Report on the determination of appropriate costing and pricing methodologies for VUA and NGA Bitstream

CONSULTANTS

TERA

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Table of contents

0 Executive summary

In November 2016, ComReg published draft market reviews of Wholesale Local Access (WLA) and Wholesale Central Access (WCA) for Mass Market Products[1]. ComReg propose that:

- Eir is designated as having SMP on the WLA market and has an obligation to provide access under a price control condition.
- WCA market is divided between Regional WCA Market and Urban WCA Market. Urban WCA Market includes 88 exchanges where the competition is sufficiently developed[2].
- Eir is designated as having SMP on the Regional WCA Market and has an obligation to provide access under a price control condition. Urban WCA Market is deregulated.

ComReg is currently reviewing Eir's obligations with respect to the prices of wholesale access to the NGA (Next Generation Access) local loop on the WLA and Regional WCA markets. TERA Consultants has been mandated to conduct an economic study to inform ComReg's decisions. The objective of the study is to provide recommendations on the pricing and costing methodologies relating to two wholesale access services: VUA (Virtual Unbundling Access) and NGA Bitstream.

The study answers whether the current obligation not to cause a margin squeeze is sufficient or it should be replaced by a cost orientation obligation. It then defines costing parameters and gives general principles on how the chosen pricing approach should be implemented.

TERA Consultants identifies recommendations on pricing approaches for four types of access products separately: VUA FTTC[3], VUA FTTH[4], Bitstream FTTC and Bitstream FTTH. This report will focus to a large extent on the FTTC and FTTH market trends are these technologies are the one requesting the higher investment. However, eVDSL[5] technology is also used in Ireland. From a regulatory perspective, the main eVDSL features are close to the FTTC ones as eVDSL requires significantly less investment than FTTH and uncertainty of the demand is very limited. All the recommendations of this report applying to FTTC also apply to eVDSL (e.g. "FTTC bitstream" should be seen as the aggregate of "FTTC bitstream" and "eVDSL bitstream").

To do so, TERA Consultants analyses how market dynamics have changed since the last market review, and whether it implies a change in the regulatory approach.

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[1] ComReg 16/96

[2] See 5 criteria in ComReg 16/96, 10.157.

[3] Fibre-To-The-Cabinet

[4] Fibre-To-The-Home

[5] VDSL provided from the exchange

For VUA FTTC and Bitstream FTTC, it is recommended to introduce the cost orientation obligation, in addition to keeping the margin squeeze obligation at the retail level: 1. between Bitstream FTTC and retail and 2. between VUA FTTC and retail in the footprint of the Urban WCA Market (where bitstream is deregulated). Even though Eir's subscriber share on the retail broadband market is currently decreasing, its position on the wholesale market is expected to become stronger over time thanks to NGA deployment. As the FTTC platform is extending, there is no sufficient retail constraint to create a downward pressure on retail FTTC prices. Indeed, the coverage of LLU, cable and FTTH networks is limited, and LLU is in decline. In addition, FTTH products will be priced at a premium to FTTC, and FTTC products are often priced at a premium to CGA products, meaning that the price pressure on FTTC products from other technologies may be limited. There is thus a need for a stricter regulation.

The cost of Bitstream FTTC should be calculated for a hypothetical operator which does not benefit from the same scale effects as Eir.

Upon regulatory approval from ComReg[6], Eir may be allowed to reduce VUA FTTC and bitstream FTTC price below the price cap if its prices are challenged by a competitor, under condition that the price of these products should not go lower than the minimum between the corresponding wholesale price of alternative operators[7] and Eir's actual cost of deploying in this particular geographic area.

If VUA FTTC price goes down, the economic space between VUA and bitstream should be respected: both VUA FTTC and bitstream FTTC prices have to decrease by the same amount. Indeed, the fact the regulated price of both VUA FTTC and Bitstream FTTC are cost oriented and that VUA is an element in the Bitstream cost stack suggests that Bitstream should follow VUA. Also, as Eir is seeking the VUA price reduction in order to be more competitive at the retail level then the VUA reductions would also be expected to apply to Bitstream.

For VUA FTTH, it is recommended to retain margin squeeze obligation between bitstream and VUA, as well as a margin squeeze obligation between retail and VUA in the footprint of the Urban WCA Market (where bitstream is deregulated). As of today, the FTTH penetration is still very low and it is difficult to forecast the future penetration rate dynamics. At the same time, the FTTH price is very sensitive to the penetration rate. A wrong forecast could distort future market development: if it is too high, it will disincentivise alternative operators from investing; if it is too low, Eir will reduce its investments in the FTTH.

For Bitstream FTTH, it is recommended to keep a margin squeeze obligation at two levels: upstream margin squeeze obligation (between bitstream and VUA, mentioned above) and downstream (between retail and bitstream). Given the

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[6] A similar regulatory approval mechanism has also been introduced for CGA services.

[7] If the alternative operator does not propose wholesale products, its hypothetical wholesale price is calculated from its retail price.

decreasing market share of Eir in the retail market, this should allow Eir the freedom it requires to compete effectively in the downstream market. In addition, it is expected that the future development of the VUA FTTC will create additional retail constraints on FTTH products even though, as explained earlier, they are not sold at the same price.

In addition, it is recommended to introduce price floor constraints for VUA FTTH products, similarly to VUA FTTC products. The price of these products should not go lower than the minimum between the wholesale VUA price of alternative operators and Eir's actual cost. Otherwise, there is a risk that Eir could decrease its VUA FTTH price below costs in order to foreclose a competitor who started deploying its own network in a given area.

Eir is allowed to decrease its Bitstream FTTH price below the cost-oriented level only under the same conditions as for VUA FTTH, by always respecting the economic space left between the Bitstream FTTH and VUA FTTH[8].

The recommended approach for each product is summarized and compared to the pricing approach currently applied in the table below.

Table 1 – Current and recommended pricing approach

Access product	Pricing approach	
	Current	**TERA recommendation**
VUA FTTC	Margin Squeeze Obligation	• Cost orientation • Margin Squeeze Obligation
VUA FTTH	Margin Squeeze Obligation	• Margin Squeeze Obligation
FTTC bitstream	Margin Squeeze Obligation	• Cost orientation • Margin Squeeze Obligation
FTTH bitstream	Margin Squeeze Obligation	• Margin Squeeze Obligation

Source: TERA Consultants

Margin squeeze test should be performed separately for FTTC and FTTH products. For FTTH, the margin squeeze obligation should be applied at two levels: between retail and NGA bitstream (downstream), between NGA bitstream and VUA (upstream), while only the downstream margin squeeze obligation is relevant for FTTC. These different tests are shown in the Figure 1 below.

The proposed package of regulatory instruments is summarized in the figure below.

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[8] The economic space is equal to the difference between the cost oriented VUA price and the cost oriented bitstream price.

Figure 1 – Recommended pricing approach: cost orientation and margin squeeze tests

Regulation for <u>FTTC</u> products

Regulation for <u>FTTH</u> products

Retail
Margin
squeeze test
1

Retail FTTC

NGA bit-stream FTTC

Retail Margin
squeeze test in
Urban Market
(EEO)

VUA
FTTC

Price point for FTTC Bitstream: Based on cost of Bitstream FTTC for a hypothetical operator (REO) which does not benefit from the same scale effects as Eircom.
Price floor for FTTC Bitstream: VUA + economic space.

Price point for FTTC VUA: Based on the BU-LRAIC+ costs of FTTC VUA.
Price floor for FTTC VUA: minimum between alternative operators' VUA FTTC price and full VUA FTTC costs.

Retail Margin
squeeze test 1

Retail FTTH

NGA bit-stream FTTH

WS
Margin
squeeze
test 2

Retail Margin
squeeze test
in Urban
Market (EEO)

VUA
FTTH

Price floor for FTTH VUA: minimum between alternative operators' VUA FTTH price and full VUA FTTH cost

Source: TERA Consultants

The results of cost orientation and margin squeeze obligation depend significantly on the choice of parameters. The report provides recommendations on the main relevant parameters for implementing these tests.

Before calculating cost oriented prices, it is necessary to first determine what the relevant costing approach is. The cost of VUA FTTC consists of the costs of several types of assets.

The costs of SLU, E-Side fibre cables and joints, and E-side trenches/chambers/poles are already calculated in the Revised Copper Access Model ('Revised CAM')[9] and these results should be reused to ensure consistency with other access products such as SLU. However, several options exist with respect to costing the assets from the Revised CAM. VUA FTTC price can be either based on the regulated SLU price, which is calculated with short lines only (less than 1.5km), or it can be based on the sub-loop cost which takes into account longer lines. It is recommended to calculate SLU costs based on sub loop length shorter than 2.5km from the cabinet, providing speeds higher than CGA.

For the VUA-FTTC specific assets (DSLAM, Agg node, wholesale costs) and Bitstream FTTC specific assets, the relevant approach is an LRIC+ bottom-up model with economic depreciation, as in the existing NGA margin squeeze test model. For VUA FTTC, the cost should be calculated only over those areas where FTTC/eVDSL is already being used. For Bitstream FTTC assets, the relevant geographic scope is the next MDFs that are to be unbundled (about 50) so as to protect the corresponding

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[9] ComReg decision D03/16

investment. Because FTTC deployment is associated with a low level of risk, there is no need to apply a risk premium on the cost of capital of these assets.

These recommendations are summarized in the table below.

Table 2 – Summary of recommendations for VUA FTTC and bitstream FTTC costing, with respect to VUA FTTC specific assets

Parameter	TERA recommendation
Modelling approach	Bottom-up
Cost standard	LR(A)IC+
Depreciation method	Economic depreciation
Geographic aspect	For VUA FTTC, average over MDFs where FTTC/eVDSL is used For Bitstream FTTC, average over the next MDFs to unbundle
Line length	Based on sub loop length shorter than 2.5km from the cabinet
Risk premium	No risk premium

Source: TERA Consultants

As for the margin squeeze obligation, the EC has published a list of parameters that should be defined for the test. In addition to these parameters, TERA Consultants has considered the geographic aspect of the margin squeeze obligation.

First, there is a need to define the relevant market share for the modelled operator. Currently, the margin squeeze obligation between NGA retail and NGA bitstream is based on the SEO principle (Similarly Efficient Operator based on the market share of an alternative operator) with some elements assessed on an EEO basis. To simulate the costs of an alternative operator, it is recommended to use REO approach (alternative operator's costs) with the elements of EEO. In case REO data is not available, SEO with elements of EEO can be kept. For the margin squeeze obligations relating to Bitstream FTTH–VUA FTTH it is recommended to pass from SEO to REO as this ensures that alternative operators invest in VUA, and to continue using SEO if REO data is not available. For the test between NGA retail and VUA in the footprint of the Urban WCA Market EEO can also be used because competition is already sufficiently developed in this area and EEO is more favourable to Eir.

Second, a relevant set of products should be defined. Even though the EC generally recommends a flagship approach, where the test is done separately for each flagship product, a portfolio approach seems to be more relevant in the Irish context, where Eir's retail subscriber shares are decreasing. This would give Eir more flexibility in retail pricing.

Third, with respect to the cost standard, it is recommended either to use LRIC+[10] (as recommended in the 2013 EC Recommendation) or ATC (the current approach also

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[10] Long-Run Incremental Cost

used for CGA). LRIC+ or ATC approach is reasonable given that competition in Regional WCA market is not significantly developed to pass to LRIC, which would be more favourable for Eir.

Finally, it is recommended to keep a DCF[11] approach and not to apply a risk premium to the FTTH cost, which is consistent with the European Commission's recommendations.

The recommendations on the margin squeeze obligation parameters are summarised in the table below.

Table 3 – Margin squeeze obligation parameters for the recommended margin squeeze tests: 1. Bitstream-Retail, 2. VUA-Bitstream and 3. VUA-Retail in the footprint of the Urban WCA Market

Parameter	Current	2013 EC Recommendation	TERA recommendation
Downstream costs	1. Bitstream-Retail: SEO with elements of EEO 2. VUA-Bitstream: SEO	EEO; SEO accepted under certain conditions	1. Bitstream-Retail: REO with elements of EEO 2. VUA-Bitstream FTTH: REO 3. VUA-Retail: REO with elements of EEO or EEO
Cost standard	ATC	LRAIC+	LR(A)IC+ or ATC
Retail product basis	Portfolio	Flagship	Portfolio
Time period	DCF, over average customer lifetime	Dynamic approach such as DCF, over average customer lifetime	DCF, over average customer lifetime
Geographic aspect of NGA bitstream	National	-	Average over the next MDFs to unbundle (Relevant for 2. VUA-Bitstream)
Risk premium	WACC at 8.18%, no premium for FTTH since the service did not exist then	No risk premium for FTTC, a risk premium for FTTH	No need to estimate FTTH risk premium since no cost orientation for VUA FTTH

Source: TERA Consultants

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[11] Discounted Cash Flow

1 Introduction

In fixed markets, the local loop represents a bottleneck to which access is necessary to sell retail services to end-users. Since its duplication is very costly, an alternative operator needs to get access to the local loop of an operator with SMP (Significant Market Power) in order to sell services to end-users. That is why ComReg has imposed obligations on Eir to provide access to its local loop via several wholesale services. In addition, ComReg has imposed specific conditions of access obligation such as transparency, non-discrimination, price control and accounting separation.

ComReg is currently reviewing Eir's obligations with respect to the price controls for the access to the Next Generation Access (NGA) local loop. Eir has been indeed deploying NGA FTTC networks over the past few years and is in the process of expanding this footprint and deploying FTTH.

TERA Consultants has been mandated to conduct an economic study to inform ComReg's decisions. The objective of the study is to give recommendations on the pricing and costing methodologies relating to two wholesale NGA access services: VUA and NGA Bitstream.

It is to be noted that this report will focus to a large extent on the FTTC and FTTH market trends as these technologies are the ones requiring the higher investment. However, eVDSL[12] technology is also used in Ireland. From a regulatory perspective, the main eVDSL features are close to the FTTC ones as eVDSL requires significantly less investment than FTTH and uncertainty in terms of demand is very limited. All the recommendations in this report applying to FTTC also apply to eVDSL (e.g. "FTTC bitstream" should be seen as the aggregate of "FTTC bitstream" and "eVDSL bitstream").

The document is structured as follows:

- The second section provides the general regulatory and competition context: it describes the European regulatory framework, the Irish regulatory framework, summarizes operators' views on the market development and access pricing, and gives an overview of NRAs' methodological choices for NGA access pricing in other European countries (see §2).

- The third section defines the criteria to be used to choose between imposing an Economic Replicability Test (margin squeeze obligation) and imposing cost orientation based on the European Commission (EC) recommendations and the previous ComReg's market analysis. Using market statistics and operators' views, the section then makes an assessment of the Irish market over these criteria (see §3).

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[12] VDSL provided from the exchange

- Based on the analysis of the third section, the fourth section identifies recommendations on the choice of the most appropriate costing approach for each wholesale access product: VUA FTTC, VUA FTTH and NGA bitstream (see §4).

- The fifth section defines the relevant approaches and parameter values to carry out the margin squeeze obligation and to define the cost level for cost oriented prices (see §5).

2   Context

This section describes the European and Irish contexts of regulating access to NGA fixed networks. The following questions are addressed: what are market conditions leading to a choice of one or another pricing approach, how these approaches should be implemented, and what is the current approach to regulating NGA access prices in Ireland? The section then summarizes the views of operators with respect to wholesale access and NGA markets, which were given in response to a questionnaire issued by ComReg in 2015. Finally, a benchmark of other NRAs NGA access pricing approaches and EC's comments is provided.

2.1   European regulatory framework

According to the European Commission, a Next Generation Access (NGA) network means *"a wired access network which consists wholly or in part of optical fibre elements and which is capable of delivering broadband access services with enhanced characteristics (such as higher throughput) as compared to those provided over already existing copper networks."*[13] Depending on national circumstances, an FTTH, an FTTC, an HFC (Hybrid Fibre-Coaxial) or a mixed network may be considered as NGA network. In Ireland, different NGA technologies are used: Eir is rolling out both FTTH and FTTC networks, UPC/Virgin Media owns an HFC network, ESB/Vodafone joint venture SIRO is building an FTTB[14] network, while the National Broadband Plan aims at delivering high-speed broadband to the most rural areas using different appropriate technologies.

The European Commission published two recommendations in relation to Next Generation Access networks: recommendation on the access to NGA dated 20th of September 2010 (hereafter "2010 EC recommendation") and recommendation on non-discrimination and costing methodologies dated 11th of September 2013[15] (hereafter "2013 EC recommendation").

The 2010 EC Recommendation explains that differentiated remedies may be imposed in different areas depending on the state of competition. It also defines diverse access products which can be imposed in case of an SMP (significant market power). Also, according to the 2010 EC Recommendation, investment risk for FTTC is significantly lower than for FTTH: *"Investment into FTTN,<…> which is a partial upgrade of an existing access network (such as for example VDSL), normally has a significantly lower risk profile than investment into FTTH."*[16]

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[13] 2010 EC Recommendation, §11

[14] "Using ESB's existing infrastructure, SIRO will deliver a 100% fibre-to-the-building network directly into homes and businesses right across Ireland" http://siro.ie/what-is-siro/

[15] European Commission, Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment, C(2013) 5761

[16] 2010 EC Recommendation, Annex

The 2013 EC Recommendation (§6) distinguishes between three types of NGA access products:

1. Active inputs, for example bitstream over fibre,
2. Passive inputs, for example fibre unbundling in the ODF, in the cabinet, or at the concentration point,
3. Non-physical or virtual wholesale inputs offering equivalent functionalities to passive inputs, for example VUA.

The EC recommends NRAs not to impose cost orientation on NGA wholesale products under several conditions (§48-49):

- equivalence of inputs or obligations relating to technical replicability when equivalence of inputs is not yet fully implemented;
- obligations relating to the margin squeeze obligation;
- there exists a demonstrable retail price constraint.

The retail price constraint can be created either by alternative infrastructures or by competing access products. When considering active products, such a constraint can be created by passive or equivalent virtual inputs. When considering passive and virtual wholesale products with equivalent functionalities, the retail price constraint can be created by the legacy access network products offered by the SMP operator subject to a cost-oriented price control obligation in accordance with the costing methodology specified by the EC. The conditions not to impose cost orientation are summarized in the schema below.

Figure 2 – Need for cost orientation following the 2013 EC Recommendation
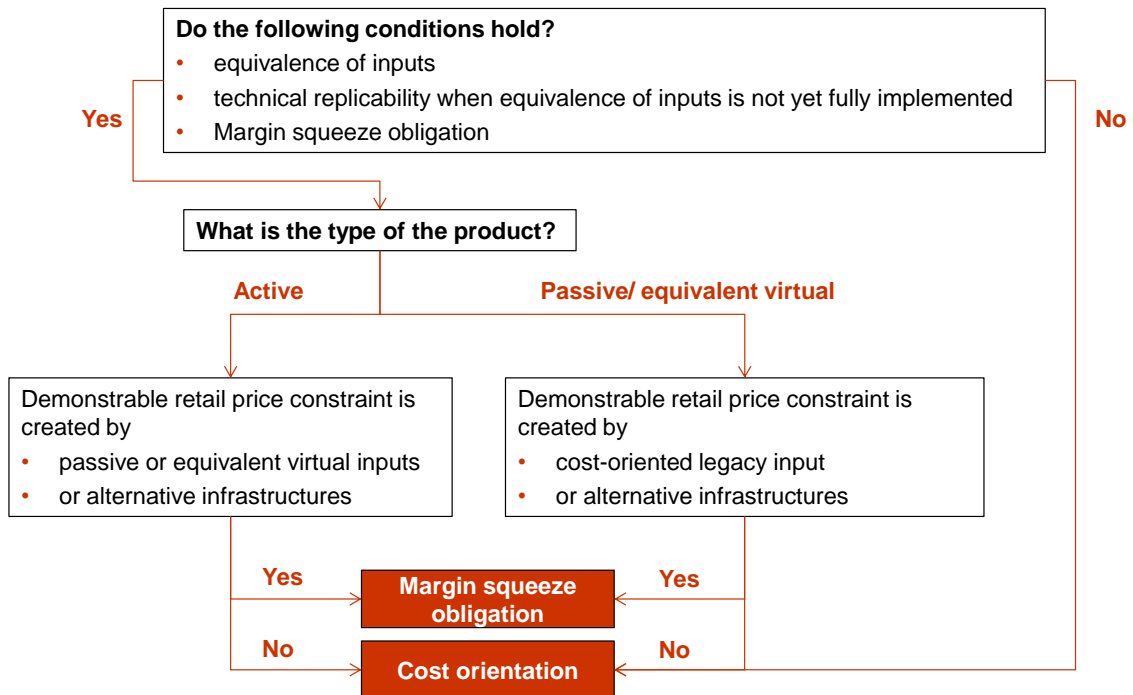
Source: TERA Consultants

In the case cost orientation is preferred, the 2013 EC recommendation indicates that the calculation of wholesale NGA product costs should be based on a BU LRIC + approach (§29) except for civil engineering costs deployed for legacy services and which can be reused for NGA services (§35). Reusable legacy civil engineering assets and their corresponding RAB should be valued on the basis of the indexation method (§34). This is the approach that ComReg has adopted for copper access pricing (ComReg Decision D03/16 / Document No 16/39).

In the case margin squeeze obligation is imposed, the EC gives recommendations on the choice for the following main parameters of the test:

- **Equally or Similarly Efficient Operator?** The margin squeeze obligation can be conducted either considering the costs of the incumbent (Equally Efficient Operator – EEO) or the costs of an efficient alternative operator (Similarly Efficient Operator – SEO). The EC recommends using EEO or in some specific cases SEO "*in order to ensure that economic replicability is a realistic prospect."*

- **Static or dynamic model?** The margin squeeze obligation can be conducted either by estimating the costs and revenues of an "average year" (average yearly margin method) or estimating and discounting all future cash flows (discounted cash flows). The EC recommends the second, dynamic approach over a customer's lifetime.

- **Product by product or portfolio?** The analysis can be achieved by testing every product separately or by studying a basket of products. The EC recommends a product-by-product approach on flagship products.

- **Which cost standard to use?** The EC recommends using LRIC+, that includes incremental cost (including sunk costs), and to add a mark-up for common costs related to the downstream activities.

- **What is a reasonable margin?** A WACC should be included to allow for a normal profit.

More details are provided in the annex.

2.2 Irish regulatory context

This section outlines the general context of access regulation in Ireland and current approaches to VUA and NGA bitstream pricing.

2.2.1 Regulatory Market Reviews and SMP

Like other NRAs in Europe, ComReg conducts regular market analyses which identify market failures and which conclude on the need for *ex ante* intervention. In a given relevant market, where an operator is found to have a Significant Market Power (SMP) position, several obligations can be imposed: access obligation, transparency, non-discrimination, accounting separation, price control, etc.

ComReg is currently reviewing, in ComReg Document 16/96, the wholesale access markets, i.e. Market 3a and Market 3b as defined in the 2014 European Commission Recommendation[17]:

- 3a. Wholesale local access (WLA) provided at a fixed location,
- 3b. Wholesale central access (WCA) provided at a fixed location for mass-market products.

These markets were previously known as Market 4 or wholesale physical network infrastructure access market ("WPNIA") market and Market 5 or the wholesale broadband access ("WBA") market correspondingly. Eir was previously designated as dominant in markets 4[18] and 5[19] and was therefore required to provide a suite of wholesale products: legacy products (bitstream) and NGA products (VUA and NGA Bitstream).

