppose further that the access provider does not have a significant pay TV operation. If the access provider were to squeeze the access seeker, there is a likelihood that many of the potential subscribers of the access seeker that wish to buy a bundle of NGA broadband and pay TV would choose the cable operator rather than the access provider's own retail offering (since the latter may have an inferior TV component). As a result, the access provider should have incentives to supply NGA inputs to the access seeker to at least obtain wholesale margins from these subscribers rather than squeeze such an access seeker and lose the subscribers altogether (i.e. it should have incentives not to squeeze).

under the 2013 Recommendation). The more limited is the diversion from NGA offerings of access seekers to the access provider and the smaller are retail margins relative to wholesale margins, the more likely it is that the gain in area d is smaller than the loss in area c, and that overall there is a lack of incentive to squeeze.

Figure 13: Vertical arithmetic – plausible illustration of margins for the access provider in the context of NGA where there is a “demonstrable retail price constraint”



231. **Third, how much higher a retail price the access provider would be able to charge following exclusion.** The illustrations in the preceding figures assume no change in the retail price following exclusion of the NGA offers of access seekers. A “squeeze” strategy might be attractive for an access provider even if area d is smaller than area c if there is an expectation of being able to achieve higher retail prices once rival NGA offerings of access seekers have been excluded (thereby increasing retail margins albeit with the loss of some sales in response to the higher prices). However, in the context of continuing demonstrable retail price constraints from CGA-based services and alternative infrastructure operators, there will be a limited ability to raise retail prices following the exclusion of offerings of access seekers that rely on NGA inputs. Again, the conditions under which the ERT applies are those in which the attractiveness of a margin squeeze strategy may be limited.
232. To be clear, we are *not* suggesting that in the circumstances in which economic replicability testing will apply there will *never* be incentives for access providers to squeeze. What we are saying it that the factors that influence incentives tend to point to low incentives to squeeze rather than high incentives.

6.4. Outline of the options

6.4.1. Option A: An ex ante obligation to pass the ERT with ex post testing in the event of a complaint or an investigation initiated by the NRA

233. This procedure involves an ex ante obligation to pass an ERT, with testing to occur ex post only in the event of an investigation by the NRA of a complaint or on the NRA's own initiative. This procedure has been in place for NGA services in the UK since 2010, although Ofcom is currently proposing a change of procedure toward Option B.¹¹⁶
234. This procedure is similar to competition law in that both involve ad hoc ex post investigations. However, it would be wrong to conclude that this procedure would add nothing beyond an SMP operator's existing competition law obligations: it may differ from the competition law obligation not to margin squeeze in a number of respects. First, the SMP operator may not be subject to any competition law obligation if the relevant competition authority were to find that, despite its SMP designation, the SMP operator is not dominant.¹¹⁷ Second, the NRA may provide clear guidance regarding the parameters that it will use in any ex post ERT assessment, whereas under competition law, while precedents exist, the parameters may evolve and there may be less certainty regarding how a competition law test would be performed. Third, the parameters that the NRA chooses for the ERT assessment may differ from the parameters that may be used under competition law. Fourth, an ex ante obligation to pass an ERT with ex post testing may allow an NRA to assess and take appropriate measures to remedy a failure of the ERT more quickly than would be possible under competition law.
235. This procedure performs well along a number of the dimensions that we have considered. In particular:
- a. **Flexibility for the access provider to compete downstream.** This procedure offers commercial flexibility to an access provider, since the access provider does not have to seek prior approval from its NRA before launching products and can therefore do so without any delay. As long as it is satisfied that its prices are compliant with the parameters of the ERT that would be applied ex post, it can confidently compete in the market. Moreover, there is no "one size fits all" approach to required margins: any concern that may arise with a product or a portfolio will be assessed on its merits and in the particular circumstances.
 - b. **Flexibility for the NRA to avoid regulatory failure.** This procedure affords flexibility for the NRA as the NRA would be able to adjust any guidance on how the test would be performed as market circumstances change and ex post testing would be able to take into account all of those particular circumstances. The risk of regulatory failure is therefore low with this option.¹¹⁸ Of course, any adjustments to guidance should apply only *prospectively* – an access provider should not be found

116 See Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraphs 4.48 – 4.106.

117 Although SMP and dominance are normally equated, a competition authority may take a different view on SMP/dominance from the NRA.

118 Ofcom holds a similar view: see Ofcom, *Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 – Consultation on the proposed markets, market power determinations and remedies*, 3 July 2013, paragraph 11.377.

in breach of its SMP obligation to pass the ERT for failing to follow guidance that was not in place at the time. The access provider should also be allowed a grace period to amend its pricing following any change to guidance.

- c. **Regulatory burdens on the access provider and the NRA.** Performing testing only when there is a complaint or the NRA itself identifies a concern may limit the burden on both the NRA and the access provider.
236. Alongside this option an NRA may also impose an obligation on the access provider to regularly compile and/or submit accounts in a form that reflects the ERT parameters, in order to expedite the testing process should a complaint or concern arise. This occurs in Lithuania and Sweden.¹¹⁹ This may increase the regulatory burden on the access provider, however it is likely to be the case that the access provider will in any event be preparing such accounts for its own internal compliance process. Provided that the accounts that must be submitted do not involve levels of detail beyond the accounts that the access provider would use for its own internal compliance process, the additional burden should be limited.
237. There may be concerns with this procedure regarding the other two dimensions that we consider.
- a. **Safeguarding competition.** Under this procedure it is possible that a failure of the ERT could continue for some time before being identified and prevented. In our experience access seekers are quick to complain if they suspect that margins are inadequate. However, investigations of complaints can take time and it may be a number of months if not years before a complaint is resolved. There may be harm to competitors and the possibility of exit from the market during this time.
 - b. **Transparency and certainty for market participants.** There is also a risk that market participants may lack certainty regarding when an investigation would be initiated and how testing would be conducted ex post, including the details of the parameters that would be used. Regarding the trigger for an investigation, the NRA will have discretion as to which complaints to investigate in detail, and when to open an investigation on its own initiative, and this inevitably carries some uncertainty for both access providers and access seekers. Regarding the parameters that would be used in the testing, although it should be possible for the NRA to provide a high level of guidance, until a test is actually conducted nuances and fine details may not be transparent. As we have mentioned, a lack of certainty is potentially damaging for incentives to invest, both upstream and downstream. Further, uncertainty may impact on commercial flexibility: for example, the access provider may not price as aggressively at the retail level as it would if it were more certain about whether particular price points are compliant or not.
238. It is therefore important that if this option is chosen complaints and investigations are handled as quickly as possible to provide all market participants with clarity and to ensure that any failure of the ERT is for as short a duration as possible.
239. If this option is chosen it also may be complemented by detailed ex ante guidance regarding the parameters that will be used in the ex post testing in order to address the

¹¹⁹ This also occurs in Slovenia and is supposed to facilitate regular testing by the NRA under Option B. However, Telecom Slovenia is uncertain whether the NRA is itself undertaking testing.

transparency/certainty concern. Transparency/certainty may have been an issue in the UK, where BT's SMP obligation to price virtual unbundled local access (VULA) on "fair and reasonable" terms (including to avoid a margin squeeze) has been loosely specified by Ofcom since 2010 as follows: "we are initially likely to consider whether the current price differential was above the current long-run incremental cost of the downstream activities of a reasonably efficient operator, including an allowance for subscriber acquisition costs".¹²⁰ It is presumably difficult for BT to understand the differences between an "REO" as specified by Ofcom and BT's own downstream costs, as Ofcom has provided little further guidance on the nature of the "REO".¹²¹ Ofcom is currently proposing a revised obligation that would contain far more detailed guidance within the SMP obligation.¹²²

240. The extent of guidance that is necessary may depend on the parameters chosen. For example, if the equally efficient operator (EEO) approach is chosen, there may be no need for guidance around this parameter as the access provider will know that it may model its own downstream costs. However if a divergence from the EEO approach is chosen then detailed guidance is likely to be needed to clarify the exact types of divergence from the access provider's own costs that must be modelled. Similarly, if a LRIC cost standard is chosen there may be little need for further guidance, but if a LRIC+ cost standard is chosen detailed guidance may be required concerning which shared costs should be included in the "+" and how those shared costs should be allocated between products and portfolios.
241. On the other hand, guidance that is too detailed may do more harm than good and may undermine one of the attractive features of Option A: its ability to avoid regulatory failures through a full investigation of the facts of the particular case.

6.4.2. Option B: An ex ante obligation to pass the ERT with ex post testing at regular intervals

242. Options A and B both involve ex post testing on the basis of an ERT where the parameters are determined ex ante. However, rather than testing occurring only when there is an investigation, under Option B there would be a process of testing at regular intervals (e.g. every six or 12 months). Under Option B there may (or may not) also be scope for testing in response to specific complaints or NRA concerns at other times.

120 Ofcom, *Review of the Wholesale Local Access Market: Statement*, 7 October 2010, paragraph 8.132.

121 In paragraphs 8.135 and 8.136 Ofcom does elaborate to an extent on the REO:

In particular, this means that the measure of incremental costs that is used should be adjusted to reflect the scale of a reasonably efficient competing operator, and that the assumptions used should be consistent with a competitive market.

We note that the 'reasonably efficient operator' assumption is consistent with that taken in our Pay TV review, where we derived wholesale prices on a retail-minus basis for competitors that would be as efficient as Sky at equivalent scale, but do not actually have the same scale as Sky. It is also consistent with our approach to setting the margin between ATM interconnection and IPStream in 2004.

However there remains considerable uncertainty regarding the scale of the REO and also whether other adjustments would be made to reflect an REO (such as adjustments to subscriber acquisition costs or to average customer lives).

122 See Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraphs 4.48 – 4.72.

243. This option may improve over Option A with respect to **safeguarding competition and transparency/certainty**. As testing will occur regularly, a failure of the ERT may be identified sooner than if testing only occurs in response to a complaint or the NRA itself identifying a concern. And since testing will occur regularly, there may be greater transparency and certainty for market participants regarding how the NRA will implement the test and whether the access provider's offerings comply. However, transparency may still be lacking if the NRA does not disclose the parameters and the model that it uses when testing the offerings: in that case the access provider would be submitting its accounts into a "black box" and the line between passing and failing the test may be unclear to the access provider until it is informed that it has failed a test.
244. This option may impose greater **burdens on the access provider and the NRA** compared to Option A. The access provider would be required to prepare accounts suitable for testing on a regular basis and the NRA may need to devote substantial resources to regularly review the accounts and perform the test. This may result in more resources devoted to testing than necessary in the absence of any complaints. The NRA's burden may be reduced if the accounts are prepared in such a form that the NRA need only confirm the veracity of the data and that the margins are positive. However, if the NRA were to need to conduct a de novo investigation of the accounts each review period (e.g. as products and market circumstances change) there could be substantial resources required from both the NRA and the access provider. Against this, the burdens imposed under Option B may be less than the burdens faced by the access provider and the NRA should there be a full-blown investigation under Option A, which, as mentioned, may take many months if not years to resolve.
245. A potential compromise solution may be for the NRA to conduct a relatively brief high level review on a regular basis, and a more in-depth review only in the event of a complaint or other reason to investigate more thoroughly.
246. Option B also performs less well than Option A with regard to **flexibility for the NRA to avoid regulatory failure and the flexibility of the access provider to compete downstream**. Under Option B it will likely be necessary for the NRA and the access provider to agree on a model that the access provider must populate with data on a regular basis. However such a model may by necessity contain elements of a "one size fits all" approach and lack flexibility to deal dynamically with developments in the nature of the products being offered and as market circumstances change.¹²³ This risks regulatory failure as the market develops and the model no longer reflects the changed circumstances. The NRA and the access provider may need to devote substantial resources to continually reaching agreement on revisions to the model necessary to reflect changing circumstances. Alternatively, if the NRA refuses to entertain adjustments to the model, it may become out of date and uninformative. Either way, the access provider's ability to react dynamically to changes in the market will be constrained more than under Option A.
247. If this option is adopted, then in order to avoid false negatives due to the "one size fits all" nature of the modelling there should be a procedure under which a failure of the ERT is followed by a case-by-case assessment of the reasons for the failure and whether there is

123 See the discussion of this option in Ofcom's *Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 – Consultation on the proposed markets, market power determinations and remedies*, 3 July 2013, paragraphs 11.391-11.393.

any likely harmful effect on competition. We discuss such an approach in our discussion of Option C below.