Currently, NGA bitstream and VUA are access products on the WBA market provided using NGA. VUA is a Layer 2 product allowing the interconnection at the local

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[17] 2014/710/EU

[18] ComReg Decision D05/10

[19] ComReg Decision D06/11

exchange[20]. The level of control of OAO for such a product is similar to that of LLU. As part of the new 3a/3b market review ComReg are proposing to move VUA to market 3a.

Compared to NGA bitstream, end-to-end NG bitstream is located lower in the ladder of investment, i.e. it does not require the OAO to have its own infrastructure such as backhaul or ISP services.

Figure 3 – Connection points for SLU, VUA, and NGA bitstream

Source: TERA Consultants
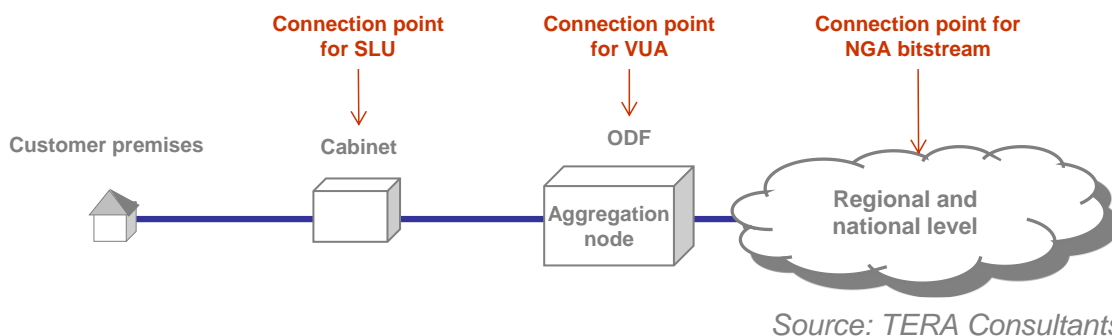
In addition to the access obligation, ComReg introduced price control for VUA and NGA bitstream.

The new market review (ComReg Document 16/96) for Market 3b (which includes NGA Bitstream) has proposed two separate markets: an Urban WCA market (consisting of 88 exchanges) which ComReg proposes will no longer be subject to regulation and also a Regional WCA Market (which is the balance of exchanges) which should be subject to regulation.

The table below summarises access obligations under new regulation: LLU and VUA obligations are kept on the whole national territory, while bitstream obligations are kept only in non-competitive areas.

Table 4 – New access obligations on 3a and 3b markets

Market	Technology	Access product	Competitive areas	Other areas
3a	CGA	LLU	Keep obligation on the whole national territory	
3a	NGA	VUA FTTC	Keep obligation on the whole national territory	
3a	NGA	VUA FTTH	Keep obligation on the whole national territory	
3b	NGA	NGA bitstream	Remove obligation	Keep obligation
3b	CGA	CGA bitstream	Remove obligation	Keep obligation

Source: TERA Consultants

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[20] As will be explained in section 4.2, there are two VUA products: local VUA and remote VUA.

The objective of this report is to identify the relevant pricing approach for VUA and NGA bitstream.

ComReg has recently reviewed the price control obligations for legacy access products (see ComReg Decision D03/16, Document 16/39). To ensure consistency, these obligations should be taken into account when choosing a pricing approach for VUA and NGA bitstream: relativity between copper and fibre pricing needs to be maintained for the time being.

2.2.2 Current Pricing Approaches for NGA Access

Two broad pricing approaches exist and are used in Europe for local loop access pricing (see §2.4):

- margin squeeze obligation (or margin squeeze test), which checks that access prices can be replicated by a competing operator given the retail price, so that they are constrained by the end-user prices of the corresponding final services;

- Cost orientation, which sets access prices on the basis of the cost of providing the services and includes an allowed profit.

These two approaches can also be combined.

Currently the price control obligation for VUA and NGA Bitstream is in the form of margin squeeze control (ComReg D03/13), which is equivalent to the margin squeeze obligation. The following obligations are applicable at the wholesale level:

- No margin squeeze between end-to-end next generation bitstream and NGA bitstream: *"Eircom shall ensure that it does not create a Wholesale Margin Squeeze between <…> the price for End-to-End Next Generation Bitstream and the price for NGA Bitstream based on the NGA Margin Squeeze Model."*

- No margin squeeze between NGA bitstream and VUA: *"Eircom shall ensure that it does not create a Wholesale Margin Squeeze between <…> the price for NGA Bitstream and the price for VUA (Virtual Unbundled Access) based on the NGA Margin Squeeze Model."*

- No margin squeeze between VUA and SLU: *"Eircom shall ensure that it does not create a Wholesale Margin Squeeze between <…> the price for VUA and the price for SLU based on the NGA Margin Squeeze Model."*

These margin squeeze tests are illustrated in the figure below.

Figure 4 – Current regulation: wholesale margin squeeze tests for NGA bitstream and VUA
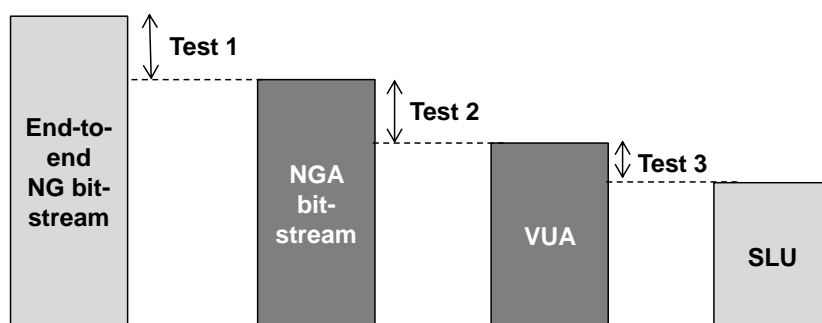
Source: TERA Consultants

The main reasons for choosing the margin squeeze test obligations were (based on ComReg D03/13):

- ComReg considered that the volatility and unpredictability of demand, at both the retail and wholesale level, meant that significant risks are associated with a cost based approach. (§10.69-10.70)

- ComReg considered that the required rate of return for investors is difficult to measure. (§10.69-10.70)

- ComReg considered that this would be consistent with the upcoming EC recommendation. (§10.67-10.68)

- ComReg considered that in areas where Eircom plans to roll out its NGA network, there is competition from UPC and legacy platforms and there are retail constraints. Eircom had not reduced the headline prices for its bundles offers in response to losing customers to UPC, but it has increased the perceived value of existing packages with a mixture of 'free' upgrades. (§10.71-10.77)

ComReg explains that it is important to maintain the relativity of prices between LLU and VUA[21]. To ensure that this objective holds, the same cost of sub-loop assets, in the form of the SLU price, is included in both the LLU cost when calculating the cost-oriented tariff and in the VUA price floor in the downstream margin squeeze test. This price floor cannot go down until SLU price goes down. The regulation is therefore technologically neutral: for a given exchange, operators can choose the most appropriate technology, either copper- or fibre-based. In particular, LLU products are not squeezed out by VUA.

There is also a margin squeeze test at the retail level between next generation bitstream and retail price[22].

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[21] ComReg D03/13, §10.11

[22] ComReg D03/13, page 386

2.3 Summary of operators' submissions

ComReg issued a formal notice, dated 19 February 2015, requesting operators to provide information pursuant to section 13D(1) of the Communications Regulation Act 2002. In the qualitative questionnaire (Annex 1 of the notice), operators were asked by ComReg to provide their views on the main market developments and provide information on their current and future market strategy. This section summarises the main conclusions based on the operator responses that are most relevant to the current project.

On the wholesale market, there are signs of reduced demand on the LLU platform: ✄

Concerning the wholesale prices, operators express their concern about the current regulatory approach which in their views is insufficiently restrictive for Eir. ✄

Operators' responses also indicate that the retail products based on different technologies are not priced equally: there are differences between legacy and NGA products, and between FTTC and FTTH products.

More details are provided in the annex.

2.4 Benchmark of NGA access pricing approaches and EC's comments

This section studies the pricing and costing approaches in other European jurisdictions with respect to NGA products. It also summarizes EC's comments on the draft decisions under the article 7a of the Electronic Communications Framework Directive - 2002/21/EC.

Among the 18 studied cases, cost orientation for NGA access pricing is used in 5 countries (Italy, Slovakia, Denmark, Poland, and Netherlands). The relevant costing approach chosen by the NRAs is LRIC+, which includes a share of common costs.

Margin squeeze obligation is used in 7 countries (Czech Republic, Luxembourg, Malta, Spain, Sweden – for local access, Germany, and UK). To calculate costs, margin squeeze obligation uses either the SEO – Similarly Efficient Operator (Luxembourg) or the EEO – Equally Efficient Operator (Malta, Sweden) cost reference. While the EEO has the same costs and the same scale effect as the incumbent, the SEO has a smaller market share, leading to a higher cost per unit. The margin squeeze obligation can be based either on a flagship product (Luxembourg) or on a portfolio of products (Czech Republic, UK)

In 6 other cases, another solution has been chosen by NRAs: no NGA access obligation (Romania, Sweden – for central access), no NGA access price regulation (Bulgaria), only ex post margin squeeze obligation in Germany for Layer-3 bitstream, etc.

To summarize, both cost orientation and margin squeeze obligation are broadly used to price NGA wholesale products: among the 18 studied cases, cost orientation was used in 5 and margin squeeze obligation – in 7 cases. The EC has accepted both of these

pricing approaches, depending on the national situation. The EC underlined that when choosing an approach, it is important to consider criteria set out in the 2013 EC Recommendation. For example, when commenting on a Netherlands decision, the EC questioned the need for cost orientation given the presence of alternative infrastructures at the national level (NL/2015/1794). In contrast when commenting on a German decision, the EC, reiterates the need to better demonstrate competitive safeguards in the case it is decided not to impose cost orientation (DE/2015/1781).

The EC has commented not only on the choice of the pricing approach but also on different parameters used in its implementation.

Regarding the geographic aspect, the EC recommends assessing the market situation not nationally but by relevant areas. This recommendation was made with respect to a Spanish decision (ES/2015/1818) and an Italian decision (IT/2011/1230, IT/2011/1231). At the same time, the geographic segmentation should be clearly defined and not very complex (ES/2015/1818).

The EC underlines the importance of specifying all the relevant parameters if the margin squeeze obligation is chosen, as given in the 2013 EC Recommendation (CZ/2014/1647).

- The EC reiterates that the margin squeeze obligation should be made product by product for flagship products (MT/2015/1803).
- If the SEO approach is chosen, the NRA has to justify the choice of the market share value (LU/2014/1633).
- The EC reiterates that, as a general rule, a dynamic approach has to be chosen for margin squeeze obligation over a static one (UK/2015/1692). However, the EC accepts that in some cases, when competition is not developed yet, a period-by-period approach may be temporarily accepted (LU/2014/1633).

With respect to cost orientation parameters, the EC reiterates that reusable civil engineering assets should not be valued at full replacement costs (PL/2015/1780).

More details on the benchmark and EC's comments are provided in the annex (see §6.3).

3 Assessing criteria used to choose between cost orientation and margin squeeze obligation

This section starts by recalling the 2013 market assessment that led ComReg to choose the margin squeeze obligation approach to VUA and NGA bitstream pricing (§3.1). It then makes an assessment of the current market situation over the two defined criteria: Competition from other platforms (§3.2) and Volatility and unpredictability of demand (§3.3).

3.1 Defining a list of criteria and reminding conclusions of the 2013 market review

In its previous decision D03/13 of January 2013, ComReg decided to choose the margin squeeze obligation over cost orientation both for VUA and NGA bitstream for two main reasons:

- There was sufficient competition from cable networks and CGA and these platforms constrain retail and wholesale NGA prices;
- The NGA demand was difficult to predict.

Each of these reasons is considered in more details below.

3.1.1 Competition from cable network and CGA

The development of competition is one of the main criteria mentioned by the EC in its 2013 Recommendation used to choose a pricing approach for NGA products (see §2.1). The EC explains that for virtual access products equivalent to passive ones (such as VUA), the retail constraints can come either from CGA wholesale access bitstream or from alternative infrastructures. For bitstream products, the retail constraint can come either from passive and equivalent virtual products or from alternative infrastructure.

ComReg's reasoning in the D03/13 decision is consistent with this EC's Recommendation. The degree of competition was assessed by ComReg with reference to the following parameters:

- Subscriber shares. Subscriber shares were decreasing for Eir and growing for UPC especially in urban areas. The share of cable users was increasing compared to DSL. In addition, ComReg was expecting a growing LLU take-up, in particular thanks to BT's investment, who in its turn is reselling its services to Sky in the form of bitstream[23].
- Retail prices. UPC's retail prices were higher than Eir's prices. Even though there was no retail price decrease by Eir during the analysed period, there were 'free'

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[23] D03/13, §10.72; Oxera January 2013 report, p.6

bundles upgrades and time limited promotions[24]. In addition, according to Oxera, historical evidence on Eir's pricing may not be informative about Eir's behaviour going forward, so that the absence of price decrease in the past does not imply that prices cannot decrease in the future[25]. Eir's offers seemed to be more competitive in the fibre broadband-bundle segment than Eir's legacy offers[26].

- Wholesale prices. Eir had reduced prices for certain wholesale access products outside of the normal price control period review (Bitstream, LLU, SLU)[27]. Wholesale stand-alone VUA price of €17.50 was consistent with UPC's retail prices[28].
- Network coverage: ComReg expected that the NGA footprint would largely overlap that of UPC[29].
- Technical characteristics: download speeds and technical capabilities for Eir NGA and UPC were deemed to be similar[30].

ComReg had therefore concluded in 2013 that there existed enough competition on the broadband retail market from UPC and operators using Eir's access offers: indeed, Eir's subscriber shares were decreasing, Eir's retail prices were not the highest in the market, Eir was also proposing discounts, wholesale prices were voluntarily lowered by Eir, and Eir had a strong competitor, UPC, who was offering services with the same quality and coverage. This competition was deemed capable of creating a sufficient retail constraint.

3.1.2 Volatility and unpredictability of demand

The following NGA demand factors are subject to a degree of uncertainty:

- The extent to which wholesale LLU customers would move to NGA products;
- The degree to which the presence of Eircom NGA offerings would slow or reverse migration to alternative platforms such as cable;
- The extent to which the presence of enhanced NGA products would stimulate broadband penetration on the retail market.

Volatility and unpredictability of demand, at both the retail and wholesale level, made it more difficult to predict the cost per customer. For this reason it was also difficult to measure the required rate of return for investors on assets to be constructed[31]. Depending on the predictions with respect to these parameters, estimated cost-oriented tariffs were likely to vary a lot.

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[24] D03/13, §10.73; Oxera January 2013 report, p.5

[25] Oxera January 2013 report, p.11

[26] Oxera January 2013 report, p.13

[27] D03/13, §10.73; Oxera January 2013 report, p.5-6

[28] Oxera January 2013 report, p.13

[29] Oxera January 2013 report, p.5-6

[30] Oxera January 2013 report, p.5-6

[31] D03/13, §2.26, §10.69-70

In particular, if the calculated cost were under-estimated, it would have inhibited Eir's investments in the fibre network since it will not be able to recover its costs. Therefore, in conditions of uncertainty it is less risky to choose the margin squeeze obligation/margin squeeze approach than a more strict cost orientation, since the former one gives Eir freedom in setting higher wholesale prices under condition that it is consistent with retail prices.

ComReg concluded therefore in 2013 that since the NGA demand was difficult to predict, the cost orientation was not the best option at that stage of market development.

Oxera stated in 2013 that the risk of building a NGA network would be reduced over time as more information regarding NGA demand would become available, so that the next market review could lead to a recommendation to pass to cost orientation:

> *"The construction risk is likely to be diluted once the main roll-out is completed and more information is gained. Demand conditions could be assessed as part of the next review. If there is evidence of more stable demand, ComReg could consider introducing cost-plus".[32]*

The current state of the Irish markets will therefore be analysed against the two criteria outlined below to inform a choice between cost orientation and margin squeeze obligation for NGA wholesale products:

- Competition from other platforms that can create a retail price constraint on the NGA services;
- Volatility and unpredictability of demand.

3.2 Competition from other platforms

According to the European Commission (§2.1), there is no need for cost orientation if there is a demonstrable retail price constraint. This constraint is created:

- For NGA bitstream, by passive inputs, or equivalent virtual inputs, or alternative infrastructures.
- For VUA, by legacy access products or alternative infrastructures.

The same indicators to those used in 2013 will be used to assess whether the retail constraint is still sufficient in today's market. These are:

- subscriber shares,
- retail prices,
- wholesale prices,
- network coverage and technical characteristics.

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[32] Oxera. Eircom's next-generation access products. Pricing principles and methodologies. April 2012. p.21-22

3.2.1 Subscriber shares

This section studies dynamics of operators' subscriber shares on both retail and wholesale markets nationally and by geographic areas, as well as the usage of different wholesale access products by operators.

3.2.1.1 Retail market[33]

Subscriber shares on the retail market are studied here using two sources of data: ComReg's quarterly reports[34] and the ICT survey[35].

Eir's subscriber share declined in the period 2011-2016, passing from 45% in Q3 2011 to 34% in Q2 2016 (Figure 5). Nevertheless, after the introduction of NGA services in Q3 2013, the decrease in the Eir retail fixed broadband subscriber share has slowed down, passing from -1.9% per quarter before the introduction of NGA to -1.2% after.

The UPC Ireland (rebranded Virgin Media Ireland) subscriber share grew from 27% in Q4 2012 to 29% in Q3 2013, which has been noted in the previous 2013 market review[36]. However, since then its market share is stagnating (Figure 5).

At the same time, the ICT survey indicates that contrary to the data of quarterly reports, UPC/Virgin Media subscriber share continued to increase after Q3 2013, passing from 25% in 2013 to 28% in 2015.

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[33] ComReg 16/96 has considered several retail market scenarios, including the retail market absent any WLA/ WCA regulation, and the retail market in the presence of WLA regulation.

[34] ComReg, Irish Communications Market, Quarterly Key Data Reports, Q3 2011-Q3 2015

[35] ComReg 15123a – ICT Consumer Survey, November 2015

[36] ComReg Decision D03/13

Figure 5 – Retail fixed broadband subscriber shares

(1) Evolution by quarter, Q3 2011-Q2 2016, from ComReg Quarterly Reports
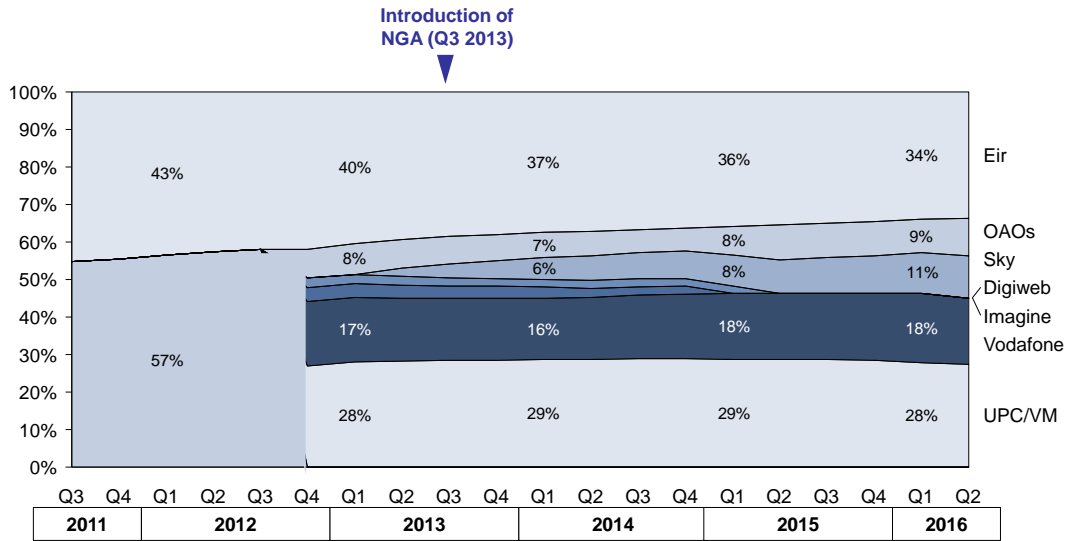
Source: ComReg Quarterly Reports

(2) Evolution between 2013 and 2015 from ICT survey
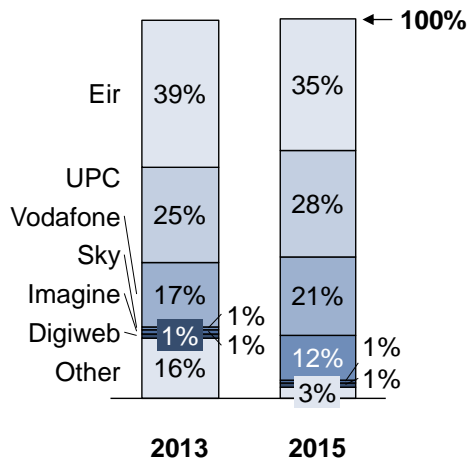
Source: ComReg 15123a – ICT survey

Operators' subscriber shares differ significantly by area. Eir's subscriber share is only 15% in Dublin but remains high in other urban areas (37%) and in rural areas (53%). Virgin Media subscriber share is high in Dublin (67%) but is only 18% in other urban areas. There is unfortunately no historical data on the evolution of subscriber shares per area.

Figure 6 – Retail fixed broadband subscriber shares by area, 2013, 2015

3.2.1.2 Wholesale market

As of today, the only two networks with a significant coverage are that of Eir and that of Virgin Media. SIRO provides VUA services over its network to Vodafone, however, numbers are very small to date. This is likely to remain as long as the NBP has not been deployed and SIRO did not significantly extend its own FTTB network. Eir operates DSL and VDSL networks, while Virgin Media operates a cable network. That is why the technology mix used to provide broadband to customers also reflects Eir's and Virgin Media's market shares on the wholesale market, including self-provision (see Figure 7).

Eir's wholesale subscriber share (including self-supply), including DSL and VDSL technologies, was slightly decreasing before the introduction of NGA in Q3 2013, and now is slightly increasing from 65% in Q3 2013 to 69% in Q2 2016. The share of VDSL users has increased from 4% in Q3 2013 to 32% in Q2 2016, while the share of DSL users has been reduced, which means that DSL and VDSL offers are seen as substitutes by customers, suggesting that CGA and NGA based retail broadband offerings are often seen by consumers as being substitutes at the retail level. The cable broadband subscriber share is the same at the wholesale and at the retail levels (when self-supply is included), increasing from 23% in Q3 2011 to 29% in Q3 2013 and then stagnating, as already has been mentioned previously, see §3.2.1.1 and Figure 5 above.