6.4.3. Option C: Ex ante economic replicability testing prior to product or tariff/promotion launches (pre-launch testing)

248. This procedure involves the NRA testing each new product or tariff/promotion (or just certain products such as “flagship” products) prior to their launch. This procedure is in place for the testing of NGA products in a number of countries, including Greece, Ireland Italy, and Spain.
249. This option performs well against the criteria of **safeguarding competition**. No product, tariff or promotion may be launched without pre-authorisation from the NRA that it is compliant with the ERT.
250. In principle it also performs well in terms of **transparency/certainty** for market participants: the access provider and access seekers should be in no doubt whether the access provider’s offerings are compliant. However, in practice certainty may be lacking if the NRA reserves the right to change its mind ex post. And again, as for Option B, transparency may be lacking if the NRA does not disclose the parameters and the model that it uses when testing the offerings: in that case the access provider would be submitting its offerings into a “black box” and would lack clarity regarding whether a particular offer was likely to pass or fail.¹²⁴ This might significantly constrain the access provider’s commercial freedom as it would lack a clear target to aim at when developing offers and may lead to a number of iterations to turn a “fail” into a “pass”.
251. The biggest concern with this option in the context of economic replicability testing (where there will already be competition downstream from CGA-based operators and/or alternative infrastructure operators) is that it performs poorly against the criteria of **flexibility for the access provider to compete downstream**. Pre-launch approval means that an access provider must allow a longer period between commercial sign-off of a proposed new product/tariff/promotion and launch of that product/tariff/promotion so that NRA approval can be obtained. The longer the approval process, the greater the restriction on the access provider’s commercial freedom and the more uneven the playing field between the access provider on the one hand and access seekers and alternative infrastructure operators on the other. This is likely to lead to less effective competition at the retail level, as the access provider will be unable to respond quickly to its competitors’ offers.
252. Given this concern there may be a desire to impose a strict time limit on the NRA’s pre-approval process and to streamline the process to allow pre-launch assessments to be conducted within that period. However, this may come with the risk of failing to assess the offers on their individual merits: a pro-forma “one size fits all” approach to assessment would risk uninformative results (either false positives or false negatives) if the tests fail to capture the nuances of the offerings and the market context. If the interests of expediency result in a model and process for testing that lacks flexibility to consider the circumstances of each offer, this option may also perform less well than Options A and B regarding **flexibility for the NRA to avoid regulatory failure**. Market changes may alter the

124 This is the case in Spain where the NRA tests Telefónica’s offers pre-launch using some parameters with values calculated internally by the NRA and not reported. This makes it difficult for Telefónica to understand in advance how the test will work and to predict the results of the test when developing the commercial details of a new product prior to launch.

relevance of the parameters and model used to perform the pre-launch ERT, with the result that an offer that fails the ERT may in fact have no harmful competitive effects.

253. In order to address this, the NRA might consider including in the procedure a “sense-check” stage, so that should any offer fail the ERT there would be a more detailed review of the offer to understand whether it is in fact unlikely to harm competition. Such a procedure is in place in Ireland, as we summarise in the box below, and in principle this seems to us a sensible initiative. However, if this full assessment must occur prior to launch, the delay before the access provider can respond to competition may become excessive and render the offer ineffective or irrelevant in the marketplace (e.g. by the time it has been fully assessed and can finally be launched, competitors may have moved on to a new offer that the access provider must again respond to, but only after a further pre-launch assessment process).

Box 4: ComReg’s case-by-case assessment of bundles that fail the test

ComReg is the Irish NRA. ComReg’s Decision D04/13 applies to bundles of NGA broadband and line rental.¹²⁵ Following its consultation process ComReg reached the conclusion that *eircom* was facing increased localised competition from LLU-based competitors and the cable-based UPC, and imposed a more flexible form of margin squeeze test for bundles offered in those areas.¹²⁶ This more flexible approach includes the introduction of a combinatorial test in which individual bundles are assessed on a LRIC (rather than ATC) basis and the portfolio of bundles in the area are assessed on an ATC basis. It also models the upstream inputs of efficient access seekers in the competitive areas (reflecting the usage of upstream inputs other than bitstream). Finally, ComReg has considered it proportionate that if a bundle fails the test, ComReg should conduct a case-by-case assessment of the bundle’s competitive effects, including its potential to pass the test going forward. ComReg notes that “it might be excessive to prohibit all offers in all circumstances and that some flexibility is needed — and it is in this context the case-by-case assessment is carried out”.¹²⁷ Included in this assessment may be known future retail efficiencies or verifiable increased customer lifetimes as a result of bundling. In addition to considering retail efficiencies and customer lifetimes ComReg “will consider the number of customers on the bundle and the importance of that bundle to the market. In addition ComReg will consider all available information to hand to consider the impact of the below cost selling of [line rental] in a bundle on competing operators and the ability of entrants to enter/remain in the market(s) and promote sustainable competition in the medium to long term”.¹²⁸

254. This option may also impose significant **burdens on the access provider and the NRA**, particularly if there is a requirement that every single product/tariff/promotion must be tested prior to launch (as in Greece, Italy and Spain). In our view this represents an excessive level of testing. Testing only “flagship products” would be less onerous if these are few in number and can be readily identified at the pre-launch stage.

125 See ComReg, *Price Regulation of Bundled Offers, Further specification of certain price control obligations in Market 1 and Market 4*, ComReg Document 13/14, 8 February 2013, paragraph 1.10.