Figure 7 – Fixed broadband subscriber shares by technology, Q3 2011-Q2 2016
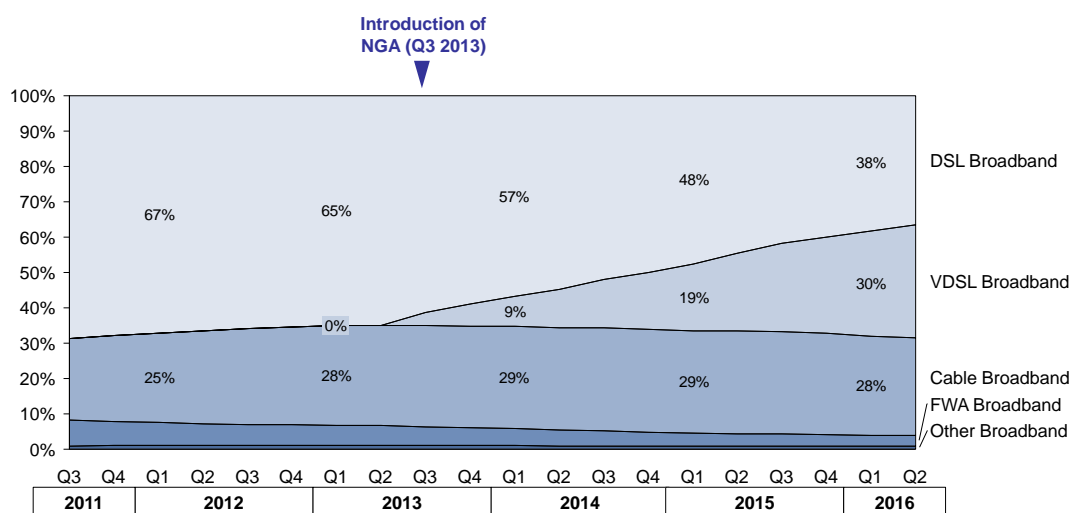
Source: ComReg Quarterly Reports

<u>It is necessary to study separately DSL and VDSL lines in more detail. In fact, for a part of these lines, the services are provided directly by Eir, and the other part – by alternative operators using Eir's wholesale services.</u>

In the DSL segment, services to the final customers are provided either by Eir or by alternative operators through LLU or CGA bitstream access offers. The share of LLU lines in the total number of DSL lines increased from 8% at the beginning of 2012 to 12% at the beginning of 2016, to then start slightly decreasing with VUA deployment, while the share of bitstream lines increased from 27% to 42% (see Figure 8). As a result, thanks to development of service-based competition, Eir's retail subscriber share in the DSL segment has decreased from 65% to 46% during the same period, which seems to demonstrate the efficiency of the existing copper access regulation.

Figure 8 – Provision of DSL access (excluding VDSL), Q4 2013-Q2 2016

| | LLU lines |
| 8% | 9% | 13% | 13% | 12% |

| | Wholesale bitstream lines |
| 27% | 28% | 33% | 38% | 42% |

| | Eir retail DSL |
| 65% | 62% | 55% | 49% | 46% |

| Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 |
| **2011** | | **2012** | | | | **2013** | | | | **2014** | | | | **2015** | | | | **2016** | |
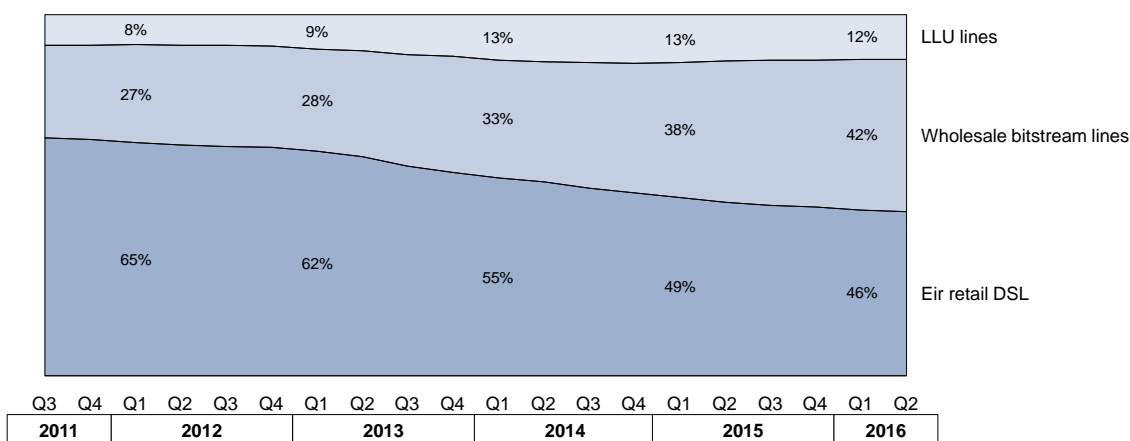
Source: ComReg Quarterly Reports

In the VDSL segment, services to the final customers are provided either by Eir or by alternative operators through VUA or NGA bitstream access offers. The VUA service has been launched in Q3 2014, passing from 0.2% in the first quarter after the launch to 9% in Q2 2016 (Figure 9). This service is still only at the beginning of its development. As of August 2016, there are only 29,824 VUA lines. At the same time, it has a significant potential for future development: these lines belong to ✂ exchanges. In total these ✂ exchanged include ✂ lines. As there are already active VUA lines in these exchanges, this means that alternative operators have already deployed all the necessary equipment to offer NGA access through VUA to the ✂ potential clients as of August 2016 (Table 6)[37]. The VDSL bitstream offer is also developing: it increased from 24% in Q4 2013 to 38% in Q2 2016. As a result of the development of services-based competition, Eir's retail market share in the VDSL segment decreased from 76% to 53% during the same period. However, it remains very significant. Indeed, comparing Figure 8 and Figure 9 shows that Eir's retail subscriber share is higher on the VDSL (53%) than on the DSL (45%), which indicates that the deployment of VDSL leads to a reinforcement of Eir's position.

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[37] This analysis does not account for the number of NGA cabinets,

Figure 9 – Provision of VDSL access, Q4 2013-Q2 2016

Q4 2013 Q1 2014 Q2 2014 Q3 2014 Q4 2014 Q1 2015 Q2 2015 Q3 2015 Q4 2015 Q1 2016 Q2 2016
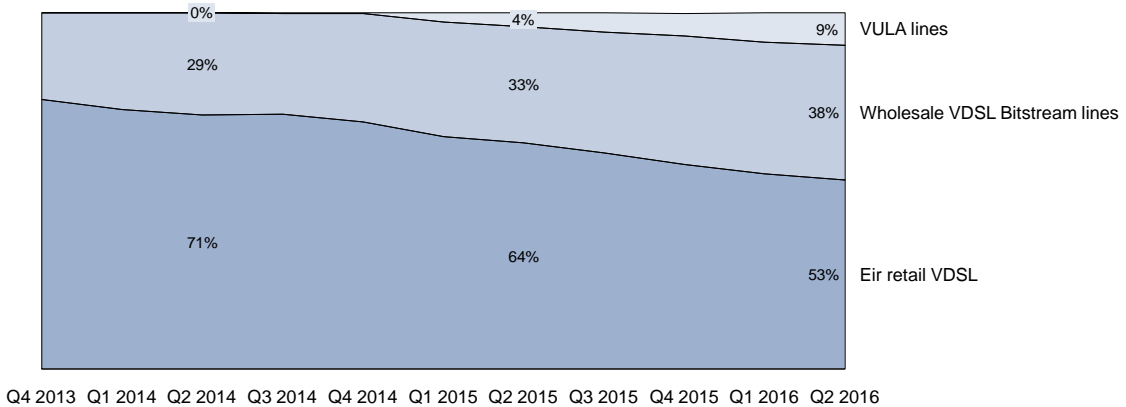
Source: ComReg Quarterly Reports

Hence, the numbers above show that service-based competition has still not been well developed yet in the VDSL segment. The competition that has developed is based mainly on bitstream and not on the VUA. At the same time, in the DSL segment, the part of LLU-based competition is significant (12.6%, see Figure 9): 59 209 LLU lines in Q2 2016 vs 38 316 VUA lines. The total number of LLU lines has decreased by 33% between Q2 2014 and Q2 2016 (see Figure 10). This seems to be partially explained by the migration from LLU to VUA: the total number of LLU and VUA lines was approximately 88 000 in Q2 2014 and 97 525 in Q2 2016.

Figure 10 – Evolution of the number of LLU and VUA lines, Q3 2013-Q2 2016
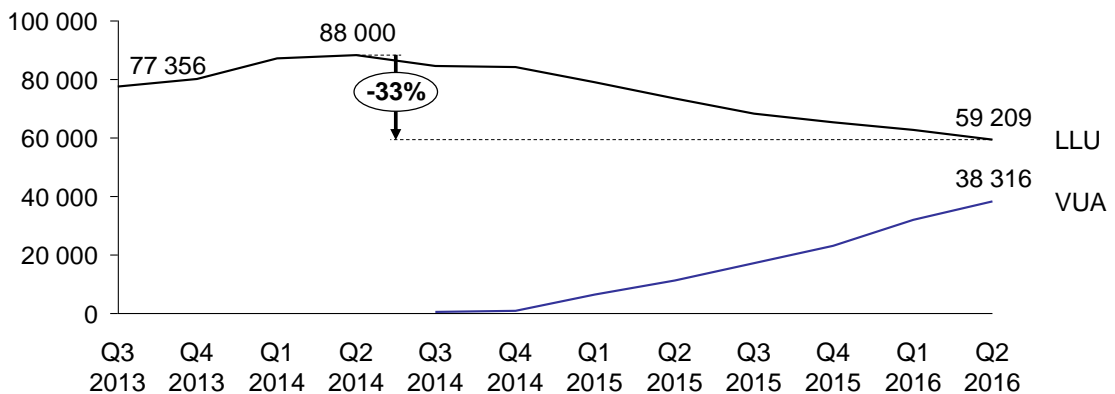
Source: ComReg Quarterly Reports

The competitive situation has also been studied separately for several identified territories, depending on the availability of different technologies and wholesale products:

- ✂ MDFs where VUA service is currently purchased;
- ✂ MDFs where LLU, LS or VUA are purchased: these MDFs include the ✂ above-mentioned VUA MDFs;

- ✂ MDFs where FTTC-VDSL is available: these MDFs include the ✂ above mentioned VUA MDFs;
- ✂ MDFs where the cable network is present.

It is observed that the retail subscriber share of Eir has decreased in all the studied areas between 2012 and 2015 (see Table 5): at the national level, it decreased from ✂% to ✂%.

Table 5 – Retail subscriber shares by area, 2012 and 2016

✂

Source: TERA analysis from ComReg data February 2016

At the wholesale level (see Table 6) including self-supply by UPC, Eir's subscriber share remained relatively stable: at the national level, it was ✂% in 2012 and 2015. Even in the VUA area, where the development of NGA could potentially lead to an increase in Eir's wholesale market share, this share has increased only slightly, from ✂% to ✂%. However, the FTTC/VDSL services were launched only in 2013, hence it is too early to conclude on the full effect of NGA development on the wholesale market shares.

Table 6 – Wholesale subscriber shares (including self-supply) by area, 2012 and 2016

✂

Source: TERA analysis from ComReg data February 2016

The competitive position of Eir in Ireland can be compared with the competitive position of incumbents in other European countries.

An international benchmark (Figure 11 from European Commission broadband indicators) shows that incumbents in countries with a higher VDSL coverage have either lost on average less wholesale subscriber shares or have even managed to increase wholesale subscriber shares than incumbents in countries with a lower VDSL coverage. Indeed, Figure 11 shows that the increase in the DSL/VDSL subscriber share between 2013 and 2015, which corresponds to the incumbent's market share in the market, tend to increase with the VDSL coverage. It may be explained by a less strict wholesale access regulation for NGA than for CGA networks. In most European countries, the wholesale subscriber share of incumbents was decreasing; the only exceptions are UK and Ireland. It can be partially explained by a broad VDSL coverage in these countries: 61% in Ireland and 79% in UK.

Figure 11 – European benchmark: link between evolution of incumbent's wholesale subscriber share and importance of FTTC/VDSL in the country
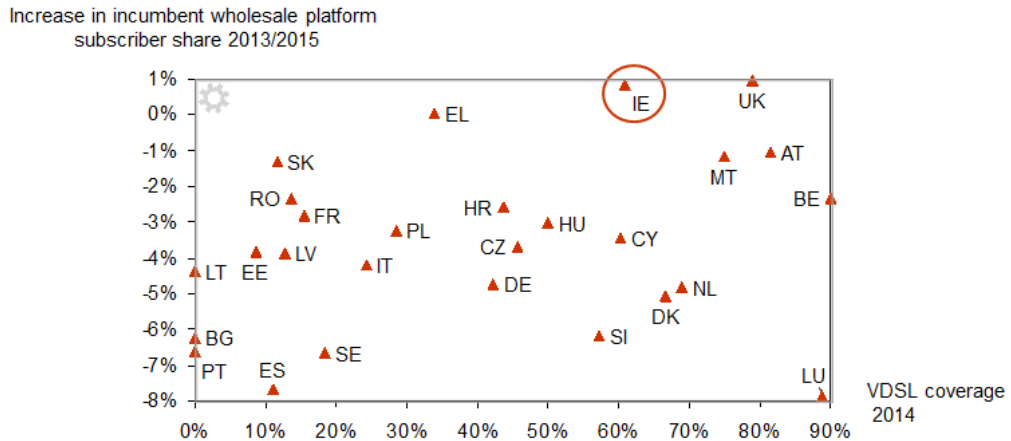
Source: TERA Consultants based on European Commission broadband indicators

Contrary to the subscriber shares on the wholesale market, subscriber shares on the retail market are not dependent on the VDSL coverage, in particular thanks to the CGA wholesale regulation (see Figure 12). Even though, as explained earlier, Eir holds its positions on the wholesale market, its losses in the retail subscriber share are bigger compared to other European countries, and that in spite of development of VDSL. Eir has lost 5 percentage points compared to 2 points on average by European incumbent operators.

Figure 12 – European benchmark: link between evolution of incumbent's retail subscriber share and importance of FTTC/VDSL in the country
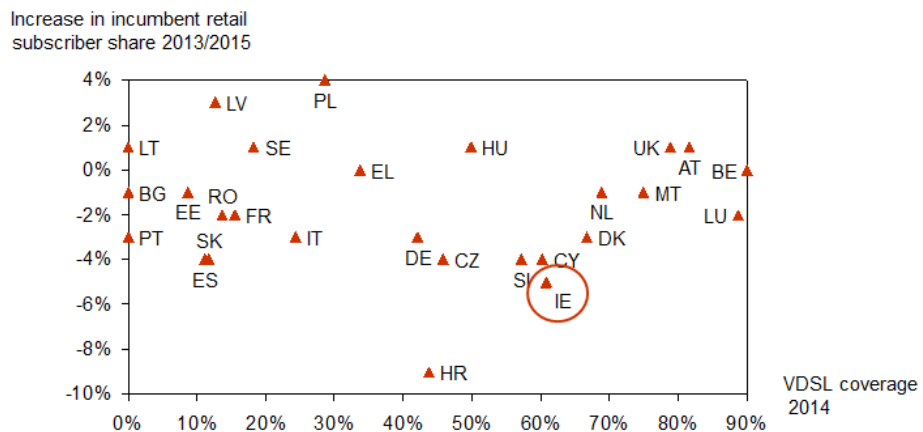
Source: TERA Consultants based on European Commission broadband indicators

To conclude, Eir subscriber shares are decreasing at the retail level. At the wholesale level, Eir's market share is relatively stable but it is still early to appreciate the impact of

the NGA development which may lead to a growth of the DSL/NGA platform and correspondingly to a decline in the cable platform. VUA is only at the beginning of its development and starting to progressively replace LLU. On the VDSL wholesale segment, Eir's market share is much greater than on the ADSL wholesale segment.

3.2.2 Retail prices

Another important indicator of competition development is the level and dynamics of retail prices.

In the past two years, there have been several increases in the broadband retail price by both Eir and its competitors:

- In 2015[38] broadband retail prices of main broadband operators increased:
    - 1 February: Sky price went up by up to €1-2.
    - 1 February: UPC price went up by €1-4 but at the same time upload speeds increased from 10Mbps to 20Mbps, and download speed of 200Mbps package increased to 240Mbps.
    - 15 April: Eir residential prices for double, triple or quad-play bundles increased by €2-8 including VAT (€5 on average) and Eir business segment prices went up by €3-10 excluding VAT (€9 on average).
- In 2016 there were more broadband price increases[39]
    - Virgin Media prices of bundles including broadband increase by €5.
    - Eir prices of bundle packages increase by up to 9.4% (additional €5-8 per month) in exchange for additional features (call minutes, international calls, TV channels). It impacted about ✂ customers.
    - Eir increased the price for standalone NGB[40] offers and for standalone NGA[41] offer by €5 (incl. VAT) from 1 September.

To our knowledge, Eir did not announce an increase in the product speeds for residential customers that could justify the price increase, contrary to what happened during the last

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[38] 5 January 2015 http://www.breakingnews.ie/business/upc-customers-facing-price-increases-in-next-bill-656815.html

16 January 2015 https://switcher.ie/blog/broadband-tv-home-phone/Eircom-announce-price-increase-from-april-2015/

[39] http://support.Eir.ie/article/pricingupdate

https://switcher.ie/blog/broadband-tv-home-phone/are-you-impacted-by-Eir-s-price-increases/

http://www.newstalk.com/Are-you-an-Eir-customer-Prepare-for-a-price-hike

http://www.independent.ie/business/personal-finance/both-Eir-and-virgin-media-increasing-cost-of-services-34387881.html

[40]   Please   see   page   2,   second   table   at https://www.Eir.ie/opencms/export/sites/default/.content/pdf/pricing/Part3.1.pdf.

[41]   Please   see   second   table   at   page   3   of https://www.Eir.ie/opencms/export/sites/default/.content/pdf/pricing/Part3.1.pdf.

review period, when prices remained stable but more additional services have been included in the bundle.

Based on operators' responses (see Annex, §6.4), they differentiate retail prices depending on the technology used: fibre-based products are more expensive than the copper-based ones, and FTTH is more expensive than VDSL.

- ✂
- ✂

It means that, even though there is a chain of substitution between ADSL and VDSL based retail products, the products based on ADSL, VDSL and FTTH are not complete substitutes because they have different characteristics and different price levels.

3.2.3   Wholesale prices

The table below gives the levels of wholesale access prices and their dynamics over time. It distinguishes between three technologies: ADSL, FTTC and FTTH. It also distinguished between two types of services: WLA (wholesale local access) that includes physical as well as virtual products with comparable functionalities, more precisely LLU and VUA services, and WCA (wholesale central access) that includes active bitstream services.

LLU prices are currently regulated on the basis of cost orientation and so are less reflective of competitive dynamics: the full LLU price decreased from €12.41 to €9.91 in 2013 and to €9.34 (excluding fault repair) in 2016. The price of ADSL bitstream was decreased by Eir in 2012.

Access prices for wholesale FTTC services, both VUA and NGA bitstream, went up in June 2015, from €17.50 to €19.50, or by 11% and in September 2016, to €23.00, or by 18%.

Concerning FTTH-based services, they were introduced in August 2015, and their price also increased from 1 September 2016. For example, the price of Standalone 150Mbps increased from €20.50 today to €23.50, or by 14%.

Access price level is the same for VUA FTTH and NGA bitstream FTTH. FTTH prices for a 150Mbps product are 17% more expensive than for FTTC products, reflecting a higher level of investments. It is likely to be reflected in retail prices.

Table 7 – Broadband wholesale access prices dynamics in Ireland

	ADSL	FTTC	FTTH
WLA	**LLU** (regulated price) • €12.41 from 2010 • €9.91 from January 2013 • €9.34 from July 2016 (D03/16) • €9.88 from July 2017 (D03/16) • €10.40 from July 2018 (D03/16)	**VUA FTTC** Standalone: • €17.50 from 20/05/2013 • €19.50 from 30/06/2015 • €23.00 from 01/09/2016 *(price increase in 2015 and 2016)* POTS based: • €5.98 from 20/05/2013 • €8.09 from 01/09/2016	**VUA FTTH** Increase from 01/09/2016 Standalone 150 Mbps: • €20.50 → €23.50 for 150Mbps • €25.50 → €28.50 for 300Mbps • €35.50 → €38.50 for 1000Mbps POTS based: • €6.98 → €9.09 for 150Mbps • €11.98 → €14.09 for 300Mbps • €21.98 → €24.09 for 1000Mbps
WCA	**Bitstream MB** (base rental) 8Mb: • €4.90 from 01/03/2010 24Mb: • €7.65 from 20/12/2010 • €5.90 from 01/05/2012 *(price decrease in 2012)*	**NGA bitstream FTTC** Stadalone: • €17.50 from 20/05/2013, • €19.50 from 30/06/2015 • €23.00 from 01/09/2016 *(price increase in 2015 and 2016)* POTS based: • €5.98 from 20/05/2013 • €8.09 from 01/09/2016	**NGA bitstream FTTH** Increase from 01/09/2016 Standalone 150 Mbps: • €20.50 → €23.50 for 150Mbps • €25.50 → €28.50 for 300Mbps • €35.50 → €38.50 for 1000Mbps POTS based: • €6.98 → €9.09 for 150Mbps • €11.98 → €14.09 for 300Mbps • €21.98 → €24.09 for 1000Mbps

Source: Open Eir, Bitstream Service Price List, version 7.34a September 2016, http://www.openeir.ie/Reference_Offers/?selectedtab=wbaro.
NB: for WCA, only port prices are shown (not traffic prices)

3.2.4   Network coverage and technical characteristics

Alternative technologies could potentially create retail constraints on the FTTC and FTTH products under condition that their technical characteristics are comparable and they have enough coverage. In Ireland, two alternative technologies are available, HFC and ADSL.

- Download speeds and technical capabilities for Eir's NGA and Virgin Media's cable, are similar. However, Virgin Media coverage is geographically limited. Indeed, of the ✄ MDFs where FTTC technology is already available as per August 2016, only ✄ also have cable coverage[42]..Therefore, the cable alone cannot create a full retail constraint on the Eir's NGA products at the national level but only in a geographically limited area.

- Concerning the ADSL technology, the LLU product cannot create a sufficient retail price constraint on the FTTC product nationally but only in a geographically limited area, since as of August 2016 there are only ✄ exchanges with activated VUA lines (Table 6), which is less than the ✄ FTTC MDFs. In terms of number of lines, ✄ MDFs where VUA is already used have ✄ lines, which is ✄% of the number of lines in FTTC MDFs. In addition, ADSL products provide speeds

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[42] TERA analysis from ComReg data August 2016

comparable to FTTC only to those final customers who are located very far from the MDFs.

SIRO's FTTB coverage is still very limited: it is currently building its networks in Carrigaline, Dundalk, and Sligo, and is planning to make the service available soon in ✂ other towns (Figure 13). Because of such limited coverage, SIRO's network is unlikely to create a sufficient retail constraint on Eir's FTTC products over the period of the market review.

Figure 13 – SIRO coverage

Source: http://siro.ie/roll-out/

3.2.5 Summary

The assessment of the market competition over the criteria set above can be summarized as follows.

Even though Eir is losing subscribers in the retail market, its retail market share on the VDSL segment is higher than on the DSL segment, which means that in the near future the transition to NGA can give Eir more power in the retail market under the current NGA regulation. On the wholesale market, Eir's subscriber shares are relatively stable but it is still too early to assess the impact of the FTTC and FTTH development by Eir. However, it is noted that on the VDSL wholesale segment, Eir's market share is much greater than on the ADSL wholesale segment (see Figure 8 and Figure 9).

Price dynamics indicate that there seems to be less price competition compared to past situations. Retail broadband prices of several operators, Eir, Sky and UPC (Virgin Media), have increased in 2015. During the same year, there has also been an increase in the VUA FTTC prices and in the NGA bitstream FTTC prices charged by Eir, and there has been an increase in wholesale prices for both FTTH and FTTC since September 2016.

The competitive constraint created on Eir's NGA products by other networks will be insufficient for two main reasons:

- Their coverage is smaller than Eir's NGA coverage. The number of LLU lines is limited and is now in decline. Cable alone cannot create a full retail constraint on the Eir's NGA products at the national level but only in a geographically limited area. SIRO's FTTB coverage is likely to be very limited in the short to medium term. Alternative networks cannot therefore generate a competitive pressure across a sufficiently broad territory. Also, in areas that have not been unbundled by alternative operators, there are or will be only two parallel infrastructures (either Eir and Virgin Media, or Eir and SIRO): in the presence of a duopoly, development of effective competition may remain very limited. As BEREC said in 2013: *"It is generally recognised that duopoly communications markets face a high risk of evolving in a non-competitive manner"[43]*.
- The prices are differentiated between networks. Operators's FTTB/H products will be priced at a premium to FTTC products, which in their turn are priced at a premium to CGA products. Even though customers are likely to consider the different technologies as partial substitutes, price constraints between technologies are not as strong as the price constraints between different offers of the same technology.

3.3 Volatility and unpredictability of demand

As was noted by ComReg in 2013, volatility and unpredictability of demand can impact the calculation of the NGA wholesale cost-oriented prices. It is therefore necessary to assess whether this volatility and unpredictability have a significant impact on FTTH and FTTC costs per unit.

FTTC and FTTH technologies are analysed separately because the impact of volatility and unpredictability can be very different.

In the previous market review in 2013, FTTC services had just started to be provided, and it was difficult to make predictions of the future FTTC penetration rate. As of 2016, it has already been three years since FTTC services started to be provided to final users. FTTC penetration data for first 3 years after the launch is therefore already available and can be used to inform predictions of the penetration rates for the years to come.

Figure 14 below simulates several hypothetical scenarios of FTTC penetration. The base case scenario corresponds to a situation where the first-year penetration rate is ✂%, and it goes up to 100% in 8 years. This scenario is a moderate average scenario which is in the middle between two extreme cases: fast penetration (scenario 2 and 4) and slow penetration (scenario 3 and 5).

Two situations are possible:

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[43] See for example BEREC's response to the European Commission's questionnaire for the public consultation on the revision of the Recommendation on Relevant Markets, March 2013 and a paper of the Dutch regulator OPTA "Is two enough?" September 2006

- When the FTTC service was launched (as in 2013), it was more difficult to predict penetration rates, so that there is a large divergence in the penetration rate predictions for the future years, as the estimation error cumulates over time. To describe this situation where the service is new, scenarios 2 and 3 have been introduced: it is supposed that they diverge from the initial scenario by 40% for each year before achieving 100%.

- If FTTC penetration rate for the first three years is already known (as in 2016), the divergence of predictions from the initial scenario is limited, as seen for scenarios 4 and 5. These scenarios coincide with the initial scenario for the first 3 years, and then converge to scenario 2 and 3 to reflect different extreme assumptions with respect to penetration speeds.

Figure 14 – FTTC penetration scenarios – for illustrative purposes
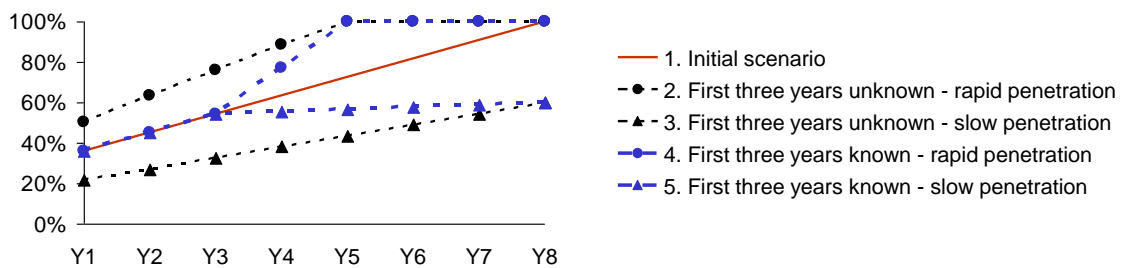
Source: TERA Consultants

The table below presents VUA FTTC price estimation results depending on the penetration scenario. This table has been completed by using the NGA margin squeeze test developed by ComReg for the previous decision (in 2013) and by testing different penetration rate scenarios. Indeed, this model uses an economic depreciation/ DCF approach to calculate FTTC or FTTH cost per line and therefore different penetration rates generate different FTTC or FTTH cost per line. The table shows that the risk of an estimation error is high if the penetration dynamics is estimated before the service is launched: it can differ by up to 18% from the initial scenario. However, if the NGA penetration data is already available for the first 3 years, this risk is significantly reduced: the divergence is only up to 10%, or twice lower.

Table 8 – VUA FTTC price depending on penetration scenarios (the price of the initial scenario is normalised to 100) – for illustrative purposes

Assumption on penetration	VUA FTTC price	Difference with initial scenario
		%
1. Initial scenario	100	
2. First three years unknown - rapid penetration	96	-4%
3. First three years unknown - slow penetration	118	18%
4. First three years known - rapid penetration	98	-2%
5. First three years known - slow penetration	111	11%

Source: TERA Consultants

FTTH services, unlike FTTC services, have just been launched recently and the penetration rates of the first years are still to be observed. The figure below proposes three FTTH penetration scenarios: the initial scenario, the rapid penetration scenario and the slow penetration scenario. Rapid and slow penetration scenarios diverge by 40% from the initial scenario. Since the service is new, the potential error in the penetration rate estimation is greater than for FTTC.

Figure 15 – FTTH penetration scenarios – for illustrative purposes
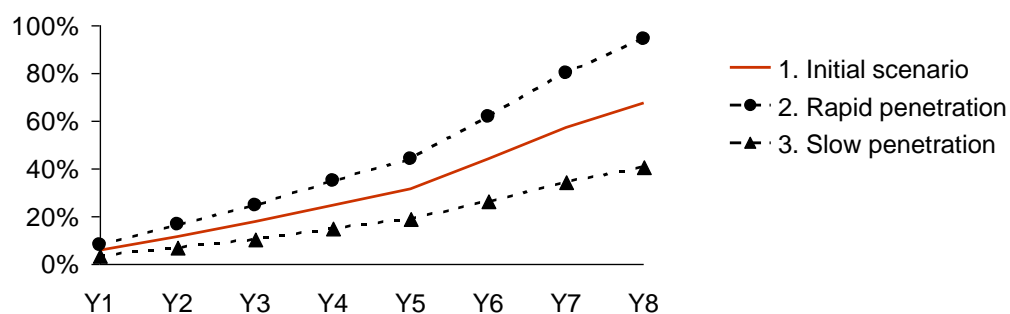
Source: TERA Consultants

In addition, the FTTH access price is more sensitive to the penetration rate than the FTTC access price. Indeed, FTTC cost is more stable because its price is partly constructed on the basis of the SLU cost per line, which in its turn, is relatively stable because it depends on the total number of lines using a copper subloop. As a copper sub-loop is used both by CGA services and FTTC services the cost of a sub-loop is relatively stable as long as FTTH penetration is low. Therefore, a greater proportion of FTTH costs is sensitive to the number of customers.

Indeed, by varying penetration scenarios, VUA FTTH price varies by 22% to 67%, while it varies by only 4% to 18% for VUA FTTC if the first years' penetration is unknown and by only 2 to 11% if the first three years' penetration is known.

Table 9 – VUA FTTH price depending on penetration scenarios (the price of the initial scenario is normalised to 100) – for illustrative purposes

Assumption on penetration	VUA FTTH price	Difference with initial scenario
		%
1. Initial scenario	100	
2. Rapid penetration	78	-22%
3. Slow penetration	167	67%

Source: TERA Consultants

To conclude, volatility and unpredictability of demand is still high for FTTH products that have just been launched: it may lead to an up to a 70% estimation error in the VUA FTTH price. At the same time, it became significantly lower for FTTC products compared to the situation in 2013. In addition, the VUA FTTC price, which is based on the SLU price, is less sensitive to the number of users than the VUA FTTH price, so that the potential error in the VUA FTTC price estimation is only up to about 10%.

4 Recommendations on the most relevant pricing approach for each access product

This section gives TERA's recommendations on the wholesale NGA pricing based on the analysis of the previous sections. It starts with general considerations relevant for all access products and then provides recommendations for each product separately: VUA FTTC, bitstream FTTC, VUA FTTH and bitstream FTTH. In fact, as has been shown in the previous section, FTTC network deployment is significantly in advance of the FTTH deployment, in addition, these different technical architectures have an impact on cost estimation in terms of its stability and reliability. These factors explain the separate treatment of FTTC- and FTTH-based products.

4.1 General considerations

Two general approaches are accepted by the EC for NGA wholesale pricing: margin squeeze obligation and cost orientation (see §2.1). A European benchmark has shown that both of these approaches are used for VUA regulation in different European countries, depending on market circumstances (see §2.4).

The analysis of the previous section has shown that the two main criteria used to choose between pricing and costing approaches are the degree of competition and the certainty of demand and, consequently, of unit costs. Given these criteria and the analysis of previous sections, in this section the advantages and disadvantages of margin squeeze obligation and cost orientation are now discussed in this section.

4.1.1 Arguments in favour of margin squeeze obligation

The main arguments in favour of a margin squeeze obligation are the following:

- Since margin squeeze is already currently being used for VUA and NGA Bitstream in Ireland, keeping it would provide regulatory consistency, which is important since it provides operators with a long-term vision and so facilitates planning investments.

- In general, margin squeeze obligation is easier to implement than cost orientation since only the cost difference between products need to be calculated, and not the full cost as it is the case with cost orientation. However, this argument is less relevant in Ireland, where a bottom-up model of the fixed access network has already been developed.

- margin squeeze obligation is more practical compared to cost orientation because it may be difficult to make a precise estimation of costs, especially given the sensitivity of price to the forecast of penetration rates:

  o The difficulty is insignificant for VUA FTTC as the data on the first three years of penetration is already available;

  o Risk of estimation error is bigger for VUA FTTH as the price is very sensitive to the number of users, which is difficult to predict (see §3.3).

- margin squeeze obligation leaves more flexibility to the regulated entity to set its prices, which may be important to maintain its investment incentives.

4.1.2 Arguments in favour of cost orientation

The main arguments in favour of cost orientation for NGA wholesale pricing are:

- Cost orientation for NGA would be more in line with pricing of SLU and LLU regulation, which are cost oriented. SABB (Standalone Broadband) is already subject to cost orientation Outside the LEA (see ComReg Decision D11/14). Since NGA networks are in competition with the copper networks, the consistency of pricing approaches between wholesale products using different technologies helps operators to make an efficient choice of the most optimal wholesale product.

- Cost orientation ensures that the access price is not too high, so that competition may develop and a correct build-or-buy signal is sent. Under margin squeeze obligation, the access price may be too high if the retail price is high. This can occur in areas where no competition from alternative infrastructure providers is present, more exactly outside the LEA. However, in areas where competition at the retail level is sufficient, margin squeeze obligation approach can suffice.

- Cost orientation ensures greater predictability of access price for alternative operators, so that they can invest. Under margin squeeze obligation approach, Eir could increase both retail and wholesale prices at any moment if competition is not sufficient.

4.2 VUA FTTC pricing

4.2.1 General recommendations

Assessing the VUA FTTC product over the two main criteria, presence of sufficient competition from other platforms and volatility and unpredictability of demand provides the following results:

- <u>Competition from other platforms</u>. As has been described above, Eir's subscriber share on the retail broadband market is decreasing. However, its position on the wholesale market can become stronger over time thanks to its NGA deployment (see §3.2.1). Indeed, as the FTTC platform is extending, the retail constraint from alternative platforms to create a downward pressure on retail FTTC prices is reducing: the LLU is in decline and its coverage is limited while cable coverage and SIRO's FTTB future coverage is geographically limited as well (see §3.2.4). In addition, price competition between products based on different technologies will be limited since ADSL, FTTC and FTTH will not be priced at the same level (see §3.2.2). As a result, both retail and wholesale prices have increased in 2015, and the wholesale price is expected to increase further in 2016 (see §3.2.2, 3.2.3).

- <u>Volatility and unpredictability of demand</u>. It is somewhat easier to predict FTTC demand for the several years to come since the data for the first three years of penetration is already available. Moreover, FTTC is less sensitive to the NGA penetration rate compared to FTTH since it shares a part of the network (D-side copper) with ADSL and other copper based services (see §3.3).

<u>It is therefore important to regulate the downstream product, VUA FTTC, by moving to cost orientation.</u> Cost orientation for VUA FTTC will encourage alternative operators to invest in FTTC deployment while maintaining investment incentives for Eir.

One of objectives of the VUA FTTC regulation is not only to ensure efficient development of VUA FTTC but also to check that it does not disincentivise LLU development in those parts of the network where it is economically efficient. While a margin squeeze test between VUA FTTC and LLU is not proposed, a certain link between VUA FTTC and LLU prices will be created indirectly thanks to cost orientation. Indeed, the cost of these two services is calculated from a bottom-up model and consists of two parts (in addition to wholesale specific costs): the cost on the D-Side (between the cabinet and the customer, corresponding to the SLU service) is the same for both products, while the cost on the E-Side (before the cabinet) differs in technology (VUA cost is obtained by replacing copper by fibre). Figure 16 shows that the sub loop is shared between the two services, as well as to a great extent the cost of civil engineering on the E-side, since optical fibres use the same trenches as the copper cables, except for the cases of saturation. Other categories of costs differ: it is E-side fibre cables and joints and ODF for VUA FTTC and E-side copper cables and joints and MDF for LLU.

It means that if, for example, the cost on D-Side increases, then the cost of both LLU and VUA increases, so that a correct price differential between the two products is kept, leading to efficient investment incentives for operators.

There is also a link between VUA FTTC and SLU price: if SLU decreases, this decrease should also influence the price of both LLU and VUA FTTC.

Figure 16 – Cost categories for VUA FTTC and LLU

As explained earlier, the Urban WCA Market will be deregulated. As a result, there will be no NGA bitstream obligation in these areas and therefore no margin squeeze test between NGA bitstream and retail price. In order to ensure that enough economic space is left to an alternative operator at the retail level, it is recommended to introduce a <u>margin squeeze test directly between VUA FTTC and FTTC retail in MDFs belonging to the Urban WCA Market</u>. The introduction of this test aims at protecting the investment made by alternative players using WLA wholesale market product. It is to be noted that if market 3b is deregulated in this area, market 3a is not.

4.2.2 Difference between remote and local VUA

Eir proposes two types of VUA products, local and remote:

- For local VUA, the MDF/ODF and the customer traffic handover point (serving AGG node/ WEIL) are co-located in the same exchange,
- For remote VUA, the MDF/ODF and the customer traffic handover point (serving AGG node/WEIL) are not co-located in the same exchange.

The figure below gives an example of a network with 5 cabinets connected to one aggregation node: cabinets 3-5 are connected directly while cabinets 1 and 2 belong to other exchanges, which in their turn are connected to the aggregation node. Eir will thus propose a local VUA for cabinets 3, 4, and 5, and propose remote VUA for cabinets 1 and 2, for which the interconnection point is not located in their closest exchange but in a remote exchange.

Figure 17 – Remote and local VUA
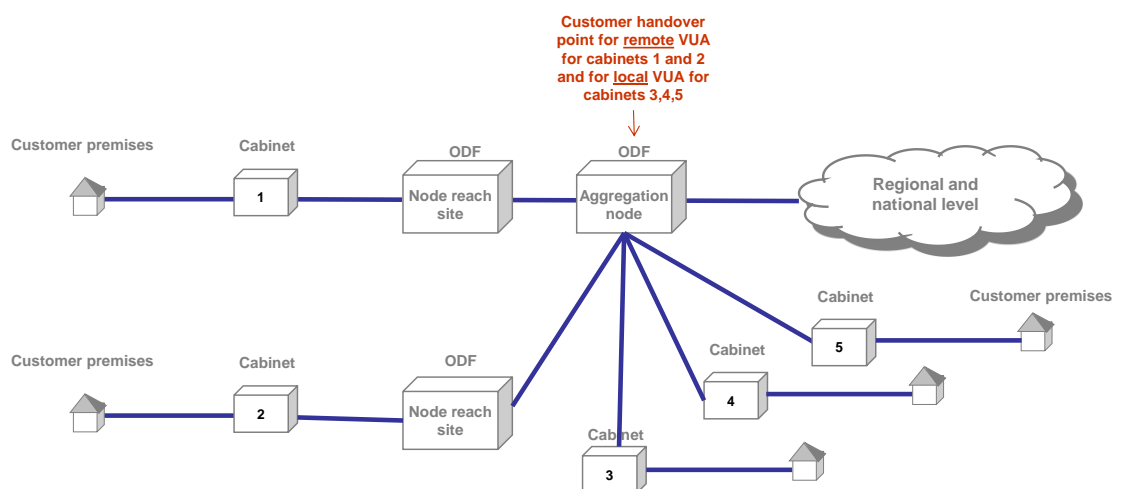
Source: TERA Consultants

Local VUA is potentially available or will soon be available in 141 MDF/ODFs, while remote VUA – in a further 883MDF/ODFs (these exchanges can be accessed through a parent exchange)[44], out of 1204 MDFs nationally. However, the usage of both remote and local VUA is still limited: out of ✂ MDF/ODFs where VUA is used as per August 2016(cf. Table 6), approximately ✂ are accessed through local VUA and the remaining – through remote VUA.

Currently, Eir charges the same price for both local and remote VUA. If it retains cost orientation for VUA FTTC, ComReg will need to decide whether the regulated price level should be the same for the two products:

- If the price level is the same, then the broadband retail prices are likely to be the same irrespective of the service used by the alternative operator, remote or local, so that the risk of digital divide will be limited. It is to be noted that remote VUA is only provided at non Aggregation Node exchanges, and there are immaterial volumes of LLU/Line Share at those exchanges. It means that even if the cost of the network between the aggregation point and the exchange is not taken into account when calculating the cost of remote VUA and VUA price is the same for both remote and local VUA, it does not create any problems for LLU/LS cost recovery. In addition, a unique price for remote VUA and local VUA is in line with the current practice.
- If the price level is different, it will better reflect the underlying costs: the cost for remote VUA is likely to be higher since it includes a longer path between the remote ODF and the final customer. However, there is a risk of digital divide.

Therefore, it is recommended to set a unique price for both remote VUA and local VUA as an average of two costs. The remote VUA cost includes the cost of backhaul between sites that are accessible through the remote VUA products and their parent site.

4.2.3 Strict cost orientation or price cap

Another decision to take if the cost orientation approach is chosen is whether the regulated price level should determine the strict price to be respected by Eir or only set a price cap.

The figure below draws an FTTC cost per line curve, which goes up as the population density goes down. The territory is divided between FTTC and non-FTTC areas. In the case of a strict cost orientation, since VUA FTTC cost oriented price is averaged over the whole FTTC area (see also §5.1.4 below for the discussion of the geographic aspects), it will be above costs in the most dense areas. In these areas, alternative operators with their own infrastructure can set lower prices. If Eir cannot decrease its wholesale prices, it is also prevented from decreasing its retail prices because of the margin squeeze obligation, and it will not be competitive in these areas. An exception mechanism that enable wholesale prices to be set below the cost-orientation level in specific circumstances would then be relevant.

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[44] Data received from Eir in October 2016.

Figure 18 – Negative effect on Eir if strict cost orientation is chosen
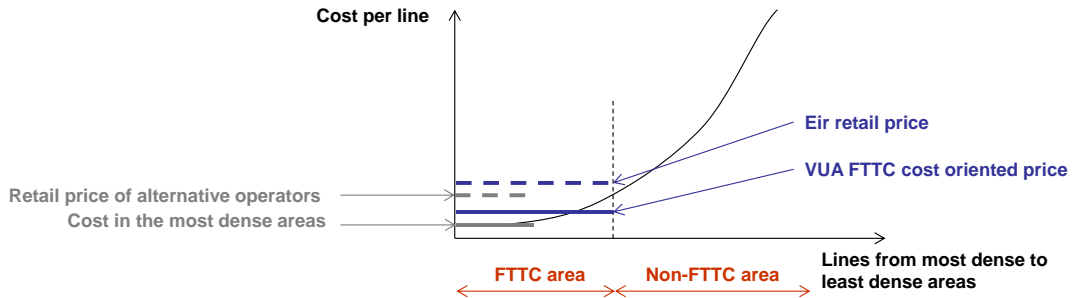
Source: TERA Consultants

The following competitive problem may appear in the market: Eir may use its freedom of setting the VUA FTTC price below the regulated level in order to foreclose a competitor (UPC, SIRO, an NBP operator). For example, Eir would start intensive price competition only in areas where an alternative operator starts to deploy. In any case, the LLU price would have to be decreased by Eir in accordance with the decrease in VUA FTTC prices.

Ex post investigation in these cases may be insufficient since the OAO deployment would be delayed until an ex post decision can be taken, while Eir's NGA deployment is developing at a fast rate. As a result efficient infrastructure competition could be inhibited. In addition, ex post investigation creates more regulatory uncertainty.

A "regulatory approval" mechanism may be set up to solve this problem, whereby Eir asks ComReg to decrease wholesale access prices in a given geographic area if its prices are challenged by a competitor so long as it does not price below a specified price floor. Such price floor can be set for example as a minimum between the alternative operator's wholesale VUA price (or alternative operator's retail price minus relevant cost so that to obtain the equivalent of VUA price) and Eir's full deployment costs assessed based on Eir's business plans.

Figure 19 – Setting price floor for VUA FTTC
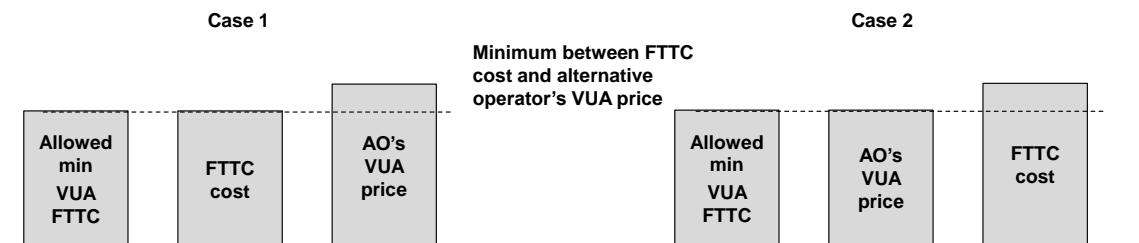
Source: TERA Consultants

A similar approval mechanism will be used for legacy products[45].

If VUA FTTC price goes down, the economic space between VUA and bitstream should be respected: both VUA FTTC and bitstream FTTC prices have to decrease by the same amount. Indeed, the fact the regulated price of both VUA FTTC and Bitstream FTTC are cost oriented and that VUA is an element in the Bitstream cost stack suggests that Bitstream should follow VUA. Also, as Eir is seeking the VUA price reduction in order to be more competitive at the retail level then the VUA reductions would also be expected to apply to Bitstream.

4.3 Bitstream FTTC pricing

As explained earlier, the Urban WCA Market (88 exchanges in urban areas) will be deregulated: the obligation to provide bitstream will be removed. In these areas there is a competitive constraint on Eir from an alternative infrastructure. Bitstream obligation is maintained in the Regional WCA Market (remaining exchanges). The recommendations on the pricing approach below concern therefore only the Regional WCA Market.

For active products, such as Bitstream FTTC, the choice of pricing decision depends on whether enough retail constraints are created by:

- Passive or equivalent virtual inputs,
- Or alternative infrastructure.

As explained above (§4.2), the competition from alternative platforms at the retail-level exists only in areas where these platforms are available; in these areas bitstream will be deregulated. There is no competitive pressure from alternative platforms in remaining areas. As for the first criterion, one needs to assess whether passive or equivalent virtual inputs create enough competitive pressure. Even though the VUA FTTC price will be cost oriented, it will not be sufficient to create competitive pressure all over the national territory but only over the geographic area where VUA is available. Indeed, VUA requires a lot of investments from alternative operators. As per August 2016, VUA is actually used only in ✂ exchanges. Moreover, as explained in the previous section for VUA FTTC, the unit cost volatility is limited thanks to the knowledge of the current FTTC penetration level and thanks to sharing equipment with SLU. To ensure the presence of competition in other exchanges, it is recommended to introduce cost-oriented prices for Bitstream FTTC similarly as for VUA FTTC.