126 Generally see ComReg, above note 125, Section 3.1 and paragraphs 5.73-5.83.

127 ComReg, above note 125, paragraph 5.75.

128 ComReg, above note 125, paragraph 5.83.

255. A further concern with a procedure that tests each new product/tariff/promotion is that this may not be an informative level of aggregation. As we discussed earlier (see Section 5.2.4), if the arena of competition is broader, a more aggregated level of testing should be sufficient to safeguard competition. Indeed, if the arena of competition is broader, then test results for an individual product will be uninformative as to whether there are likely to be distortions to competition: a negative test result for a product may have little meaning if there would be a positive result at an aggregate level; and a positive test result for a particular product may be misleading if there are negative margins at the aggregate level and the aggregate level is not also tested.
256. If this procedure is chosen, it should be implemented in a form that minimises the regulatory burden for all parties and the time to market for the access provider and recognises that product level testing may be uninformative and unnecessary. Pre-launch testing of just “flagship” products or satisfaction that the portfolio of NGA products continues to pass the test when a new product is launched may be sufficient (rather than pre-launch testing of the margins of each and every new product/tariff/promotion). In principle, a procedure that includes a sense check of any failures of the ERT on a case-by-case basis would be sensible in order to avoid false negatives, however the additional delay that this may introduce before products can be launched may significantly impact on the commercial flexibility of the access provider. In the context of NGA services where there are demonstrable retail price constraints, there is a high importance of case-by-case assessments to avoid false negatives that constrain competition from the access provider, and at the same time there is an acute need to avoid delays in time to market for an access provider that faces intense competition. These factors suggest that Option C is likely to be an undesirable procedure for the ERT as either there will be long delays before offers can be launched or there will be insufficient attention to whether the offers are problematic or not.

6.4.4. Option D: Ex ante determination of minimum margins

257. Under this option, the NRA specifies the minimum margin that must be maintained between retail and wholesale prices – or, equivalently, the NRA specifies maximum wholesale prices, on a retail-minus basis. In the alternative, the NRA would specify a *model* to be used to determine the minimum margin. Such procedures apply in Denmark and The Netherlands.
258. This procedure offers similar **safeguarding competition** and **transparency/certainty** properties as Option C: in principle, the requirement to maintain a minimum margin between wholesale input prices and retail prices should protect competitors from any squeeze and also provide clarity for market participants that the access provider’s offers are compliant with the ERT. When the downstream offerings are simple and relatively undifferentiated this procedure also has the potential to improve over Option C regarding **regulatory burdens**, since the minimum margin may only need to be set once (rather than margins on each new offer having to be tested). In simple situations it may also have an advantage over Option C with respect to preserving **commercial flexibility for the access provider**, as the access provider may have the freedom to launch retail offers without having to seek pre-authorisation from the NRA, as long as the prices of those offers exceed the relevant wholesale prices by at least the minimum margin.
259. Under this procedure different minimum margins must be specified for different retail products that have different costs downstream of the NGA input. This may not be a significant issue if the minimum margin requirement applies only to stand-alone NGA

broadband, or NGA broadband bundled with line rental and telephony. This is the case currently in Denmark. However, it becomes a major issue if minimum margins must be preserved for increasingly complex bundles that include telephony or broadband “add-ons”, mobile services and/or TV. A separate minimum margin that reflects the costs of each offering downstream of the NGA input would need to be specified for each differentiated offering. In this context of differentiated downstream products – which is likely to be the context in which NGA services are sold as these are increasingly sold in bundles – the benefits listed above tend to be undermined: the minimum margin approach may lead to (a) significant complexity and **regulatory burdens** to determine minimum margins for each differentiated offering, (b) a potential lack of **transparency and certainty** as market participants may not know what the minimum margin should be for a new offer that has not had its minimum margin assessed yet by the NRA and (c) a restriction on the access provider’s **commercial flexibility** if it lacks clarity regarding the minimum margin that will be required for a new offer. These are particular concerns in a fast moving sector like communications, where products are constantly evolving and bundling is increasing.

260. Moreover, if bundles evolve such that NGA broadband becomes just one small component of the bundle – e.g. if the bundle is mainly a bundle of mobile services with a small fixed NGA broadband component – a requirement to preserve a minimum margin for such a bundle becomes an exercise in estimating the incremental cost of the rest of the bundle. Lots of interpretation issues can arise regarding the “building blocks” to the required minimum margin as bundles include more and more non-NGA broadband components.
261. If the NRA responds to these complications by requiring that the *same* minimum margin be achieved by each offering, this would impose a **severe constraint** on the access provider’s **commercial flexibility** as each bundle has different costs downstream of the NGA input. The access provider would be unable to offer many bundles under such a regime.
262. The minimum margin approach is also – even more-so than Option C – likely to lack flexibility to consider the circumstances of each offer and is likely to perform worse than Option A regarding the **flexibility of the NRA to avoid regulatory failure**. Market changes may alter the relevance of the parameters and any model used to set the minimum margins, with the result that the minimum margin set for a particular offering may be higher or lower than necessary to safeguard competition and may jeopardise NGA investment incentives.
263. The minimum margin procedure is also not well-suited to dealing with a situation where there is not a direct correspondence between the pricing of the upstream inputs and the downstream retail products (for example, where wholesale prices include fixed fees that do not vary with the number of subscribers and are therefore not reflected directly in retail prices). A requirement to keep the same wholesale price structure as the retail price structure may jeopardise risk sharing wholesale agreements.
264. This procedure therefore seems appropriate only when there is a limited variety of downstream products, a relatively simple relationship between upstream and downstream products, and no likelihood of this changing. We do not expect these circumstances to characterise the provision of residential NGA services, which are increasingly complex and increasingly consist of bundled offerings of broadband and telephony with other services such as mobile services and TV. It is equally unlikely to be an appropriate procedure for testing of NGA business offerings, as illustrated by the following summary of the situation regarding testing of such products in The Netherlands.

Box 5: Testing of business products in The Netherlands (Option D)

In The Netherlands the NRA is currently proposing to remove margin squeeze testing obligations on KPN in the consumer segment due to nationwide cable competition from the recently merged Ziggo/Liberty Global (although requirements to provide access to unbundled loops and virtual unbundled local access (VULA) would remain).