It is also important to make sure that the operators who invest in VUA FTTC are not squeezed out of the market. Therefore, Eir is allowed to decrease its Bitstream FTTC price below the cost-oriented level only under the same conditions as for VUA FTTC, by always respecting the economic space left between VUA FTTC and Bitstream FTTC. As the difference between the regulated cost-oriented prices of VUA FTTC and Bitstream FTTC reflects the necessary economic space between the two products, this same economic space must be kept in case VUA FTTC and Bitstream FTTC prices go down.

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[45] ComReg D03/16, page 227

The cost of Bitstream FTTC should be calculated for a hypothetical operator which does not benefit from the same scale effects as Eir.

In addition, to ensure that there is no foreclosure of operators at a retail level, Eir need to respect the margin squeeze obligation between the retail FTTC and bitstream FTTC.

4.4 VUA FTTH pricing

4.4.1 General recommendations

Assessing VUA FTTH over the two criteria set above (<u>competition from other platforms and volatility and unpredictability of demand</u>) shows that, similarly to VUA FTTC, the competition from other platforms is limited. However, in contrast to FTTC, FTTH penetration is still very low and it is difficult to estimate penetration rate dynamics. At the same time, as has been previously shown, VUA FTTH cost is very sensitive to the penetration rate (see §3.3). A wrong forecast of the cost per customer risks distorting the future market development: if the forecast cost is too high, it will disincentivise alternative operators using VUA FTTH, and so from investing in VUA FTTH in new exchanges; if it is too low, Eir will limit its investments in FTTH.

It is therefore recommended to retain margin squeeze obligation for VUA FTTH between the VUA FTTH product and the bitstream FTTH product[46] with the aim of ensuring that the VUA FTTH price is not too high, so that NGA bitstream does not crowd out VUA FTTH and alternative operators are correctly incentivised to invest in VUA FTTH in order to climb the ladder of investment.

According to the 2013 EC Recommendation, the margin squeeze obligation can be chosen as a pricing approach only under the condition that the equivalence of inputs is imposed on the corresponding wholesale products (see §2.1). ComReg has indeed imposed this obligation on Eir with respect to the NGA wholesale products in its decision D03/13:

> *"…Eircom shall provide pre-ordering, ordering, provisioning, fault reporting and repair for Next Generation Bitstream and VUA, as provided for by Sections 6.2 (i) and (ii) of this Decision Instrument, on an Equivalence of Inputs basis." (page 378)*

In addition, similarly as for VUA FTTC, in order to ensure that enough economic space is left to an alternative operator at the retail level, it is recommended to introduce a margin squeeze test directly between VUA FTTC and FTTC retail in MDFs belonging to the Urban WCA Market. Otherwise Eir could foreclose other operators using VUA FTTH in these areas. In addition, in the absence of such test Eir could charge excessive prices for VUA FTTH because its price is not cost oriented.

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[46] An alternative approach (section 6.6) proposing blended VUA FTTC+FTTH cost-oriented price is studied in the annex. However, it has not been chosen because of difficulties of implementation and uncertainty.

4.4.2 Price floor

Similarly to the case of VUA FTTC, the proposed approach does not protect the market from the risk of below-cost VUA FTTH pricing that Eir might adopt in selected areas in order to discourage SIRO and alternative NBP operators from investing in the FTTH network.

Eir is already planning to deploy a part of its FTTH network in proposed NBP areas. Indeed, in 2015 Eir has defined locations for FTTH deployment[47]:

- February 2015: Eir announces that first 16 of 66 FTTH locations will be able to offer service by September 2015, with speeds of 150Mb per second; 300Mb per second and 1,000Mb per second
- June 2015: Eir extends planned fibre footprint from 1.6 million premises to 1.9 million premises (80% of all premises in Ireland). FTTH technology to be used to reach additional 300,000 customers in more than 1,000 communities across the country.

These locations correspond to two types of areas (Figure 20): one type is areas with middle density and the other one is areas with relatively low density, which partially overlap the proposed NBP areas.

Figure 20 – Eir's planned FTTH investment and FTTH cost depending on the geographic area
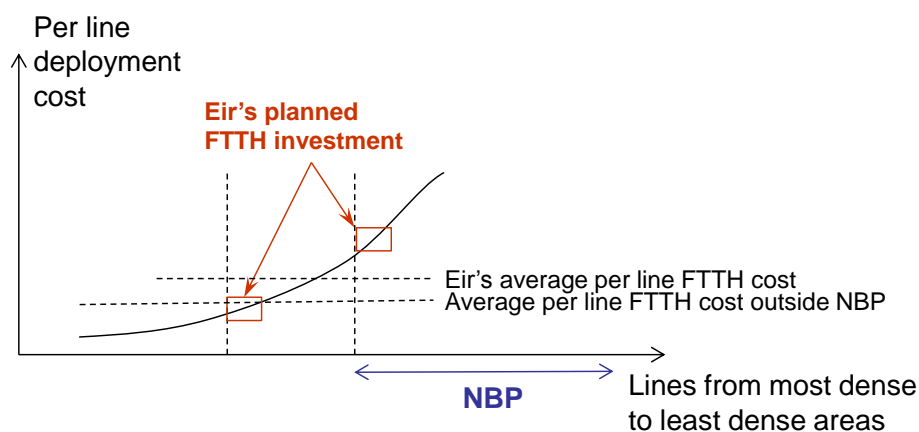
Source: TERA Consultants

With respect to NBP, it is undesirable from an economic efficiency point of view that Eir builds its FTTH network in parallel to the NBP network. In fact, the NBP network operator

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[47]   https://www.Eir.ie/opencms/export/sites/default/pressroom/Eir-Announces-Fibre-to-the-Home-FTTH-Broadband-Competition-Winner/
https://www.Eir.ie/opencms/export/sites/default/pressroom/Eir-Statement-on-NBP/
https://www.Eir.ie/pressroom/press_releases/

https://www.Eir.ie/opencms/export/sites/default/pressroom/Eircom-Selects-Huawei-for-Fibre-to-the-Home/

will have an obligation to offer a wide range of the wholesale services that will already facilitate sufficient service-based competition development, with the result that the building of a parallel Eir FTTH network is unlikely to further improve the competitive situation. In addition, the NBP operator will be selected through a competitive process which will help to ensure that the deployment costs will be efficient from a national perspective, while Eir's decision to build a parallel network is determined by its commercial considerations rather than issues of overall network efficiency. Furthermore, since the NBP network is subsidised, it is undesirable that Eir builds a parallel network since it will undermine the efficiency of the public subsidies.

It is possible that when building its FTTH network in NBP areas and SIRO planned areas, Eir has anticompetitive objectives because it is not sure that it will cover its investment given that it will have to share its demand with another network. This is therefore equivalent to predatory behaviour.

Therefore, it is recommended that Eir are prevented from setting VUA FTTH access prices too low for anti-competitive purposes. Consequently, there may be a need to introduce an additional condition forbidding Eir to set its VUA FTTH prices at a too low level.

VUA FTTH price should always be above:

- Either the full VUA FTTH cost, including the ducts and poles access rental costs (calculated from the regulated tariffs of access to civil engineering installations) and calculated with the DCF method to account for the increase in the number of VUA FTTH lines over time and also to take into account the number of parallel networks in the area: Eir cannot reasonably count on 100% market share in the presence of competition. Full cost and not an incremental cost measure should be used since it is necessary to take into account all the cost categories, those that would be relevant for an alternative operator building the network such as SIRO (unless it is proven that infrastructure access costs included by SIRO in its cost stack are at extremely low levels and/or that Eir has no access to it – but in this case, the next point below will enable Eir to compete). The costs can be calculated from a business plan provided by Eir, and it can be checked against the bottom-up model to ensure that all the relevant cost categories are included.
- Or competitor's VUA FTTH price (including NBP). If the competitor does not offer VUA, then competitor's VUA price can be calculated from the retail FTTH price by subtracting relevant costs.

In other words, Eir should be allowed to decrease VUA FTTH prices below costs only in case it does so to align with another operator's prices, in order to remain competitive.

Eir's average per line VUA FTTH cost is calculated as an average of all the areas where Eir deploys FTTH. These areas include a part of NBP area. At the same time, the subsidised FTTH access price in NBP areas will be equal to the average cost per line outside NBP areas. Since the average cost per line outside NBP areas is based on the more economic areas, it will be lower than Eir's average VUA FTTH cost. Eir will not therefore be able to set VUA FTTH prices below NBP prices. It will not be able to conquer the FTTH market in NBP areas and may be disincentivised from investing in NBP areas.

In addition, it is important to check that VUA FTTH is never less expensive than VUA FTTC. Indeed, FTTH per line cost is higher due to low demand at the start and higher investments required.

4.5 Bitstream FTTH pricing

Given similar considerations as for VUA FTTH (uncertainty of unit cost prediction), it is recommended to retain the margin squeeze obligation for Bitstream FTTH.

The margin squeeze obligation should be made at two levels: between retail FTTH and Bitstream FTTH[48], so that Bitstream FTTH is not too expensive compared to the retail product, and between Bitstream FTTH and VUA FTTH, so that Bitstream FTTH price is not too low compared to VUA FTTH price. It will provide incentives to operators to enter the market using Bitstream FTTH on the one hand and to further extend their usage of VUA FTTH compared to Bitstream FTTH, so that to make them less dependent on Eir and thus to help competition development on the other hand.

4.6 Summary of recommendations

The recommended approach for each product is summarized in the table below and is compared to the pricing approach currently applied: for FTTC products, it is recommended to move from margin squeeze obligation to cost orientation, and for FTTH products it is recommended to keep margin squeeze obligation approach.

Table 10 – Current and recommended pricing approach

Access product	Pricing approach	
	Current	**TERA recommendation**
VUA FTTC	Margin Squeeze Obligation	• Cost orientation • Margin Squeeze Obligation
VUA FTTH	Margin Squeeze Obligation	• Margin Squeeze Obligation
FTTC bitstream	Margin Squeeze Obligation	• Cost orientation • Margin Squeeze Obligation
FTTH bitstream	Margin Squeeze Obligation	• Margin Squeeze Obligation

Source: TERA Consultants

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[48] Alternatively, instead of this test, it is also possible to introduce two levels of test: (1) between NGA retail et End to End NG bitstream, (2) between End to End NG bitstream et NGA Bitstream.

The margin squeeze obligation for FTTH should be applied at two levels: between retail NGA and NGA bitstream[49] and between NGA bitstream and VUA. For FTTC, only the retail test is relevant. In addition, in the footprint of the Urban WCA Market it is recommended to introduce a test between VUA and retail because bitstream is deregulated in these areas. The tests should be performed separately for FTTC and FTTH products. These different tests are shown in the Figure 1 below.

In addition, it is recommended to introduce price floor constraints for VUA products. The price of these products cannot go below the minimum of the retail price of alternative operators and Eir's actual cost. Otherwise, Eir could decrease its VUA price below costs in order to foreclose a more efficient competitor who started deploying its own network in a given area. It is important for both VUA FTTC and VUA FTTH: even though the VUA FTTC price is cost oriented, an exception mechanism can be implemented in order to ensure Eir can compete in areas. In this case, the regulatory level locally serves only as a price ceiling, and does not prevent Eir from decreasing its prices below costs. The price of Bitstream FTTC can be decreased under condition that the economic space with VUA FTTC is always respected. As the difference between the regulated cost-oriented prices of VUA FTTC and Bitstream FTTC reflects the necessary economic space between the two products, this same economic space must be kept in case VUA FTTC and Bitstream FTTC prices go down.

The proposed package of regulatory instruments is summarized in the figure below.

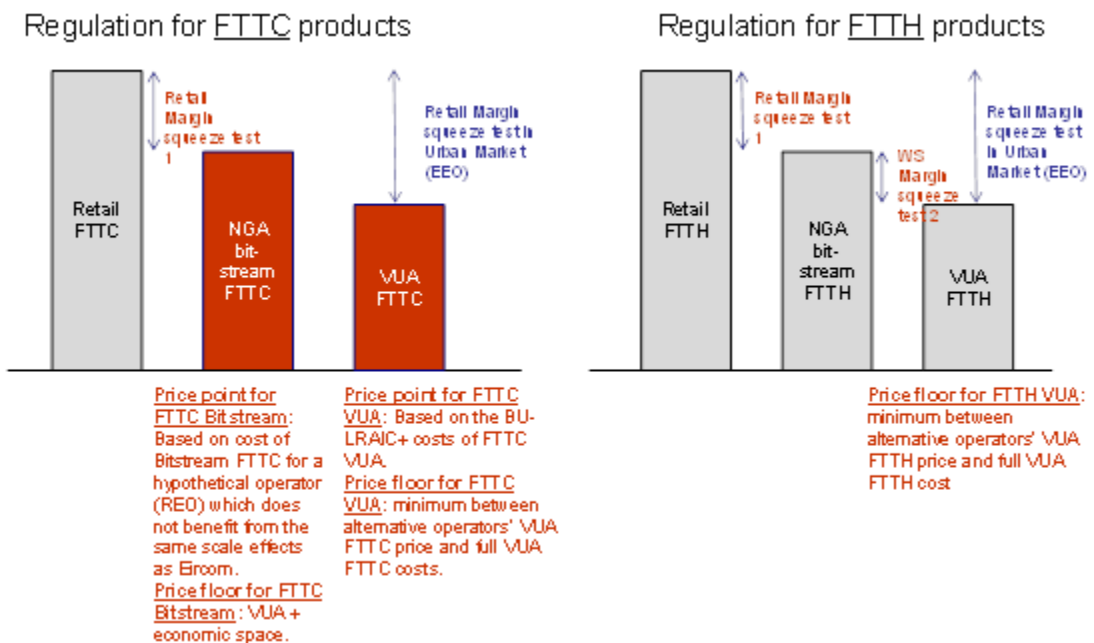**Figure 21 – Recommended pricing approach for different NGA products**

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[49] Alternatively, instead of this test, it is also possible to introduce two levels of test: (1) between NGA retail et End to End NG bitstream, (2) between End to End NG bitstream et NGA Bitstream.

5 Defining parameters for the recommended pricing approach

Once the pricing approach has been determined, there is a need to define relevant parameters.

Section 5.1 gives recommendations on the parameters of the cost model serving to define cost-oriented VUA FTTC prices.

Section 5.2 provides the recommendations on the relevant values of parameters for margin squeeze obligation, including margin squeeze obligation between retail NGA and NGA bitstream and margin squeeze obligation between NGA bitstream and VUA. These recommendations apply to both FTTH and FTTC tests.

5.1 Cost orientation parameters for VUA FTTC and Bitstream FTTC

The approach recommended for VUA FTTC and Bitstream FTTC is cost orientation (see § 4.2). It is necessary to define the relevant parameters to calculate the associated cost.

The cost of VUA FTTC consists of several types of assets, as shown on the figure below. The cost of SLU, of civil engineering assets on E-side (trenches/chambers/poles) and of fibre cables on E-side is already calculated in the Revised CAM. However, several options exist with respect to costing the assets from the Revised CAM: VUA FTTC price can be either based on the regulated SLU price (if SLU price continues to be regulated), which is calculated with reference to short lines only (less than 1.5km from the cabinet), or it can be based on the sub-loop cost which takes into account all the line lengths (see §5.1.5).

Other elements of costs (DSLAM, aggregation node, wholesale specific costs) have not been estimated in the Revised CAM, therefore it is necessary to define relevant costing parameters for these assets.

Figure 22 – Assets necessary to provide VUA FTTC

| Wholesale specific costs |
| Agg. node |
| DSLAM |

— Other assets

| E-Side fibre cables and joints |
| Trenches/chambers/poles on E-Side |
| SLU |

— Already calculated in the CAM 2015
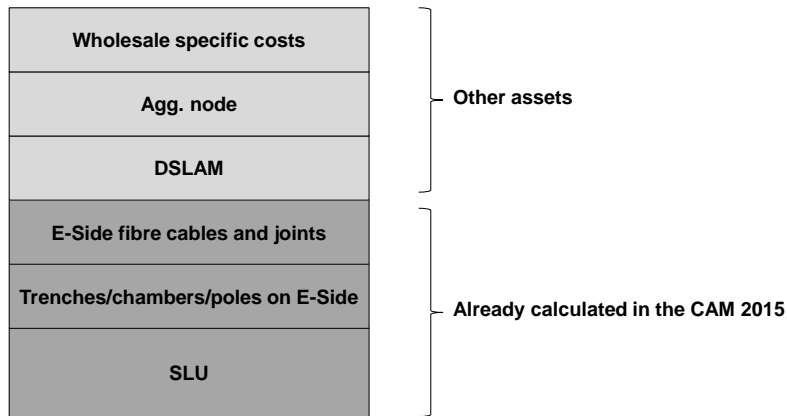
Source: TERA Consultants

The cost of Bitstream FTTC includes the same assets as VUA FTTC plus the additional assets specific to Bitstream FTTC: Agg node (backbone), WEIL, Backhaul, BRAS or BNGs.

Figure 23 – Assets necessary to provide Bitstream FTTC

| Agg.node (backbone) |
| WEIL |
| Backhaul |
| BRAS |
| VUA FTTC assets |
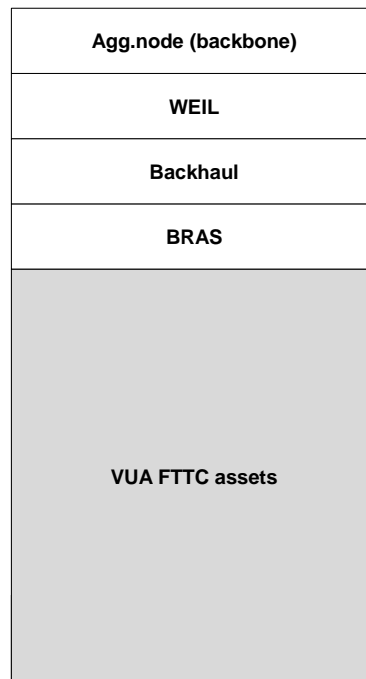
Source: TERA Consultants

The relevant costing parameters are the following:

1. modelling approach,
2. cost standard,
3. depreciation method,

4. geographic aspect,
5. line length,
6. risk premium.

Each of them is discussed below.

5.1.1 Modelling Approach: Bottom-up or Top-down or hybrid

A cost model may be based either on a top-down approach, using the existing network, or a bottom-up approach, modelling the network of a hypothetical operator.

For FTTH and FTTC, because the networks have not been deployed yet (or not fully), a top-down approach is not possible. Therefore, a bottom-up model must be used.

The main economic reason to use a bottom-up model is the need to send a build-or-buy signal to alternative operators who may want to replicate the asset. A BU model is also better at making forward-looking estimations.

However, it would be relevant to consider the current investments borne by Eir as evident in its accounts to ensure consistency between the assumptions of the bottom-up cost model and the investments actually borne by Eir.

5.1.2 Cost standard

Cost standard defines the method of distributing costs between services. The prices should be set in such a way that the total cost of the local loop is distributed between different wholesale services across all the lines of an exchange. Indeed, certain assets are used by several services:

- "Joint costs" are costs that are incurred by a set of services but not by all services (e.g. DSLAM can be used to provide voice and Internet services but not high speed leased lines);
- Network common costs are network costs used by all services (e.g. trenches in fixed networks);
- "Corporate overheads" (also known as "un-attributable costs" or "non-network common costs") are costs that cannot be attributed in a non-arbitrary way (e.g. costs associated with the Chief Executive or the costs of operating a car fleet).

The two main cost standard methodologies are **Fully Allocated Cost**[50] and **Long Run Incremental Cost**.

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[50] Also called Fully Distributed Cost (FDC).

- **Fully Allocated Cost (FAC)** is an accounting approach based on the expenses incurred by the regulated operator; a share of common costs is allocated to each service according to cost causation principle and using allocation keys.
- The **Long Run Incremental Cost (LRIC+)** methodology is an economic approach which considers that the cost of a service is equal to the change in the total long run (that is when all inputs are variable) cost resulting from a discrete variation in output due to that service, including a portion of common costs.

A key difference between both standards is in the efficiency level. The concept of LRIC cost is often applied to a hypothetical efficient operator, while the FAC concept is applied to an existing operator.

The following cost standard is relevant for each of two modelling approaches:

- FAC approach for the top-down model,
- LR(A)IC+ approach for the bottom-up model ("BU-LR(A)IC+").

A LR(A)IC+ approach should therefore be used for the bottom-up model for VUA FTTC and Bitstream FTTC.

5.1.3 Depreciation method (CCA, HCA, tilted annuity, economic depreciation, alternative)

Depreciation methods generally used are summarised in the table below[51]:

Table 11 – Comparing depreciation methodologies

Methodology	Cost recovery	Inclusion of price trend	Evolution of consumer demand	Simplicity of calculation
Linear depreciation/HCA	✓	✗	✗	Easy
CCA-OCM	✗	✓	✗	Normal
CCA-FCM	✓	✓	✗	Normal
Standard annuity	✓	✗	✗	Normal
Tilted annuity	✓	✓	✗	Normal
Economic depreciation	✓	✓	✓	Complex

Source: TERA report on SLU, LLU pricing

For a bottom-up model, the most appropriate methods from an economic point of view are the tilted annuity and the economic depreciation approaches which take into account

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[51] For more details see TERA Consultants. Report on the determination of appropriate costing and pricing methodologies for the copper access network in Ireland. July 2015

price evolution. If the number of customers using the assets at stake is not changing fast, then applying a tilted annuity to reflect asset price changes will be relevant.

Table 12 – Depreciation methodologies depending on specific circumstances

		Standard annuity	Tilted annuity	Economic depreciation
Volume of outputs is stable	Asset prices are stable	X		
	Asset prices are evolving		X	
Volume of outputs is not stable	Asset prices are stable			X
	Asset prices are evolving			X

Source: TERA Consultants

Considering demand take-up for FTTH and FTTC, only economic depreciation is relevant (also called DCF approach).

5.1.4 Geographic aspect

The economic characteristics of areas where operators have deployed or are deploying their NGA networks vary, particularly with respect to population density. The NBP covers the most rural areas with lower population densities and longer line lengths, UPC/Virgin Media covers the most densely populated parts of the country, SIRO – provincial towns, etc. That is why different operators have different incentives to invest depending on the access price, and the geographical aspect of price control raises serious questions. This choice will have important implications for competition and on issues related to cost recovery.

5.1.4.1 VUA FTTC

When setting VUA FTTC price the main objective is strict cost recovery by eircom. Indeed, on the one hand, if eircom does not recover its costs, it is not incentivized to invest in FTTC/eVDSL. In addition, alternative operators (such as SIRO) will not make efficient investments in their own local loop infrastructure if the VUA price is below costs. On the other hand, if eir over-recovers its costs, the end-user price will be too high.

It is to be noted that when choosing the geographic footprint for VUA FTTC/eVDSL, it will also impact bitstream FTTC/eVDSL prices as VUA cost is an input to bitstream.

For VUA FTTC/eVDSL, four main options exist:

- To calculate the cost over the whole national territory;
- To calculate the cost only over those areas where FTTC has been deployed;
- To calculate the cost only over those arease where either FTTC or eVDSL have been deployed;
- To calculate the cost only over the LEA areas (same footprint as for LLU access price).

The first option (calculating over the whole national territory) is not recommended because in some areas, mostly remote, FTTC will not be deployed. As a result, Eir would be compensated for the network it did not deploy.

In addition, since the average cost per line is lower in the more dense areas, where FTTC has been deployed, the second and third options lead to a lower cost level, and hence to a lower access price level for VUA FTTC (and also for bitstream FTTC because both prices are linked). As a result, end-user prices will be lower to the benefit of customers.

> The fourth option is identical to the approach that is used for the LLU access price: it is calculated over Modified LEA (as per those exchanges listed in Annex 14 of ComReg Decision D03/16). The second option is also similar: the LLU cost is calculated as an average of those lines where FTTC has been deployed. LEA contain 243 active MDFs as per August 2016 with ✂ lines, and FTTC is available in ✂ MDFs or for ✂ lines as per August 2016. There is therefore only 11% difference in the number of lines, so that there will be some consistency between VUA FTTC pricing and LLU pricing.

FTTC requires significantly more investment to be recovered than eVDSL. However, as the VUA price is aggregated for FTTC and eVDSL technologies, calculating the cost only over those areas where either FTTC or eVDSL have been deployed (third approach) appears more in line with the cost causality principle as a number of MDFs have eVDSL and no FTTC.

It is therefore recommended to calculate the VUA FTTC/eVDSL cost as an average cost of either all the MDFs where FTTC/eVDSL is deployed by Eir.

5.1.4.2 Bitstream FTTC

In the future, the NGA bitstream obligation may be removed in areas where there is sufficient competition, such as areas where unbundling is currently developed or alternative network operators have rolled out their own networks: the market analysis for Market 3b proposes to deregulate 88 exchanges in Urban areas.

If this happens, then one additional question to solve is whether, when calculating cost oriented price of Bitstream FTTC, the downstream Bitstream FTTC specific cost should be calculated for an alternative operator purchasing VUA in all FTTC areas or just in non-competitive FTTC areas (those where regulation of NGA bitstream would be kept).

Therefore, it should be decided whether the Bitstream FTTC specific cost should be calculated on all the lines where FTTC is deployed or only on the lines in non-competitive areas. This distinction is important since backhaul assets benefit from the scale effect.

Today, NGA bitstream price floors are set on the basis of VUA price plus costs of backhaul. Costs of backhaul are calculated in a consistent manner with the ones used

to set CGA floors[52]. This was initially based on the costs of an alternative operator unbundling around 150 exchanges.

Calculating Bitstream FTTC specific cost over only non-competitive areas would lead to a higher cost estimation, to a higher NGA bitstream price, and therefore favours VUA deployment (see Figure 24). In a part of the non-competitive areas alternative operators would make efficient investments in VUA that they would not make if the NGA cost was calculated over the whole FTTC footprint.

However, there is a risk that the higher Bitstream FTTC prices cannot be absorbed at the retail level.

Figure 24 – Geographic aspect of NGA bitstream pricing (for illustrative purposes)
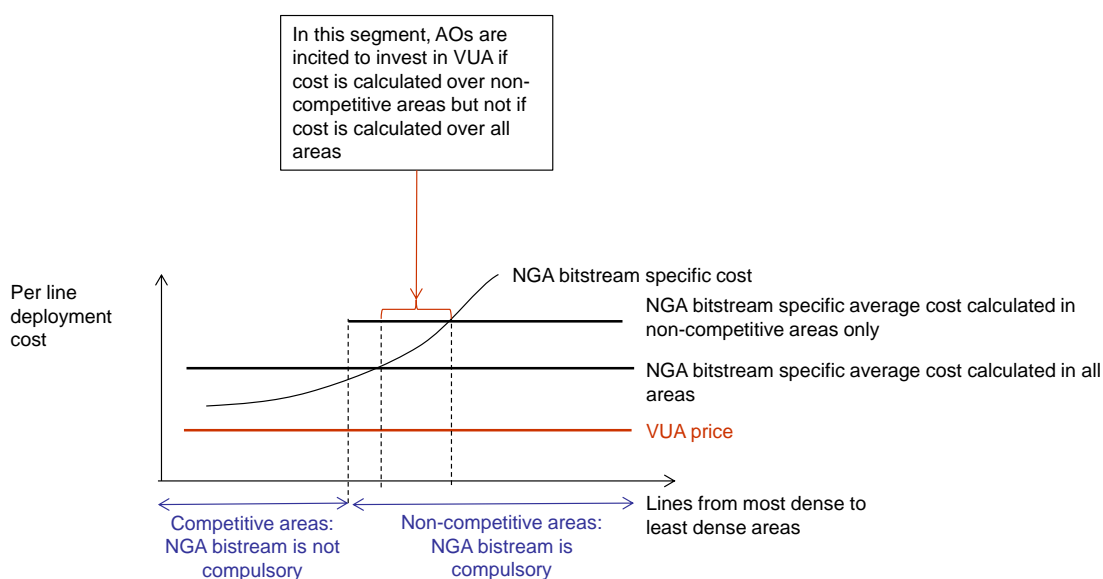
Source: TERA Consultants

In addition, in competitive areas, there will already be enough competition: alternative operators will be able to propose their own NGA bitstream products using VUA offers. Therefore, it could be argued that there is no need to take into account the costs in competitive areas when calculating cost-oriented price for NGA bitstream.

It is therefore recommended to calculate the NGA bitstream cost in non-competitive areas only. However, one should keep in mind that there is a risk that such an approach creates geographic price differences between competitive and non-competitive areas.

A preliminary estimation shows that the decision on the geographic aspect has a significant impact on the NGA bitstream cost. The table below compares the cost of NGA bitstream for the first 149 MDFs and for the next 120 MDFs. 149 is the number of MDFs used to set the existing CGA bitstream price floors (the number of LLU sites currently slightly greater). It is difficult to conduct calculations for different footprints but this is considered as sufficient to understand the magnitude of impacts. The first 149 MDFs are

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[52] ComReg D11/14

more than twice as large in terms of the number of lines, which leads to a lower unit cost. Indeed, the cost is 60-70% higher for the next 120 MDFs.

Table 13 – NGA bitstream cost depending on the geographic coverage, for illustrative purposes only[53]

Tariff part	First 149 MDFs	Next 120 MDFs
Fixed (€/line/month)	2.18	4.27
Variable (€/line/Mbps)	2.19	3.80
Total per line and per month @500 kbps	**4.37**	**8.07**

Source: TERA Consultants analysis

Given the magnitude of the impact (around plus €3) and the fact that to obtain access to all the FTTC lines, an operator needs to unbundle 141 exchanges[54] which will then give access to other exchanges via remote VUA. Out of these 141 exchanges, 93 are either already unbundled or belong to the Urban WCA marketwhich will no longer be subject to regulation. It is therefore recommended to take the balance, 48 exchanges, that still need to be unbundled, and aren't belonging to Urban WCA market.

As explained in section 4.2.2, the test should include the backhaul costs borne by alternative operators having unbundled exchanges where remote VUA is available.

5.1.5 Line length

As explained above, the cost of the sub-loop is a part of the total VUA FTTC and Bitstream FTTC cost. The cost of the sub-loop varies from one line to another and from one area to another. It depends on the scope of lines included in the cost estimation. In fact, if longer lines are included, the cost increases.

To set SLU prices (SLU is the wholesale product used to get access to the sub loop), ComReg has considered that the scope of lines should be the sub loops which are

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[53] A sensitivity analysis has been performed on the latest release of ComReg's bitstream cost model (BITSTREAM COST MODEL - v20140522-sent.xlsx) used in the context of the WBA price floors decision (https://www.comreg.ie/_fileupload/publications/ComReg1232.pdf).

As compared to the initial version of the model, the number of lines within each site has been multiplied by 37%. This mimics the fact that the number of DSL lines of 121st-240th biggest exchanges is 37% of the number of DSL lines of 1st – 120th biggest exchanges. All take-up assumptions (as regards the number of sites deployed by the alternative players have been left unchanged)

[54] October 2016 data

shorter than 1.5 km from the cabinet[55]. This is because after 1.5km from a cabinet where a VDSL asset has been installed, the maximum throughput is less than 30 Mbps (NGA limit).

However, in the specific context of VUA FTTC and Bitstream FTTC, it could be argued that all the lines benefiting from FTTC should be included. While lines shorter than 1.5km benefit from FTTC by getting speeds of more than 30 Mbps, other lines can also benefit from FTTC. For example, a line situated at 2.5km from the cabinet can still get 20 Mbps if a VDSL asset is installed at the cabinet, whereas VDSL service from the exchange,may only realise 1Mbps or less (if at more than 5km from the exchange).

Therefore, customers are likely to be ready to pay for FTTC services even if they do not get 30Mbps but for example only 10 or 20Mbps as such speeds would still be a significant improvement compared to the legacy services. Therefore, it can be relevant to calculate cost of all sub-loops in the FTTC area.

Figure 25 – Line length defining broadband speeds
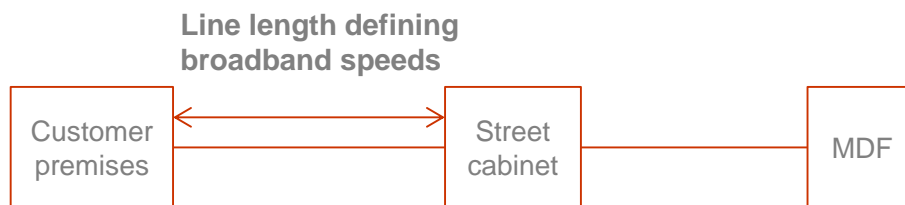
Source: TERA Consultants

Figure 26 – VDSL bandwidth depending on line length
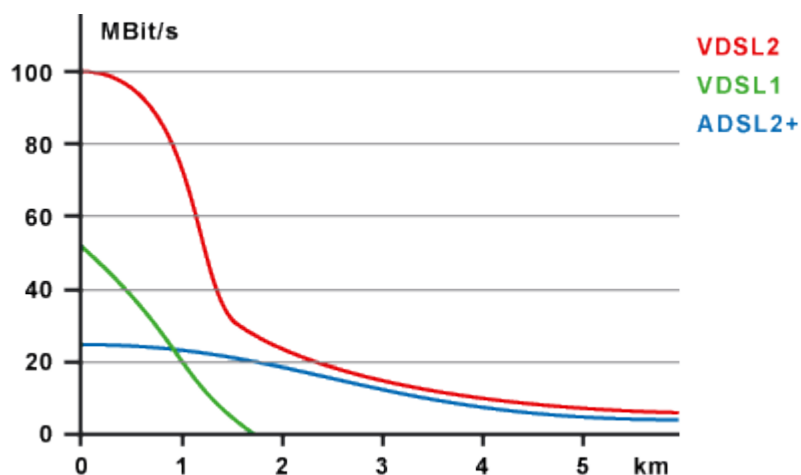
Consequently, it is relevant to consider whether the VUA FTTC and Bitstream FTTC prices should be based on the regulated SLU price, which is calculated with short lines

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[55] ComReg D03/16, page 126

only, or whether it should be based on the sub-loop cost which takes into account all the line lengths (or lines which are less than 2.5km from the cabinet, to ensure attractive broadband speeds).

In the specific context of VUA FTTC and Bitstream FTTC, it could therefore be relevant to consider a wider scope of lines (those whose length is less than 2.5km from the cabinet). With such length the customers may get 10-20 mbps, which is an improvement compared to 5-8 mbps they would get with CGA.

5.1.6 Risk premium

According to the 2010 EC Recommendation, investment risk for FTTC is significantly lower than for FTTH:

> "Investment into FTTN<…> which is a partial upgrade of an existing access network (such as for example VDSL), normally has a significantly lower risk profile than investment into FTTH, at least in densely populated areas. In particular, there is less uncertainty involved about the demand for bandwidth to be delivered via FTTN/VDSL, and overall capital requirements are lower. Therefore, while regulated prices for WBA based on FTTN/VDSL should take account of any investment risk involved, such risk should not be presumed to be of a similar magnitude as the risk attaching to FTTH based wholesale access products. When setting risk premia for WBA based on FTTN/VDSL, NRAs should give due consideration to these factors<…>"

These factors do mean that there is a reduced risk for FTTC deployment and, as discussed previously, since the FTTC deployment has already started, it is easier to make predictions on penetration rates, and the number of copper lines is relatively stable (§3.1.2).

There is therefore no need to apply a risk premium on VUA FTTC and Bitstream FTTC.

5.1.7 Summary

The cost of SLU, E-Side fibre cables and joints, and E-side trenches/chambers/poles is already calculated in the Revised CAM, so that its results should be reused to ensure consistency with other access products such as SLU. However, there are also some specific recommendations which are summarized in the table below.

Table 14 – Summary of recommendations for VUA FTTC and Bitstream FTTC specific assets

Parameter	TERA recommendation
Modelling approach	Bottom-up
Cost standard	LRAIC+

Depreciation method	Economic depreciation
Geographic aspect	For VUA FTTC, average over MDFs where FTTC/evdsl is used or MDFs where LLU price is calculated For Bitstream FTTC, average over 50 MDFs remaining to unbundle
Line length	Based on sub loop length shorter than 2.5km from the cabinet
Risk premium	No risk premium

Source: TERA Consultants

5.2 Margin squeeze obligation parameters for wholesale FTTH test, retail FTTH test and retail FTTC test

TERA Consultants recommends maintaining three NGA margin squeeze obligation:

- At the wholesale level between VUA FTTH and bitstream FTTH,
- At the retail level between bitstream FTTH and retail FTTH,
- At the retail level between bitstream FTTC and retail FTTC.

In addition to these, two margin squeeze obligations are recommended in the areas belonging to the footprint of the Urban WCA Market where NGA bitstream is deregulated:

- At the retail level between VUA FTTC and retail FTTC,
- At the retail level between VUA FTTH and retail FTTH.

The EC has published a list of parameters that should be defined for margin squeeze obligation (see §2.1). Each of them is considered in this section for the three tests above:

- Operator cost base (SEO, EEO, REO) – §5.2.1,
- Cost standard (AVC, AAC, LRAIC, ATC) – §5.2.2,
- Product basis: product-by-product or portfolio – §5.2.3,
- Model type (static or discounted cashflow) and time period – §5.2.4,
- Risk premium – §5.2.6.

In addition to these parameters, TERA Consultants has considered the geographic aspect of the margin squeeze obligation (§5.2.5).

5.2.1 Operator cost base (SEO, EEO, REO)

The margin squeeze obligation consists in checking whether the economic space left to an alternative operator is sufficient. Therefore, it is necessary to estimate the cost per line incurred by this operator. This cost per line depends on the assumptions on unit costs and on the economies of scale.

The choice of operator cost base defines the number of customers served by the modelled operator and its cost efficiency:

- An EEO (Equally Efficient Operator) has the same cost function as the SMP operator and the same number of customers, so that it benefits from the same economies of scale.

- An SEO (Similarly Efficient Operator) has the same cost function as the SMP operator but the cost base is distributed among a smaller number of customers, so that the economies of scale are less significant.

- An REO (Reasonably Efficient Operator) has a cost function of a hypothetical operator and a smaller number of customers.

It is summarized in the table below:

Figure 27 – Comparison of operator cost base

	EEO	SEO	REO
Cost function	Incumbent	Incumbent	Hypothetical operator
Number of customers	Incumbent	Less than incumbent	Less than incumbent

Source: TERA Consultants

The 2013 EC Recommendation accepts both using directly SMP operator's costs and adjusting it for scale:

- *"Downstream costs are estimated on the basis of the costs of the SMP operator's own downstream businesses (EEO test)."*
- *"NRAs may make adjustments for scale to the SMP operator's downstream costs in order to ensure that economic replicability is a realistic prospect." (see annex of the Recommendation)*

The current margin squeeze obligation between the end-to-end NG bitstream and NGA bitstream is based on SEO, and the current margin squeeze obligation between retail NGA and NGA bitstream is based on SEO with elements of EEO[56]. To ensure that economic replicability is a realistic prospect and that Eir's competitors may indeed Eir's offers, it is recommended to use an REO approach with elements of EEO for the margin squeeze test between retail NGA and NGA bitstream. It means that instead of taking Eir's costs and adjusting it for the market share it is recommended to take alternative operators' costs directly. However, if such information is not available from alternative operators, then using adjusted data from Eir can be accepted.

For the margin squeeze test between retail NGA and NGA VUA in the footprint of the Urban WCA Market, it is possible to use the same approach as for the test between retail NGA and bitstream NGA: SEO with elements of EEO. However, given the high level of

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[56] ComReg 13/11, p.371. EEO applies to certain retail costs such as advertisement because it is considered that some of Eir's competitors benefit from significant economies of scale on these cost categories (§10.369).

competition in the Urban Market, it is also possible to use EEO approach, which is more favourable to Eir.

The test between end-to-end NG bitstream and NGA bitstream should be based on the REO approach.

The current margin squeeze obligation between the NGA bitstream and VUA is also based on SEO[57]. It is recommended to use REO approach which is similar to SEO but better reflects alternative operators' costs. This approach, which is stricter than EEO, is recommended because with the deployment of FTTC and FTTH by Eir there is a risk that Eir's position will become stronger as observed in Figure 9, page 29. It would ensure that the VUA product is not crowded out by NGA bitstream. Indeed, it is important that alternative operators invest in VUA and go up the ladder of investment to be more independent from Eir.

These recommendations are summarized in the figure below.

Figure 28 – Recommendations on the relevant cost base for margin squeeze obligation
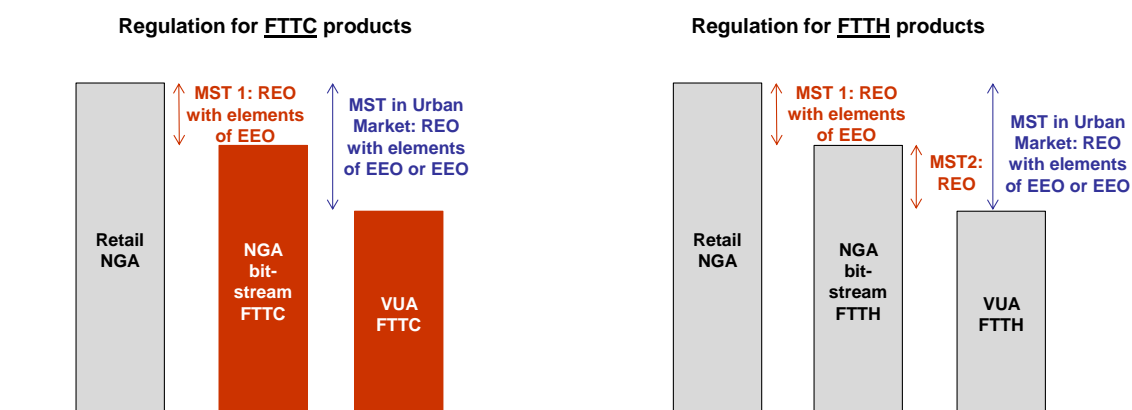
Source: TERA Consultants

5.2.2 Cost standard (AVC, AAC, LRAIC, ATC)

The cost standard defines which portion of shared costs should be recovered through the price of a given service. The following cost standards are considered, they have been defined by ComReg in its consultation document 12/27[58]:

- Average Variable Costs: "…variable cost of producing an additional unit of output. AVC does not include an allocation of fixed costs, which are the major cost component faced by telecom operators." This approach is not an appropriate approach since only a small part of costs is variable.

- Average Avoidable Costs: "short-run avoidable variable and incremental fixed costs of the additional sales of the product in question."

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[57] ComReg 13/11, p.371

[58] §11.253-11.255

- LRAIC (Long-Run Average Incremental Cost): "average efficiently incurred variable and fixed costs that are directly attributable to the activity concerned over the long-run. This approach does not include an apportionment for common costs."

- LRAIC+ (Long-Run Average Incremental Cost+): "average efficiently incurred variable and fixed costs that are directly attributable to the activity concerned over the long-run, plus a mark-up for joint and common costs."

- Compared to LRAIC, the Average Total Cost "includes variable, fixed, joint and common costs based on historical cost data but with no adjustments for efficiencies."

Both Average Avoidable Costs and LRAIC are used by competition authorities for tests of predatory pricing, so both of them are potentially relevant. Average Avoidable Costs is a criterion used by firms to determine whether to remain on the market, while LRAIC or Average Total Cost provide long-term build-or-buy signals for the construction of alternative infrastructure.

LRIC+ or ATC approach is reasonable given that competition in Regional WCA market is not significantly developed to pass to LRIC, which would be more favourable for Eir because it does not include a share of common costs.

The approach currently used for NGA margin squeeze tests is ATC[59], which includes a portion of common costs. Moreover, it is the approach used for CGA margin squeeze tests, which means that choosing it for the NGA test would ensure more consistency.

The 2013 EC Recommendation recommends an LRAIC+ approach for retail margin squeeze obligation[60].

In practice LRAIC+ approach may be similar to ATC, since both approaches include a portion of common costs. LRAIC+ approach is more often used in a bottom-up model, while ATC is more referred to when calculating costs from accounting data.

It is therefore recommended to use either LRAIC+ or ATC approach for both wholesale and retail margin squeeze test: for the margin squeeze test between retail FTTH and bitstream FTTH, retail FTTC and bitstream FTTC, bitstream FTTH and VUA FTTH, as well as between VUA and retail in the footprint of the Urban WCA Market.

Recommendations are summarized in the figure below.

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[59] ComReg 13/11, page 202

[60] See annex.

Figure 29 – Recommendations on the cost standards for margin squeeze obligation
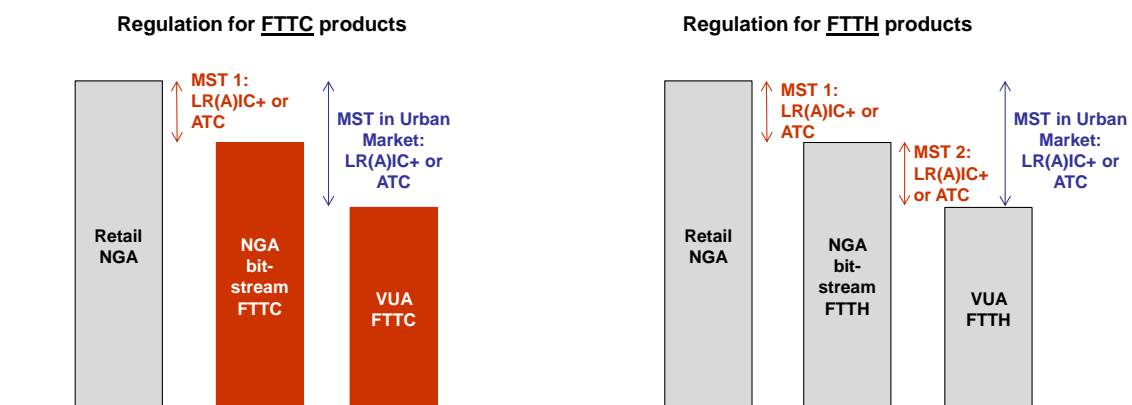
Source: TERA Consultants

5.2.3   Product basis: product-by-product or portfolio

The replicability can be assessed either product by product or by portfolio of products. Portfolio test is less strict and therefore more relevant when competition is more developed.

Arguments in favour of product-by-product approach are:

- It may be difficult for an alternative operator to replicate the whole package of services.

- It may be difficult to define the relevant mix of products for the portfolio.

- The relevant portfolio may change in time as the volumes of use of different services change.

Arguments in favour of portfolio approach are:

- A profit-maximising multi-product operator can choose prices of individual products that will be optimal, taking into account consumers' demand, which would be beneficial for the total welfare.

- When making an investment decision, an operator calculates total revenues from all the products it can sell.

A portfolio approach is currently used for the following reasons[61]:

- to ensure consistency with the bundles decision (ComReg Document No 11/72),
- to give Eir flexibility in face of demand uncertainty,
- excessive prices are unlikely due to retail constraints from cable and current generation products.