Margin squeeze testing between the active layer and the retail layer in the business segment currently takes the form of ex ante determination by the NRA of minimum margins that KPN must achieve (Option D). Each business contract is tested. In addition, each service within each contract is tested (e.g. the NGA broadband component of a bundle contract is tested on its own, separate from the rest of the contract). The test is designed to confirm whether the relevant minimum margin is covered.

KPN has an obligation to test internally each new business contract (and the constituent services). Therefore KPN does not have to seek pre-launch approval from the NRA, but must satisfy the NRA of its compliance. KPN has to keep a record of every individual application (which can be requested by the NRA, and has to be provided within three working days) and has to report on all applications. The minimum margin that must be covered varies depending on the services included in the contract. In total there are thousands of separate tests that must be conducted and the testing is further complicated by the variety of dimensions offered in business contracts (e.g. speed; quality; traffic types; geographic areas; etc.).

The procedure previously employed (until 2009) in both residential and business markets was pre-launch testing (Option C) based on a “traffic light system”, in which retail offers were classified as “green” (no testing required), “red” (products that could not be offered at all) and “yellow” (products for which the NRA’s approval was required prior to launch). This system, whilst providing more legal certainty for KPN than Options A, B and D, was abandoned because it proved impractical and resulted in significant delays and disadvantages for KPN, particularly in contracts with business customers (and particularly in the event of an appeal by competitors). Also, KPN speculates that the NRA found that Option C limited its own flexibility, as once a contract had been approved pre-launch, the NRA found it difficult to challenge that contract ex post.

While in theory the “minimum margin” approach may have the advantage of providing transparency and certainty to market players, in practice this may not be the case in The Netherlands for a number of reasons. First, the test applies to every single business contract and these exhibit great variety in terms of the services included, leading to a significant variety of minimum margins that may be relevant. Second, there are many possible combinations of wholesale and retail inputs to test, and KPN faces substantial uncertainty regarding which combinations the NRA is likely to be most concerned about. Finally, certainty for KPN from an ex ante perspective is further reduced (at least compared to Option C) by the fact that the NRA can reject (ex post) an application and mandate KPN to remedy the situation (under threat of fines), either by raising retail tariffs for the individual offering/contract, or lowering the wholesale input for the whole market.

6.5. Assessment and recommendation on procedures for economic replicability testing

265. As we have explained, the procedure chosen for economic replicability testing should be *proportionate*, in the sense of having the least impact on NGA investment incentives and placing the least burdens on the NRA and the access provider while achieving the aim of safeguarding competition. This should be assessed in the context of the demonstrable retail price constraints that must already constrain NGA services if economic replicability testing is to occur.
266. In our view, Option D is unlikely to represent a suitable procedure for implementation of the ERT except in limited circumstances. This option is inappropriate for economic replicability testing unless: such testing applies only in relation to the simplest retail products (e.g. stand-alone NGA broadband and/ NGA broadband sold in a bundle with line rental); there is a direct correspondence between upstream and downstream prices; and there is no likelihood of this changing over time. Given that the context for economic replicability testing is NGA, and NGA services are increasingly sold in bundles with other services such as TV and mobile services, the setting of minimum margins for such products is likely to be overly complex and impractical. Moreover, setting minimum margins on the basis of a pre-determined model is highly likely to result in regulatory failures as a model will be ill-suited to adjust to changing circumstances. The risk of regulatory failure is also likely to dampen NGA investment incentives.
267. This leaves Options A, B and C. Although each Option performs well against particular assessment criteria, for economic replicability testing Options A and B should be preferred over Option C for four reasons.
- a. First, pre-launch testing would have significant adverse impacts on pricing flexibility for the access provider and, consequently, incentives for investment in NGA. The need for a level playing field in terms of pricing flexibility (which is better served by Options A and B) is particularly acute in the context of demonstrable retail price constraints, since the access provider will need to react quickly to market developments including competitor offers and price changes (where those competitors – whether they are access seekers or alternative infrastructure operators – are not constrained in the same way).
 - b. Second, the need for expediency in testing under a pre-launch procedure heightens the risk of regulatory failure under Option C compared to Options A and B. A pro-forma “one size fits all” approach to assessment would risk uninformative results if the tests fail to capture the nuances of the offerings and the market context or changes in the market over time.
 - c. Third, pre-launch testing also has the potential to impose a high regulatory burden on the NRA and the access provider, particularly if there is a requirement to test each and every new product/tariff/promotion, which would be excessive. At the same time, testing every new product/tariff/promotion is likely to be uninformative about competitive effects.
 - d. Finally, in the context of demonstrable retail price constraints, a highly interventionist approach to safeguarding competition such as pre-launch testing may not be proportionate to the risks to competition and consumers. As we have explained, *where there are demonstrable retail price constraints* access providers may have limited incentives to price in an exclusionary fashion. Therefore the risk of failures

of the ERT may be low to start with. Moreover, in these circumstances there may also be limited risk of harm to consumers even if there is a failure of the ERT with respect to NGA services for a period of time (again due to the demonstrable retail price constraint from CGA-based services and alternative infrastructure, which may constrain any attempt by the access provider to exploit consumers by raising retail prices).

268. The choice between Options A and B may also be informed by the context in which economic replicability testing will occur. NGA services are fast-moving and dynamic and the high likelihood of significant changes in demand, prices, products and costs over the course of a market review period suggests that the risk of regulatory failure (and of adverse impacts on commercial flexibility for the access provider) is high unless there is a procedure that can adequately account for such changes. This points to a preference for Option A over any heavy handed form of Option B that involves detailed testing against rigid guidance.
269. Ex post testing only when there is a complaint (or an issue identified independently by the NRA) is furthermore likely to be sufficient to safeguard competition in circumstances where competitors are already well-established and likely to complain quickly if they believe that the margins implied by the access provider's offerings are inadequate. In this context Option B may impose an unnecessary burden on the NRA and the access provider as it involves testing not only in situations that might be problematic, but also in situations where margins are not controversial.
270. Option B may, however, be a reasonable option if the procedure is constructed in a way that minimises the risks of regulatory failure and the regulatory burdens on the NRA and the access provider: for example, a procedure in which the NRA conducts a relatively brief high level review on a regular basis and only if that high level review uncovers grounds for concern will the NRA conduct a full investigation to determine if there is likely to be any harm to competition and consumers.
271. Ofcom has recently consulted and issued a draft statement on the approach that it will take to the margin between BT's NGA input (virtual unbundled local access or VULA) and BT's retail offers. In its draft statement (published on 15 January 2015)¹²⁹ Ofcom proposes to implement a light handed form of Option B, as just described. We review the history of Ofcom's consultation on procedures for testing NGA margins in the following box.

¹²⁹ Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015.

Box 6: Ofcom's consultation and draft statement on procedures for testing NGA margins

Since 2010 BT has been under an obligation to price its NGA virtual unbundled local access (VULA) input on "fair and reasonable" terms, conditions and charges that includes an obligation to set "fair and reasonable" margins between wholesale and retail prices.¹³⁰ The current procedure for testing compliance with the obligation is essentially our Option A: ex ante guidance (though very limited) with ex post testing in the event of a complaint or an investigation initiated by Ofcom. Ofcom has investigated a complaint from TalkTalk Group under the 2010 "fair and reasonable" obligation and concluded that BT's pricing was compliant.¹³¹

Ofcom has recently consulted on and issued a draft statement that proposes a revision to the obligation. In its 2013 fixed access market review (FAMR) consultation¹³² Ofcom consulted on three procedural options for ensuring sufficient margins for competing downstream operators. The three options were essentially Options A, B and D as set out in this report. In that consultation Ofcom indicated a preference to continue with Option A (but with more detailed guidance). Ofcom subsequently consulted further on procedures for NGA margin testing in a specific 2014 FAMR consultation on "Approach to the VULA margin".¹³³ In this further consultation Ofcom considered only Options B, C and D and ultimately expressed a preference for a light-handed form of Option B.¹³⁴ Ofcom's 2015 draft statement is in all material respects consistent with Ofcom's position in its 2014 consultation.¹³⁵

Ofcom rejected Option D (setting minimum margins) due to a significant risk of regulatory failure under that option, meaning a significant risk that Ofcom will determine a margin that

130 Ofcom, *Review of the wholesale local access market – Statement on market definition, market power determinations and remedies*, 7 October 2010, paragraphs 8.123 – 8.136.

131 Ofcom, *CW/01103/03/13: Complaint from TalkTalk Telecom Group plc against BT Group plc about alleged margin squeeze in superfast broadband pricing*, 21 October 2014.

132 Ofcom, *Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 – Consultation on the proposed markets, market power determinations and remedies*, 3 July 2013, paragraphs 11.371 – 11.403.

133 Ofcom, *Fixed access market reviews: approach to the VULA margin*, Consultation, 19 June 2014.

134 Ofcom, *Fixed access market reviews: approach to the VULA margin*, Consultation, 19 June 2014, paragraphs 4.48 – 4.105. In paragraphs 4.48 – 4.72 Ofcom considers four options for the form of the VULA margin control, which it labels Options A to D. Ofcom's Option D is equivalent to our Option D: the specification of a minimum margin. Ofcom's Options A, B and C differ with respect to whether guidance or a model is included in the SMP condition itself, but in principle all of these three options could be consistent with our Option B or our Option C. After rejecting Option D, in paragraphs 4.78 – 4.105 Ofcom considers a further set of options regarding compliance monitoring. One of these options (which Ofcom calls option (iii)) is similar to our Option C: pre-launch approval. Another option (which Ofcom calls option (i) and which Ofcom ultimately prefers) is a light-handed form of our Option B (regular ex post testing) in which Ofcom would conduct a "high level assessment" of information on margins that BT would be required to provide every six months. Ofcom does not consider our Option A in this consultation as Ofcom considers that some form of compliance monitoring and testing process is necessary in order to identify any breaches of the proposed VULA margin requirement in a sufficiently timely manner (paragraph 4.77).

135 See Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraphs 4.48 – 4.106.

is either too high (and therefore fails to achieve Ofcom's aim) or too low (which would be "unduly burdensome and disproportionate", "preventing BT from competing effectively in the market until the minimum margin could be consulted on and implemented").¹³⁶ Ofcom's main concern with the minimum margin procedure is that it lacks flexibility to respond to changes in BT's products or the wider market circumstances. In addition, TalkTalk Group, which favoured "pre-specified" margins prior to Ofcom's 2013 consultation,¹³⁷ responded to the 2013 consultation by expressing significant concerns with minimum margin setting as "the appropriate margin would be highly case sensitive and dependent on the features and downstream costs of each product" and "it was unclear how a single model could manage this complexity".¹³⁸

Ofcom also rejected a form of our Option C, due to the "very significant burden on BT" that it would impose as it "would significantly restrict its commercial freedom every time it wanted to launch a new product or revise an existing offer, as it would need Ofcom approval first. This would significantly impede BT's ability to compete in the market and react to events and could only really be justified where the consequences of BT breaching the VULA margin requirement were so significant (e.g. caused a competitor to exit the market before the margin could be rectified)".¹³⁹

As mentioned, in its 2013 consultation Ofcom preferred Option A over Option B. This was based on Ofcom's concern that in the context of NGA services, demand, prices, the products offered (including how NGA broadband is bundled with other services) and the costs incurred by BT could change in ways difficult to forecast in advance. Therefore Ofcom was particularly concerned in the NGA context with the risk of regulatory failure and viewed Option A as preferable to Option B (and Options C and D) for that reason.¹⁴⁰ Ofcom was also concerned that Option B may impose an "undue regulatory burden" as it is not targeted at cases that are considered problematic.¹⁴¹ Ofcom's preference for Option A reflected "the fact that BT's competitors include large, well-resourced companies such as TalkTalk, EE and Sky. Such companies have considerable experience with the UK regulatory regime and are well placed to submit a dispute to Ofcom if they believe they are unable to obtain VULA on fair and reasonable terms".¹⁴²

136 Ofcom, *Fixed access market reviews: approach to the VULA margin*, Consultation, 19 June 2014, paragraph 4.71. See also Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraph 4.71.