However, according to the EC, the flagship approach is more relevant for margin squeeze obligation between NGA products (see 2013 EC Recommendation, annex

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[61] ComReg 13/11, p.199, 202, 203

§6.2). For example, with regards to the Malta NGA pricing decision (see annex, MT/2015/1803), the EC commented that conducting margin squeeze obligation on an aggregate level only for flagship products may not be sufficient to ensure that access seekers can compete for the provision of each flagship product. The product-by-product approach is also acknowledged by BEREC's Guidance on the regulatory accounting approach to the margin squeeze obligation, which states that *'the use of a product-by-product approach ensures that each bundle/standalone offer is replicable and that there can be no form of cross-subsidy between bundles and standalone offers'*.

In spite of the view of the European Commission, it is recommended to keep a portfolio approach in Ireland since the retail market share of Eir is in decrease, and therefore the operator should be left enough freedom in price setting.

5.2.4 Model type (static or discounted cashflow) and time period

It is possible either to adopt a static approach or to use a discounted cash flow (DCF) approach over time. The second one is more relevant for the NGA network deployment because of some uncertainty of demand for NGA products, demand increasing over time and the need to make significant investments. Indeed, as shown in previous sections, the penetration rates of FTTH and FTTC products change significantly over time (see §3.1.2). If a static approach is adopted, the cost allocation between years does not take into account these dynamics, so that the per line price is too high during the first years. The DCF is also recommended by the European Commission for margin squeeze obligation in its 2013 Recommendation (annex).

The European Commission also specifies that the period over which the cash flow should be calculated is the customer's lifetime:

> *"The relevant period should be set in accordance with the estimated average customer lifetime (…) over which the customer contributes to the recovery of the downstream costs (…) and other downstream costs that are normally not annualized (typically the subscriber acquisition costs)."*

The approach currently used by ComReg is a DCF approach over the customer's lifetime[62]. It is recommended to keep this approach.

5.2.5 Geographic aspect of FTTH bitstream

FTTH Bitstream specific costs to be included in the margin squeeze test will depend on the MDFs included in the geographic scope.

Geographic scope for the margin squeeze obligation test between VUA FTTH and Bitstream FTTH can be similar to the one proposed for Bitstream FTTC cost orientation.

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[62] ComReg 13/11, p.200, 202

5.2.6 Risk premium

The deployment of NGA networks is exposed to different market risks, in particular those related to the demand which will define migration speed from the old networks to the new ones. This risk should be taken into account when calculating costs in the form of the cost of capital. A risk premium should therefore be included in WACC. According to the 2010 EC Recommendation, the risk premium for FTTH products is significantly higher than for FTTC products:

> *"The above considerations [on setting the risk premium] apply in particular to investment into FTTH. <…>while regulated prices for WBA based on FTTN/VDSL should take account of any investment risk involved, such risk should not be presumed to be of a similar magnitude as the risk attaching to FTTH based wholesale access products."*

Indeed, as explained in §3.3, the FTTC service shares a part of the network with CGA networks, which makes the per-customer cost less dependent on the NGA penetration rate. In addition, FTTH investments are more significant than for FTTC.

In the previous decision[63], ComReg did define the risk premium to be included in WACC for the FTTH margin squeeze obligation because the FTTH service did not exist yet.

However, because VUA FTTH is not cost-oriented, there is no need to estimate costs of the access network. At the same time, the assets relevant for FTTH margin squeeze obligation are not a part of the access network but of the core network. These assets are not therefore subject to a risk premium.

5.2.7 Summary of recommendations

The table below summarizes TERA's recommendations on the margin squeeze obligation parameters.

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[63] ComReg 13/11, §10.102

Table 15 –Margin squeeze obligation parameters for the recommended margin squeeze tests: 1. Bitstream-Retail, 2. VUA-Bitstream and 3. VUA-Retail in the footprint of the Urban WCA Market

Parameter	Current	2013 EC Recommendation	TERA recommendation
Downstream costs	1. Bitstream-Retail: SEO with elements of EEO 2. VUA-Bitstream: SEO	EEO; SEO accepted under certain conditions	1. Bitstream-Retail: REO with elements of EEO 2. VUA-Bitstream FTTH: REO 3. VUA-Retail: REO with elements of EEO or EEO
Cost standard	ATC	LRAIC+	LR(A)IC+ or ATC
Retail product basis	Portfolio	Flagship	Portfolio (relevant for 1. Bitstream-Retail and 3. VUA-Retail)
Time period	DCF, over average customer lifetime	Dynamic approach such as DCF, over average customer lifetime	DCF, over average customer lifetime
Geographic aspect of NGA bitstream	National	-	Average over the next MDFs to unbundle (Relevant for 2. VUA-Bitstream)
Risk premium	WACC at 8.18%, no premium for FTTH since the service did not exist then	No risk premium for FTTC, a risk premium for FTTH	No need to estimate FTTH risk premium since no cost orientation for VUA FTTH

Source: TERA Consultants

6 Annex

6.1 Glossary

AIP	Alternative Infrastructure Provider
BEREC	Body of European Regulators of Electronic Communications
BU	Bottom-Up
CCA	Current Cost Accounting
DCF	Discounted Cash Flow
DSL	Digital Subscriber Line
EC	European Commission
ERG	European Regulatory Group
FAC	Fully Allocated Cost
FAR	Fixed Asset Register
FCM	Financial Capital Maintenance
FTTB	Fibre To The Building
FTTC	Fibre To The Cabinet
FTTH	Fibre To The Home
FTTN	Fibre To The Node
FWA	Fixed Wireless Access
HCA	Historical Cost Accounting
LEA	Large Exchange Areas
LFI	Line Fault Index
LLU	Local Loop Unbundling
LRIC	Long Run Incremental Cost
LS	Line Sharing
MEA	Modern Equivalent Asset
NBP	National Broadband Plan
NBV	Net Book Value
NGA	Next Generation Access
NGN	Next Generation Network

NRA	National Regulatory Authority
OAO	Other Authorised Operator
OCM	Operating Capital Maintenance
PSTN	Public Switched Telephone Network
SABB	Standalone Broadband
SB-WLR	Single Bill Wholesale Line Rental
SLU	Sub Loop Unbundling
TD	Top-Down
VDSL	Very high bit-rate Digital Subscriber Line
VUA	Virtual Unbundling Access
WBA	Wholesale Broadband Access
WPNIA	Wholesale Physical Network Infrastructure Access

More detailed definitions are also provided below:

- Civil Engineering Infrastructure or Assets means physical local loop facilities deployed by Eircom to host local loop cables such as copper wires, optical fibre and co-axial cables. It includes, but is not limited to, underground or above-ground assets such as sub-ducts, ducts, manholes and poles.

- Exchange means an Eircom network premises or equivalent facility used to house network and associated equipment and includes a Remote Subscriber Unit (RSU).

- Local Loop means the physical circuit connecting the network termination point at the subscriber's premises to the Main Distribution Frame or equivalent facility in the fixed public telephone providers' network. This is also called "Access network" or "Copper Access Network" by ComReg in its decisions.

- Main Distribution Frame is a termination point within the local exchange where exchange equipment and terminations of local loops are connected via jumper wires.

- Sub-Loop means the portion of the local loop which runs from a street cabinet or node to a home or premises.

- Next Generation Access (NGA) network means a wired access network which consists wholly or in part of optical fibre elements and which is capable of delivering broadband access services with enhanced characteristics (such as higher throughput) as compared to those provided over already existing copper networks.

- FTTN (Fibre to the Node) means an access network architecture whereby active equipment is installed in an access network node. This is a NGA network.

- FTTC (Fibre to the Cabinet) means a variant of the FTTN access network architecture where the node used to house active equipment is the street cabinet. The connection between the street cabinet and the End User premises is by way of a copper sub-loop. This is a NGA network.

- Access Services means services offered by Eircom to alternative operators that grant them access to part of Eircom's local loop and allow alternative operators to provide their own services to end-users. They can be provided either over current generation copper network infrastructure and its associated facilities at a fixed location or over next generation fibre network infrastructure and its associated facilities at a fixed location. They include:

  o Copper-based WPNIA (Wholesale Physical Network Infrastructure Access) services, including:

    ▪ Full LLU (Local Loop Unbundling) which allows unbundled access to the local loop.

    ▪ SLU (Sub Loop Unbundling) which allows unbundled access to the local sub-loop.

    ▪ Line Share which allows renting the broadband capability of a loop only.

  o Copper-based WBA services (wholesale broadband access comprising non-physical or active network access including "Bitstream" access at a fixed location), including but not limited to:

    ▪ Naked DSL (or SABB, stand-alone broadband) provides a standalone DSL broadband service over the Local Loop, without a Public Switched Telephone Network (PSTN) service.

  o Other copper-based services:

    ▪ SB-WLR (Single Bill Wholesale Line Rental) allows a fixed service provider to issue one single bill to end-users for carrier pre-select (CPS) "all calls" and line rental charges and to maintain a primary relationship with the end user.

  o NGA-based virtual offer: VUA FTTH and VUA FTTC

  o NGA-based WBA services: FTTH NGA bitstream and FTTC NGA bitstream

- Access Prices (or wholesale Access Prices) mean prices paid by an operator for an access service offered by Eircom (can be full LLU, Line Share, SB-WLR, SLU or Naked DSL).

- 2010 EC Recommendation – Commission recommendation of 20 September 2010 on regulated access to Next Generation Access Networks (NGA) (2010/572/EU)

- 2013 EC Recommendation – Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment, C(2013) 5761

6.2 European regulatory framework

According to the European Commission, a Next Generation Access (NGA) network means:

"a wired access network which consists wholly or in part of optical fibre elements and which is capable of delivering broadband access services with enhanced characteristics (such as higher throughput) as compared to those provided over already existing copper networks."[64]

In order to respect the technological neutrality principle, the European Commission does not give a more precise definition of an NGA network. Depending on national circumstances, an FTTH, an FTTC or a mixed network may be considered as a modern efficient NGA network:

"In the light of the principle of technological neutrality and in view of different national circumstances, NRAs need a degree of flexibility to model such a modern efficient NGA network." "An FttH network, an FttC network or a combination of both can be considered a modern efficient NGA network."[65]

The European Commission published two recommendations in relation to Next Generation Access networks: recommendation on the access to NGA dated 20th of September 2010 (2010 EC recommendation) and recommendation on non-discrimination and costing methodologies dated 11th of September 2013[66] (2013 EC recommendation).

On 20 September 2010, the European Commission published a recommendation on the regulated access to NGA. It explains that differentiated remedies may be imposed in different areas depending on the state of competition.

It also defines diverse access products which can be imposed in case of an SMP (significant market power):

- on the physical access market:
  - access to civil engineering at cost-oriented price,

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[64] 2010 EC Recommendation, §11

[65] European Commission, Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment, C(2013) 5761

[66] European Commission, Commission recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment, C(2013) 5761

- o access to the terminating segment and unbundled access to the local fibre loop in the case of FTTH deployment,
- o obligatory unbundled access to the copper sub-loop in the case of FTTC/FTTN supplemented by backhaul measures and ancillary remedies;
- on the wholesale broadband access market.

Also according to the 2010 EC recommendation, investment risk for FTTC is significantly lower than for FTTH:

"Investment into FTTN,<…> which is a partial upgrade of an existing access network (such as for example VDSL), normally has a significantly lower risk profile than investment into FTTH, at least in densely populated areas. In particular, there is less uncertainty involved about the demand for bandwidth to be delivered via FTTN/VDSL, and overall capital requirements are lower. Therefore, while regulated prices for WBA based on FTTN/VDSL should take account of any investment risk involved, such risk should not be presumed to be of a similar magnitude as the risk attaching to FTTH based wholesale access products. When setting risk premia for WBA based on FTTN/VDSL, NRAs should give due consideration to these factors<…>"[67]

The 2013 on-discrimination recommendation addresses several subjects such as the case where the cost orientation obligation could be relaxed for NGA wholesale products, the margin squeeze obligation (economic replicability test), the equivalence of inputs/outputs issue, the cost orientation obligation applied to legacy services.

The EC recommends NRAs not to impose cost orientation on NGA wholesale products under several conditions (§48-49):

- equivalence of inputs or obligations relating to technical replicability when equivalence of inputs is not yet fully implemented;
- obligations relating to the margin squeeze obligation;
- there exists a demonstrable retail price constraint.

However, the cases when cost orientation is not necessary are not necessarily limited to the one described above. Indeed, the EC states (§58):

"The conditions set out in the points 48-57 should not be seen as the only circumstances under which NRAs can decide not to impose regulated access prices for NGA wholesale inputs. Depending on the demonstration of effective equivalence of access and on competitive conditions, in particular effective infrastructure-based competition, there may be additional scenarios where the imposition of regulated wholesale access prices is not warranted under the Regulatory Framework".

The recommendation explains that the calculation of wholesale NGA product costs should be based on a BU LRIC + approach (§29) except for civil engineering costs

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[67] EC Recommendation, annex

deployed for legacy services and which can be reused for NGA services (§35). This is the approach that ComReg has recently adopted for copper (ComReg Decision D03/16). Reusable legacy civil engineering assets and their corresponding RAB should be valued on the basis of the indexation method. (§34)

The EC also gives recommendations on the margin squeeze obligation, for which an NRA should determine parameters: relevant costs, cost standards, wholesale and retail products, time period. It lists the following parameters:

- **Equally or Similarly Efficient Operator?** The margin squeeze obligation can be conducted either considering the costs of the incumbent (equally efficient operator – EEO) or the costs of an efficient alternative operator (similarly efficient operator – SEO). The EC recommends using EEO or in some specific cases SEO: *"Downstream costs are estimated on the basis of the costs of the SMP operator's own downstream businesses (EEO test)." "NRAs may make adjustments for scale to the SMP operator's downstream costs in order to ensure that economic replicability is a realistic prospect."*

- **Static or dynamic model?** The margin squeeze obligation can be conducted either estimating the costs and revenues of an "average year" (average yearly margin method) or estimating and discounting all future cash flows (discounted cash flows). The EC recommends the dynamic approach over a customer's lifetime: *"NRAs should evaluate the profitability of the flagship products on the basis of a dynamic multi-period analysis." "The relevant period should be set in accordance with the estimated average customer lifetime (…) over which the customer contributes to the recovery of the downstream costs (…) and other downstream costs that are normally not annualized (typically the subscriber acquisition costs)."*

- **Product by product or portfolio?** The analysis can be achieved by testing every product separately or studying a basket of products. The EC recommends a product by product approach on flagship products: *"NRAs should assess the most relevant retail products including broadband services ('flagship products') offered by the SMP operator. NRAs should consider whether a particular retail product is particularly attractive to alternative operators that may focus on a certain niche products."*

- **Which cost standard to use?** The evaluation of the costs can be based on (see 5.1.2) :
  - The average avoidable costs (AAC)
  - The average variable costs (AVC)
  - The optimized average incremental costs (LRAIC)
  - LRAIC+
  - The average total costs (ATC)

The EC recommends using LRIC+[68]: *"The incremental cost of providing the relevant downstream service is the appropriate standard. A LRIC+ model should be used to calculate the incremental cost (including sunk costs) and to add a mark-up for common costs related to the downstream activities."*

6.3 Benchmark of NGA access pricing approaches

This section studies pricing and costing approaches in other European jurisdictions, which will help understanding what main drivers to choose one or another approach depending on the national context. It also summarizes EC's comments on the draft decisions.

Cost orientation is used in 5 countries (Italy, Slovakia, Denmark, Poland, Netherlands). Cost orientation is based on an LRIC+ (LRAIC) model.

Table 16: European benchmark of pricing and costing methods of fibre access products: countries having chosen cost orientation

Country	Market	Product	Other costing details
Italy	3b	Bitstream/ VULA NGA	DCF to take into account evolution of demand and avoid high prices at the beginning BU-LRIC (FDC bottom-up until BU-LRIC model is developed)
Slovakia	3a	VULA	BU-LRIC+ topology of the SMP undertaking
Denmark	Wholesale access to the local loop	VULA	LRAIC, MEA – FTTH
Poland	Wholesale broadband access	xDSL and FTTx-based access	LRIC+, justified efficient cost (cost incurred by the operator until submission of the relevant audited LRIC+ cost calculations)
Netherlands	3a	ODF-FTTH access	DCF KPN's own internal rate of return

Source: NRAs' and European Commission's decisions

Margin squeeze obligation is used in 7 countries (Czech Republic, Luxembourg, Malta, Spain, Sweden, Germany, UK). Margin squeeze obligation is based either on the SEO (Luxembourg) or on the EEO (Malta, Sweden) cost reference. Margin squeeze obligation can be based either on a flagship product (Luxembourg) or on a portfolio of products (Czech Republic, UK)

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[68] In this context equivalent to "LRAIC+" as defined in ComReg document 12/27.

Table 17: European benchmark of pricing and costing methods of fibre access products: countries having chosen margin squeeze obligation

Country	Market	Product	Other costing details
Czech Republic	3a	VULA	Margin squeeze obligation between markets 3a, 3b and the retail level Portfolio approach
Luxembourg	WPNIA	-	Flagship products, SEO (15% market share), LRIC+, period by period
Malta	3a	VULA	EEO, LR(A)IC+ for sunk costs and top-down values for other costs (retail, common), flagship products at an aggregate level, DCF (5 years customer lifetime).
Spain	3a	Virtual access to fibre (NEBA)	-
Sweden	3a	fibre	EEO, BULRIC+, national average access price, two most relevant retail products.
Germany	3b – Layer-2 Bitstream	Layer-2 Bitstream	Ex-ante margin squeeze
Germany	Wholesale local access	Access to fibre loop (FTTH)	Margin squeeze
UK	3a	VULA	BT's own costs and revenues but with a lower average customer life and lower bandwidth costs of alternative operators. LRIC+, portfolio approach, including the cost of premium content

Source: NRAs' and European Commission's decisions

In 6 other cases another solution has been chosen by NRAs

- No NGA access obligation in Romania and Sweden;
- Only ex post margin squeeze obligation in Germany for Layer-3 bitstream;
- Neither cost orientation nor margin squeeze obligation in Bulgaria;
- No strict cost orientation in France but a fibre bottom-up model is developed to create a base for tariffs;
- In Netherlands, the tariffs for VULA will be determined in a price decision which will apply only if an alternative operator requests such price decision for VULA. Thus, the tariffs set in the commercial agreements will serve as a price ceiling and will not be assessed by ACM. These tariffs will be based on LLU safeguard cap and increased by the Embedded Direct Costs of the VULA increment.

To summarize, both cost orientation and margin squeeze obligation are broadly used to price NGA wholesale products: among the 18 studied cases, cost orientation was used in 5 and margin squeeze obligation – in 7.

The EC has accepted both of these prices approaches, depending on the national situation. The EC underlined that when choosing the approach, it is important to consider criteria set out in the 2013 EC Recommendation. When commenting on a Netherlands decision, the EC question the need for cost orientation given the presence of an alternative infrastructure at the national level: *"In a context of generalised infrastructure*

competition at national level, and in which it has proven to be possible for commercial agreements to be concluded on wholesale local access to other parts of KPN's infrastructure (VULA), the Commission invites the NRA to consider whether it is necessary to impose ex ante price controls on regulated FTTH wholesale local access." (NL/2015/1794)

When commenting on a German decision, the EC, on the contrary, reminded of the need to better demonstrate competitive safeguards in the case it is decided not to impose cost orientation: *"…BNetzA intends not to apply a strict cost orientation obligation without demonstrating that the conditions for pricing flexibility set out in point 48 of the 2013 Recommendation, in particular the application of EoI as a competitive safeguard, are present in the market... The Commission recognises that the conditions in point 48 are not the only circumstances under which an NRA can decide not to impose price regulation based on strict cost orientation."* (DE/2015/1781)

The EC has commented not only on the choice of the pricing approach but also on different parameters of its implementation.

Regarding the geographic aspect, the EC recommends assessing the market situation not nationally but by relevant areas. This recommendation was made with respect to a Spanish decision *("Need to assess competition by market segment and geographic area, in the light of the locally varied competitive constraint from other NGA infrastructures"* ES/2015/1818) and an Italian decision (*"The Commission invited AGCOM to take into account the need to appropriately assess the differences in competitive conditions between geographic areas in the broadband access market in its consultation on remedies differentiation"*, IT/2011/1230 and IT/2011/1231). At the same time, the geographic segmentation should be clearly defined an not very complex. In response to a Spanish decision, the EC stated that *"the proposed geographic differentiation of remedies is highly complex (in particular, the fact that the geographic differentiation for the wholesale local access market is based on municipalities and the deregulation of the wholesale central access market is based on MDF areas)"* (ES/2015/1818).

The EC underlines the importance of specifying all the relevant parameters if the margin squeeze obligation is chosen, as given in the 2013 EC Recommendation (CZ/2014/1647).

The EC reminds that the margin squeeze obligation should be made product by product for flagship products: *"Conducting margin squeeze obligation on an aggregate level only for flagship products may not be sufficient. According to BEREC's Guidance on the regulatory accounting approach to the margin squeeze obligation, 'the use of a product-by-product approach ensures that each bundle/standalone offer is replicable and that there can be no form of cross-subsidy between bundles and standalone offers'."* (MT/2015/1803)

If the SEO approach is chosen, the NRA has to justify the choice of the market share value (LU/2014/1633).

The EC reminds that a dynamic approach has to be generally chosen for margin squeeze obligation: *"A static period-by-period approach looking at a short time interval (6 months)*

in isolation unduly limits incumbent's flexibility. An adequate reference period would be the average customer lifetime" (UK/2015/1692) However, the EC accepts that in some cases, when competition is not developed, a period-by-period approach may be temporarily accepted: *"Generally dynamic multi-period analysis is recommended; however, a stricter period-by-period margin squeeze obligation may be appropriate at least for transitional period (limited LLU take-up, lack of infrastructure competition, cost oriented LLU model not finished)". (LU/2014/1633)*

With respect to cost orientation parameters, the EC reminds that reusable civil engineering assets should not be valued at full replacement costs (PL/2015/1780).

6.4 Operators' submissions

This section summarizes operators' positions on questions relevant to this report.

6.4.1 Operators' usage of wholesale products and investment plans

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6.4.2 Operators' strategies on the retail market

✄

6.4.3 Operators' views on wholesale pricing and market trends

✄

6.5 Consistency of the recommended approach with ComReg's statutory objectives

When choosing the relevant price control obligation and/or appropriate network pricing and costing approaches, ComReg has to consider its statutory objectives. Under the Communications Regulation Act of 2002 and under European policy objectives, ComReg's objectives regarding the electronic communication market are:

- to promote competition,

- to contribute to the development of the internal market,

- to promote the interests of users within the Community,

- to ensure the efficient management and use of the radio frequency spectrum and numbers (Not relevant here).

According to the Communications Regulation Act of 2002, promoting competition can be achieved by:

- ensuring that users, including disabled users, derive maximum benefit in terms of choice, price and quality,

- ensuring that there is no distortion or restriction of competition in the electronic communications sector,

- encouraging efficient investment in infrastructure and promoting innovation, and

- encouraging efficient use and ensuring the effective management of radio frequencies and numbering resources.

Amongst all these objectives, it is clear that ComReg must find a balance between two key principles (see TERA 2015 report for ComReg on current generation product pricing[69]):

- Encourage the development of alternative infrastructure ("encouraging efficient investment in infrastructure"),

- Promote competition.