137 See Ofcom, *Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 – Consultation on the proposed markets, market power determinations and remedies*, 3 July 2013, paragraphs 11.368.

138 Ofcom, *Fixed access market reviews: approach to the VULA margin*, Consultation, 19 June 2014, paragraph 4.15.

139 Ofcom, *Fixed access market reviews: approach to the VULA margin*, Consultation, 19 June 2014, paragraph 4.104. See also Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraphs 4.101 – 4.106.

140 Ofcom, *Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30 – Consultation on the proposed markets, market power determinations and remedies*, 3 July 2013, paragraphs 11.400.

141 See Ofcom, above note 140, paragraphs 11.401.

142 See Ofcom, above note 140, paragraphs 11.401.

However, in its 2014 consultation and in its 2015 draft statement Ofcom favours a light-handed form of Option B in which Ofcom would conduct a “high level assessment” of information on margins that BT would be required to provide every six months.¹⁴³ Option A is not even considered in these documents, apparently because Ofcom has formed the view that some form of compliance monitoring and testing process is necessary in order to identify any breaches of the proposed VULA margin requirement in a sufficiently timely manner to prevent any distortion to competition.¹⁴⁴

7. CONCLUSION AND RECOMMENDATIONS

272. The purpose of this report has been to analyse the 2013 Recommendation and the BEREC guidance and recommend a consistent and proportionate approach regarding the parameters and procedures of economic replicability tests in the context of next generation access (NGA) services.
273. Our recommendations on parameters and procedures for economic replicability testing have been guided by the aim of the 2013 Recommendation, which we interpret to be the promotion of efficient investment in NGA infrastructure while simultaneously safeguarding the degree of competition that already exists (including that based on CGA and alternative infrastructures such as cable).
274. Our recommendations in terms of parameters are summarised in the following table.

Parameter	CRA Recommendation
Relevant downstream costs	EEO with no adjustments
Relevant downstream cost standard	Avoidable cost (but if incremental cost is used, then use LRIC <i>excluding</i> shared costs and, if necessary, a combinatorial approach to confirm shared cost recovery)
Relevant wholesale inputs	The “most relevant regulated inputs” should reflect an <i>efficient</i> mix of NGA inputs that it is realistic for access seekers to use during the market review period
Relevant wholesale prices	Where there are volume discounts, model the discount achievable by the largest access seeker Where there are commitment arrangements: if an ERT is to be conducted it should be at an aggregated level and use a time period that reflects the length of the commitments; if fixed wholesale charges are

¹⁴³ See Ofcom, *Fixed access market reviews: approach to the VULA margin*, Consultation, 19 June 2014, paragraphs 4.78 – 4.105; and Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraphs 4.78 – 4.106.

¹⁴⁴ See: Ofcom, *Fixed access market reviews: approach to the VULA margin*, Consultation, 19 June 2014, paragraph 4.77; and Ofcom, *Fixed Access Market Reviews: Approach to the VULA margin, Draft Statement*, 15 January 2015, paragraph 4.77.

Parameter	CRA Recommendation
	modelled an ERT should only be conducted on a prospective basis; and there is no need to apply an ERT to “no-commitment” wholesale charges if the commitment arrangements allow for effective competition
<i>Relevant retail products</i>	<p>Test the “arena of competition” over which important entry and exit decisions are made – this may be consistent with the concept of “flagship products”, but the testing of individual products or contracts is likely to be excessive and unnecessary and preclude legitimate pricing strategies</p> <p>When testing bundles that are technically replicable by competitors, all of the incremental revenues and costs should be included in the test</p>
<i>Modelling approach and time period</i>	Either DCF or period-by-period may be used, but: period-by-period requires sensible allocations of fixed costs across periods; the timeframe for DCF analysis should depend on the relevant investments at the level of aggregation of the test; and terminal values or other adjustments may be required to reflect benefits not reflected within the time frame used (including bandwagon or network or learning by doing effects)

275. With respect to procedures, we have considered the merits of the following four broad categories of procedures in light of the aim of the 2013 Recommendation and the context of economic replicability testing.
- A. An ex ante obligation to pass the ERT with ex post testing in the event of a complaint or an investigation initiated by the NRA.
 - B. An ex ante obligation to pass the ERT with ex post testing at regular intervals.
 - C. Ex ante economic replicability testing prior to product or tariff/promotion launches (pre-launch testing).
 - D. Ex ante determination of minimum margins.
276. We consider that Option D is unlikely to represent a suitable procedure for implementation of the ERT except in limited circumstances. Options A and B should also be preferred over Option C for economic replicability testing for four reasons. First, pre-launch testing would have significant adverse impacts on pricing flexibility for the access provider and, consequently, incentives for investment in NGA. Second, the risk of regulatory failure is higher under Option C compared to Options A and B. Third, pre-launch testing that involves testing every new product/tariff/promotion has the potential to impose a high regulatory burden on the NRA and the access provider and is likely to be uninformative about competitive effects. Finally, pre-launch testing to safeguard competition may not be proportionate to the risks to competition and consumers in the context of demonstrable retail price constraints.

277. The choice between Options A and B should also be informed by the context in which economic replicability testing will occur. NGA services are fast-moving and dynamic and the high likelihood of significant changes in demand, prices, products and costs over the course of a market review period suggests that the risk of regulatory failure (and of adverse impacts on commercial flexibility for the access provider) is high unless there is a procedure that can adequately account for such changes. This points to a preference for Option A over any heavy handed form of Option B that involves detailed testing against rigid guidance.
278. Ex post testing only when there is a complaint (or an issue identified independently by the NRA) is furthermore likely to be sufficient to safeguard competition in circumstances where competitors are already well-established and likely to complain quickly if they believe that the margins implied by the access provider's offerings are inadequate. In this context Option B may impose an unnecessary burden on the NRA and the access provider as it involves testing not only in situations that might be problematic, but also in situations where margins are not controversial.
279. Option B may, however, be a reasonable option if the procedure is constructed in a way that minimises the risks of regulatory failure and the regulatory burdens on the NRA and the access provider: for example, a procedure in which the NRA conducts a relatively brief high level review on a regular basis and only if that high level review uncovers grounds for concern will the NRA conduct a full investigation to determine if there is likely to be any harm to competition and consumers.

GLOSSARY

AC: Avoidable Cost. Those costs that would be avoided if the increment being tested was not produced. This excludes any costs shared with other increments, and also *excludes any sunk costs*, as these cannot be avoided once they have been incurred (except in a long run sense).

ACL: Average Customer Lifetime.

ATC: Average Total Cost. The fixed and variable costs of producing an increment of output divided by the quantity of output. In the case of a single-product business or, more generally, where the increment being tested is the entire business, ATC is equal to LRIC. In the context of measuring the costs of a single product of a multi-product business, ATC is understood as a cost measure where a portion of shared costs is allocated to the increment being tested.

AVC: Average Variable Cost. The variable costs of producing an increment of output divided by the quantity of output.

CGA: Current Generation Access. Copper-based communications access lines from the local exchange to the end customer, capable of delivering download speeds up to 30Mbps.¹⁴⁵

CPE: Customer Premises Equipment (e.g. broadband routers).

DAE: Digital Agenda for Europe.

DCF: Discounted Cash Flow. A method for valuing a business or project in which cash flows are estimated and discounted to arrive at a net present value.

DOCSIS: Data Over Cable Service Interface Specification. International telecommunications standards that permit broadband data transmission over a cable television network. DOCSIS 3.0 provides significantly higher data transmission bandwidth than the earlier DOCSIS 2.0 and DOCSIS 1.0 standards.

DSL: Digital Subscriber Line. A group of technologies that permits broadband data transmission over a copper telephone network. DSL broadband services are typically delivered simultaneously with telephone services over the same copper pair (using higher frequency bands for the data).

EEO: Equally Efficient Operator. An access seeker that is as efficient as the access provider at the downstream level. See Section 5.1.1 for a discussion.

EOI: Equivalence of Inputs. A regulatory principle that requires that an access provider provide to access seekers the same input products on the same terms and conditions by means of the same systems and processes as it provides to itself.

EOO: Equivalence of Outcomes. A regulatory principle that requires that an access provider provide to access seekers an equivalent product to the comparable product that it provides to itself, but not necessarily in an identical manner.

FAC: Fully Allocated Cost. An accounting method for attributing all the costs of a business to the products it produces. When a FAC method is applied to costing an increment of

145 In some definitions, the threshold is 24 Mbps.

output (e.g. a single product in a multi-product business) the result is that a portion of the shared costs in the business is allocated to the increment.

FTTB: Fibre-to-the-building. An NGA technology that involves optical fibre being extended from the local exchange to a building that contains a number of end-customer premises. In this configuration of the access network copper is usually replaced entirely by fibre and other infrastructure (e.g. coaxial cable or Ethernet wires).

FTTC: Fibre-to-the-cabinet. An NGA technology that involves optical fibre being extended from the local exchange to a cabinet in the access network usually located within a few hundred metres of end customer premises. The remaining part of the access network from the cabinet to the end customer premises is usually copper.

FTTH: Fibre-to-the-home. This refers to FTTP where the end customer premises is a residential home.

FTTN: Fibre-to-the-node or fibre-to-the-neighbourhood. This is very similar to FTTC, but the cabinet is further away from the end customer premises.

FTTP: Fibre-to-the-premise. An NGA technology that involves optical fibre being extended from the local exchange to the end customer premise (a house or a business premise), replacing copper entirely.

LLU: Local Loop Unbundling. A process by which the copper loop running from an end customer premise to a local exchange is disconnected from the access provider's network and connected to an access seeker's network enabling the access seeker to use the copper loop to provide services directly to the end customer.

LRAIC: Long Run Average Incremental Cost. A cost measure that includes an allocation of costs directly associated with an increment that is larger than the increment being tested. For further discussion see Section 5.2.1.

LRIC: Long Run Incremental Cost. A cost measure that includes only those costs that are directly attributable to the increment being tested and that vary with the addition of that increment. For further discussion see Section 5.2.1.

MEO: More Efficient Operator. An access seeker that is *more efficient* than the access provider at the downstream level.

NGA: Next Generation Access. Communications access lines from the local exchange to the end customer capable of delivering download speeds greater than 30Mbps.¹⁴⁶ NGA networks may be based on a variety of technologies, including mixtures of fibre and copper (e.g. FTTN/FTTC with VDSL), fibre all the way to the end-customer or to the end-customer's building (FTTH/FTTP/FTTB) and cable (DOCSIS 3.0).

NRA: National Regulatory Authority.

REO: Reasonably Efficient Operator. An access seeker that is not as efficient as the access provider at the downstream level, but is considered "reasonably" efficient given a smaller scale or other cost disadvantages. See Section 5.1.1 for a discussion.

SAC: Stand-alone Cost. A cost measure that includes all costs that are required to produce the increment on a stand-alone basis.

146 In some definitions the threshold is 24 Mbps.

SEO: Similarly Efficient Operator. An access seeker that has the same downstream cost function as the access provider, but operates at a smaller scale. See Section 5.1.1 for a discussion.

SLU: Sub-loop Unbundling. This is similar to LLU, but where the unbundling occurs at a point between the local exchange and the end customer (usually at a cabinet).

SMP: Significant Market Power.

SRMC: Short Run Marginal Cost. The cost of producing one additional unit of output.

VDSL: Very-high-bit-rate Digital Subscriber Line. A DSL technology allowing data transmission over copper wires of up to 100 Mbps. VDSL technology requires short lengths of copper and is therefore typically deployed together with FTTN/FTTC.

VUA and VULA: Virtual Unbundled Access and Virtual Unbundled Local Access. This refers to a form of wholesale access to a NGA network where, rather than providing an access seeker with a physical line, the access provider provides a virtual connection from a local aggregation point (i.e. a point where access seekers can interconnect with the access provider's network) to the end customer that gives the access seeker a dedicated link to the end customer and substantial control over the services that they can provide. VULA is the term that Ofcom uses for VUA.