The Access Directive also highlights the need to consider both these objectives: *"the imposition by national regulatory authorities of mandated access that increases competition in the short-term should not reduce incentives for competitors to invest in alternative facilities that will secure more competition in the long-term".*

The approach proposed by TERA is consistent with the above objectives. Indeed, the development of alternative infrastructure is encouraged thanks to a cost oriented price for VUA FTTC which leads to a lower access price. The alternative operators will favour VUA FTTC over NGA bitstream if Eir decides to keep the NGA bitstream price at the same level, thus going up the ladder of investment. In addition, alternative operators can also invest in their own FTTH networks. Eir may try to prevent them from doing so by lowering VUA prices below cost in chosen areas, so that their investments are not profitable any more. The proposed price floor mechanism would prevent Eir from doing so. Investment in FTTH is therefore encouraged. In addition, the two margin squeeze obligations ensure that the wholesale products situated higher in the ladder of investment cannot be squeezed out by the lower prices of wholesale products that are situated lower in the ladder of investment: NGA bitstream cannot be squeezed out by end-to-end NG bitstream, and VUA cannot be squeezed by NGA bitstream.

The proposed regulation will also promote competition. First of all, the competition will develop thanks to a lower VUA FTTC price, which can lead to more operators using VUA FTTC or services provided through VUA FTTC, and therefore more competition. In addition, thanks to the margin squeeze obligation tests, Eir cannot set too high prices for wholesale products compared to retail prices, which allows alternative operators enter the market through wholesale products. Finally, the competition will develop thanks to investments by alternative operators, which is encouraged by the proposed regulation as explained above.

Two additional criteria can be considered:

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[69]

http://www.comreg.ie/publications/annex_7_to_comreg_document_15_67__tera_report.583.104880.p.html

- Feasibility of proposed measures. The feasibility is fulfilled because ComReg has already developed both relevant cost models for both margin squeeze and cost orientation, so that measures proposed by TERA can be easily implemented.

- Certainty for operators. If there is too much uncertainty on the take-up or on the geographic scope of a given wholesale product, then the cost orientation obligation may be very risky to implement. The situation is very different for FTTH and for FTTC: take-up of FTTH is unknown and the geographic scope of Eir's future FTTH network is not fully known, while FTTC costs are known and there is already data available of take-up rates during the first three years since the launch. That is in this report cost orientation is not proposed for VUA FTTH but only for VUA FTTC.

6.6 NGA pricing and investment incentives

6.6.1 Two alternative approaches to VUA price regulation

This note aims at explaining how VUA pricing approach can incentivise FTTH investments in Ireland while at the same time ensuring wholesale prices do not deviate significantly from costs (as seem to have occurred recently when Eir proposed to increase its VUA and NGA Bitstream prices[70]).

The current regulation of VUA prices is based on margin squeeze tests. As the NGA network is rapidly developing and the NGA services become more wide spread, it becomes necessary to re-assess the current approach to the regulation. TERA's report has shown that under the current regulatory approach, the market risks being re-monopolised by Eir through its NGA deployment. Therefore, a more strict approach of price regulation is recommended, i.e. from margin squeeze tests to cost orientation for VUA FTTC.

Eir can provide VUA services through two different network architectures, FTTH and FTTC. A question arises then, should the cost orientation be applied to both technologies, FTTH and FTTC? Two approaches are possible[71]:

- **Approach 1: Cost orientation is applied only to VUA FTTC and margin squeeze is kept for VUA FTTH.** Such an approach is justified by the fact that FTTH is at the very beginning of its development, unlike FTTC which has been deployed for a number of years. As a consequence, it is difficult to predict future penetration rates, which makes the estimation of the average unit cost of FTTH rather uncertain. Moreover, FTTC shares a part of its costs with the copper network; this cost is spread over a large customer base of copper lines and

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[70] VUA FTTC passing from 19.50 to 23.0, and VUA FTTH passing from 20.50 to 23.50 starting from September 2016. Source: OpenEir Bitstream Service Price List, Version TBC September 2016

[71] In addition, for both approaches, it is recommended to complement the price cap regulation with the price floor constraints. The price of these products should not go lower than the minimum between the notional wholesale price of alternative operators and the actual cost. Otherwise, Eir could decrease its VUA price below costs in order to foreclose a competitor who started deploying its own network in a given area.

estimation of the unit cost becomes more certain compared to the case of FTTH (see TERA report for more details – Approach 1 is the approach proposed in TERA report).

- **Approach 2: Cost orientation is applied to both FTTH and FTTC.** However, as explained above, the unit cost evaluation for FTTH service has low certainty. A possible solution to this problem would be to calculate a blended unit cost based on the mix of both technologies, FTTH and FTTC. Introducing FTTC cost would significantly lower the uncertainty as a unique VUA price would then be oriented to the blended VUA cost. This approach has not been considered yet in the TERA report.

6.6.2   Advantages of approach 1 & disadvantages of approach 2

FTTH and FTTC technologies are different to the extent that they do not have the same characteristics for customers and costs for operators. FTTH-based connections offer require greater investment on the part of the operator but for higher speeds than FTTC, although FTTC speeds can be close to FTTH speeds when customer premises are located close to street cabinets.

As a consequence, under approach 2, customers using FTTC will face a higher price, to partially cover FTTH costs even though they will not benefit from the additional speed advantages of the FTTH technologies. However, in the long term FTTC customers may also benefit from such an approach because it can lead to a more rapid FTTH development giving rise to greater economies in the operator's network. Moreover, FTTC speeds can be close to FTTH speeds when customer premises are located close to street cabinets.

In addition, the pricing mechanism proposed under approach 2 would be dynamic since it depends on the relative take-up between FTTC and FTTH, so it will be difficult to monitor. Different implementation questions arise such that how often the price should be changed and how to gather and verify the information. Since the VUA price depends on the current coverage, it becomes dynamic and should be updated over time in line with network developments. Consequently, there would necessarily be a trade-off between the accuracy of unit cost calculation and the resources spent in collating data and updating models.

Furthermore, the resulting price uncertainty may be problematic for other operators which need to anticipate future VUA FTTC and FTTH price changes. It makes it more difficult to them to purchase VUA services because the VUA price may increase in the future, as the FTTH uptake becomes more wide-spread (because VUA FTTH is more expensive than VUA FTTC).

Under approach 2, it may be also difficult for an alternative operator to compete with Eir's FTTH network. Indeed, as such an operator which is unlikely to have the same possibilities to cross-subsidize FTTH by FTTC, it will have to set higher wholesale and

potentially retail prices. It will then prefer to stay with Eir's VUA offer rather than build its own network. Approach 1 helps to avoid such cross-subsidisation.

6.6.3 Advantages of approach 2 & disadvantages of approach 1

Under approach 2, the VUA price is based on a blended cost of two technologies. Costs of FTTH lines are included only for those areas where the FTTH network has been actually built.

Approach 2 gives incentives for Eir to build the FTTH network since all the investments are compensated for. From a theoretical point of view, approach 1 also compensates for FTTH investment (because Eir would then increase its retail prices). However, under approach 1, increases in retail prices are constrained by customer willingness to pay relative to the level of costs of expanding the FTTH network. FTTH may be so costly to deploy that the resulting retail prices may be unaffordable. With approach 2, when a new area is covered, it is included in the cost base. Covering a new area with FTTH will result in an increase of the FTTH share in the cost base, leading to an increase in the regulated VUA price cap as the FTTH cost is higher than FTTC cost. However, the increase in the blended FTTH/FTTC price will be less than the increase in FTTH only prices. As a result the blended FTTC/FTTH price that is derived under approach 1 will always be less than the FTTH only price that is derived under approach 2.

In other words, if P is the optimum price to sell FTTH, under approach 1, it will still be possible to sell at P while under approach 2, there may be areas where Eir would refuse to deploy FTTH because the incremental cost to cover this area would give rise to an average FTTH price much greater than P. It is very important to note that approach 2 is worth considering if and only if it is clear to Eir that not deploying FTTH in a given area means that the cost of this area will not be included in the blended cost base and therefore will not be reflected in the wholesale price.

Compared to the current VUA prices, VUA FTTC prices would drop less with approach 2 than with the approach 1. Indeed, VUA FTTC prices would remain higher because of the more expensive FTTH component thereby mitigating the move to cost oriented prices for FTTC on the market.

Compared to approach 1, under approach 2 FTTH retail offers are likely to be more attractive relative to the FTTC offers and legacy offers thanks to cross-subsidies. As a consequence, customers will more rapidly migrate to the FTTH. It could lead to a more rapid FTTH penetration and consequently to a decrease in FTTH unit costs in the longer term.

Volatility of the cost-oriented price remains at acceptable levels under approach 2 when compared to the case of FTTH-only cost orientation. Indeed, the majority of lines will use FTTC, which will make prices stable.

Indeed, as explained in the TERA report, the VUA price level significantly depends on the penetration scenario. The model uses an economic depreciation (discounted cash

flow) approach to calculate FTTC and FTTH cost per line and therefore different penetration rates generate different FTTC or FTTH cost per line.

The table has been complemented by using the NGA margin squeeze test developed by ComReg for the previous decision (in 2013) and by testing different penetration rate scenarios. The table shows that the risk of an estimation error is significantly lower for FTTC (<11%) than for FTTH (<67%). The risk for the blended price is under 26% under the assumption that the portion of FTTH lines in the number of NGA lines is 15%. It is significantly lower than for FTTH alone.

Table 18: VUA depending on penetration scenarios (the price of the initial scenario is normalised to 100)

Assumption on penetration	VUA FTTC price	Difference with initial scenario	VUA FTTH price	Difference with initial scenario	VUA blended price	Difference with initial scenario
				%		
1. Initial scenario	100		100		100	
2. Rapid penetration	98	-2%	78	-22%	93	-7%
3. Slow penetration	111	11%	167	67%	126	26%

Source: TERA Consultants

There are areas where Eir is building its FTTH network in the absence of any infrastructure-based competition: customers have a choice only between Eir's copper network (without FTTC) and Eir's FTTH network, no cable network is present. There is a risk that, under approach 1, Eir will increase both NGA retail and wholesale prices for FTTH (VUA and NGA bitstream) while still respecting the margin squeeze test. The current CGA regulation can only partly help to solve this problem:

- Even though alternative operators could in theory access any exchange through unbundling, it may be unprofitable in most rural areas. Operators could access these areas only through CGA bitstream.
- LLU is currently in decline.
- FTTH products will be priced at a premium to CGA products, meaning that the price pressure on FTTH products from other technologies may be limited.

Service-level competition would then be limited in these areas, allowing an NGA price increase. Those customers who will not be ready to pay a higher price for NGA services will stay on the Eir's copper network, therefore also generating revenues for Eir[72]. Approach 2 would help to solve this problem.

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[72] However, in the longer term Eir may prefer to lower its prices for FTTH in order to encourage the remaining copper customers to migrate, and therefore avoid running two parallel networks.

6.6.4   Conclusion

Approach 1 is recommended because the Approach 2 is more difficult to implement and may create uncertainties.

6.6.4   Conclusion

6.7 EC comments on national decisions concerning NGN access pricing

Country	Case	Market	Remedies	EC comments
Bulgaria	BG/2015/1767	3a and 3b	No cost orientation Given BTC's competitors' considerable NGA infrastructure deployment and the fact that VULA does not exist in Bulgaria so far, CRC proposes to oblige the SMP operator to offer VULA only on request, and does not impose cost orientation for VULA	Margin squeeze obligation recommended In light of the particular market circumstances prevailing in the wholesale local access market in Bulgaria, the Commission considers the proposed approach to VULA as appropriate at this stage. If the SMP operator launches a VULA product without being obliged to set cost orientated prices, the Commission asks CRC to put in place all necessary Safeguards foreseen by the 2013 EC Recommendation, in particular the use of an appropriate margin squeeze obligation.
Croatia	HR/2014/1612	WBA	ADSL/VDSL/FTTH wholesale broadband access services: set prices on the basis of BU-LRAIC+ model. For FTTH WBA service, calculating volume discounts based on the number of FTTH lines in a specific area (instead of in the whole territory), to better reflect the link between the volume discount and the risk premium.	Need to ensure that in the presence of volume discounts market entry remains possible and that the WBA pricing structure would allow a sufficient margin between wholesale and retail prices. The Commission asked HAKOM to verify that the wholesale broadband prices, despite being capacity-based, are indeed stable and predictable and analyse whether and how the proposed volume discounts affected the market.

Croatia	HR/2014/1674	WBA	Changes in the model: decreasing the number of areas where FTTH roll-out is potentially profitable, adding to the existing ODF areas additional MDF areas that can (potentially) be connected to the existing ODF. The newly proposed rates are lower.	No comments
Czech Republic	CZ/2010/1070	wholesale (physical) network infrastructure acces (ex market 4) FTTx included	Only transparency and accounting separation remedies for FTTx products.	Invited to assess the possibility to impose an access remedy on fibre lines
Czech Republic	CZ/2014/1647	Market 4	The specification of the access obligation will be deferred as regards FTTH until O2 has a retail offer on the basis of this topology. No cost orientation for O2's FTTx networks	In line with 2013 EC recommendation: regulated access prices should not be imposed on NGA wholesale inputs under conditions of a demonstrable retail price constraint from infrastructure competition or a price anchor from cost oriented wholesale copper access prices, an ex-ante replicability test and EoI. Need to detail margin squeeze obligation.
Czech Republic	CZ/2014/1648	Market 5	The specification of the access obligation will be deferred as regards FTTH until O2 has a retail offer on the basis of this topology	-

Czech Republic	CZ/2015/1753	Local access provided at a fixed location	VULA is required where physical unbundling is unfeasible because of vectoring and GPON. Economic space test between markets 3a, 3b and the retail level, instead of margin squeeze obligation between the respective wholesale and retail products on both markets 3a and 3b. For Market 3a, a portfolio approach for both copper and NGA based services.	Ok for test between 3a, 3b and retail. Need for monitoring of geographic price variations at retail and wholesale level for different brackets of products, and to analyse appropriateness of future price control.
Denmark	DK/2013/1488	Wholesale (physical) network infrastructure Access	DPB VULA – cost orientation Network costs between the end user and the local exchange are based on historic costs of the copper network and that no fibre costs have been modelled in the access network.	DBA is requested to amend its methodology for calculating VULA prices still as part of its current review, by modelling a hypothetically efficient FTTC network and estimating the cost difference between FTTC and copper based access services.
Denmark	DK/2013/1518	Wholesale (physical) network infrastructure Access	Uncontended VULA – cost orientation The network costs (excluding active equipment) between the end user and the local exchange are based on historic costs of the copper network and no fibre costs have been modelled in the access network.	The Commission calls on DBA to amend as soon as possible its methodology for calculating VULA prices by modelling a hypothetically efficient NGA network and estimating the cost difference between FTTC/FTTH and copper based access services as asked in the Commission Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment.

Germany	DE/2011/1177	Wholesale local access (copper, FTTH excluding pure fibre lines serving large business users)	For access to the fibre loop (FTTH), price control relies on the application of a margin squeeze Justification: copper loop exercises a pricing constraint on the fibre loop.	EC asks BNetzA to impose an ex-ante price control based on true cost orientation for fibre based access and, in order to increase transparency, to set out in the final measure a cost model on which cost-orientation will be based
Germany	DE/2015/1781	Wholesale central access – 3b Two markets: Layer-2 bitstream (xDSL, fibre, not HFC) Layer-3 bitstream (xDSL, fibre, HFC)	Ex-post margin squeeze for Layer-3 Ex-ante margin squeeze for Layer-2	Layer-3: EC repeatedly criticised ex post approach -> need to reconsider Layer-2: welcomes ex ante approach. However, need to better demonstrate competitive safeguards. "…BNetzA intends not to apply a strict cost orientation obligation without demonstrating that the conditions for pricing flexibility set out in point 48 of the 2013 Recommendation, in particular the application of EoI as a competitive safeguard, are present in the market... The Commission recognises that the conditions in point 48 are not the only circumstances under which an NRA can decide not to impose price regulation based on strict cost orientation. In fact, the 2013 Recommendation sets out in point 58 that, depending on the demonstration of effective equivalence of access and on competitive conditions, in particular infrastructure-based competition, there may be other additional scenarios where the imposition of regulated wholesale access prices is not warranted under the regulatory framework."

Italy	IT/2011/1230 and IT/2011/1231	Ex market 5	Cost orientation for VULA-access and NGA bitstream access at the parent and distant feeder	The Commission invited AGCOM to take into account the need to appropriately assess the differences in competitive conditions between geographic areas in the broadband access market in its consultation on remedies differentiation.
Italy	IT/2014/1587	Ex market 5	VULA-access and NGA bitstream access: pending the development of the BU-LRIC model, prices for bitstream/VULA services are based on a FDC bottom-up costing methodology. Volumes are evaluated considering the expected demand of services in a discounted cash flow (DCF) 15 years period.	-
Lithuania	LT/2011/1197	3a Includes copper, FTTH, FTTB	Obligation of unbundled access to optical fibre only when access to the civil engineering infrastructure is not possible	The Commission provided comments on the need to impose on the SMP operator an obligation to provide fully unbundled access to its fibre loops in addition to access to civil engineering infrastructures and not make fibre access conditional on the availability of the latter.
Lithuania	LT/2015/1821	3a Includes copper and fibre	Obligation of access to local fibre loops on TEO.	So far the take up of the imposed wholesale remedies has been very limited, not just on the lower quality xDSL network of the SMP operator, but also on its FttH network. Careful monitoring will be required during the next period of review of whether the imposed access remedies fulfil their intended role. If access seekers will continue to disregard access products, including in areas where they are unlikely to roll out

				their own networks, then it will become necessary to further investigate whether any aspect of the design of the remedies is not fit for purpose and should be improved.
Luxem-bourg	LU/2014/1633	WPNIA (using connections established via copper pairs or partially using fibre)	No cost orientation EoI, technical and economical replicability could provide safety. Even in the absence of alternative infrastructure, a retail price constraint could be exercised by cost oriented BULRIC+ copper access prices (evidence: at retail level the price differentiation between copper and fibre offers is low) Principles: Flagship products SEO (same cost but not economies of scale – 15%) LRIC+ period-by-period analysis	Welcomes margin squeeze obligation Comments on parameters: Need to further justify 15% market share; Generally dynamic multi-period analysis is recommended by the Recommendation. Stricter margin squeeze obligation than the one recommended by the Recommendation. However, it may be appropriate at least for transitional period (limited LLU take-up, lack of infrastructure competition, cost oriented LLU model not finished). Invites to reconsider margin squeeze obligation parameters once LLU cost-oriented price is fixed
Malta	MT/2012/1374	3a	Uphold the principle of cost orientation when setting VULA price. Could adopt other forms of price control for setting VULA prices, for example margin squeeze obligation.	Need to impose proper access obligations on fibre infrastructures and to review proposal to impose a price control obligation on a future fibre infrastructure.

Malta	MT/2015/1803	3a	VULA: margin squeeze obligation EEO LR(A)IC+ for sunk costs and top-down values for other costs (retail, common) flagship products at an aggregate level DCF approach with a customer lifetime of five years.	Conducting margin squeeze obligation on an aggregate level only for flagship products may not be sufficient to ensure that access seekers can compete for the provision of each flagship product… This approach is also acknowledged by BEREC's Guidance on the regulatory accounting approach to the margin squeeze obligation, which states that 'the use of a product-by-product approach ensures that each bundle/standalone offer is replicable and that there can be no form of cross-subsidy between bundles and standalone offers'.
Nether-lands	NL/2015/1794	3a	VULA: a price cap on VULA based on the LLU safeguard cap and increased by the EDC of the VULA increment (applicable only in case no alternative commercial agreement is reached between KPN and access seekers). A safeguard cap for existing LLU services is based on the previous price cap increased by the CPI. The tariffs for VULA will apply only if an alternative operator requests such price decision for VULA. The tariffs set in the commercial agreements will serve as a price ceiling and will not be assessed by NRA. ODF-FttH access: a price cap on KPN's FttH based on a DCF model using KPN's own internal rate of return (IRR).	The Commission notes that ACM's approach to price controlling KPN's FttH deployments deviates from the Commission's Costing and non-discrimination Recommendation, in that even in the presence of competitive constraints and of high standards of non-discriminatory treatment (EoI), a form of price control is still foreseen going beyond the constraints inherent in margin squeeze obligation. The Commission recognises that ACM's approach, using a DCF methodology based on KPN's business plan (in terms of the assumed internal rate of return, demand forecast and project lifetime), provides a degree of pricing flexibility to the SMP operator investing in fibre roll-outs, and reflects the approach already applicable since the KPNReggefiber merger decision of 31 October 2014. None the less, in a context of generalised infrastructure competition at national level, and in which it has proven to be possible for commercial agreements to be concluded on wholesale local access to other parts of KPN's infrastructure

				(VULA), the Commission invites ACM to consider in its final measure whether it is necessary to impose ex ante price controls on regulated FTTH wholesale local access.
Poland	PL/2014/1632	Wholesale broadband access	xDSL and FTTx based access: cost orientation LRIC+, justified (efficient) costs Provisionally maintain the current obligation to set charges based on the costs incurred by Orange.	-
Poland	PL/2015/1780	Wholesale central access	Reference Offer regarding 100 Mbit/s and 300 Mbit/s FTTH access products. Wholesale charges were estimated from an LRIC model but price squeeze test revealed that the margin was negative. Wholesale charges were recalculated on the basis of retail minus. Note: in LRIC, civil engineering assets are valued at full replacement costs.	It is likely that the application of the recommended cost model (including more recent cost data and changing civil engineering valuation) would have resulted in lower wholesale costs, not causing the margin squeeze which triggered further wholesale price adjustments by means of a retail minus methodology. The application of the recommended cost model should normally be sufficient to avoid wholesale prices which could lead to a margin squeeze and that any further adjustment below the calculated costs raises issues of compliance. The proposed wholesale bitstream charges for the 100 Mbit/s and 300 Mbit/s products are significantly below the charges for lower speed bitstream products (both on legacy copper as well as VDSL/FTTH infrastructures). Normally required to apply the same price control method for all the bitstream products of various speeds.

Romania	RO/2015/1804	3a	No competition concerns Withdraw all the remedies currently imposed on the market for wholesale local access provided at a fixed location.	No comments
Slovakia	SK/2011/1210	Wholesale (physical) infrastructure access – copper and fibre	No cost orientation for fibre	Prices for fibre access services should also be set on the basis of cost oriented prices, appropriately adjusted for investment risks.
Slovakia	SK/2012/1308	Wholesale (physical) infrastructure access – copper and fibre	Price control for copper and fibre (BU-LRIC)	Welcomes cost orientation of all forms of access
Slovakia	SK/2014/1671	Wholesale local access	Price control for fibre based wholesale access (VULA). BU-LRIC+ MEA, replacement costs Scorched Node Economic depreciation Indexation for usable civil infrastructure	-

Slovakia	SK/2015/1738	Wholesale local access	Final prices for copper and fibre wholesale access VULA €11.40/month Plans to impose BU-LRIC+ in both local and central access	Need to adopt a consistent approach for price control remedies in both the wholesale local and wholesale central access markets
Slovenia	SI/2010/1159	3b	Retail minus Prohibition of margin squeeze between the retail and the wholesale price of all broadband-based packages	The Commission invited APEK to closely monitor the competitive constraints at retail level and revisit its analysis in order to impose cost-orientation if such constraints were not sustainable over time.
Slovenia	SI/2015/1826	3b	AKOS noticed : (i) Slovenia is lagging behind in terms of broadband speeds, (ii) retail prices and download speeds have changed, (iii) access seekers and the SMP operator are unable to provide retail offers (in terms of price and bandwidth) comparable to those of operators with their own unregulated infrastructure. In order to calculate the downstream costs in its "retail-minus" methodology NRA has calculated Telekom Slovenije's downstream costs (from separate accounts based on TD LRIC+, current costs) and compared them with the costs of alternative operators. When met with significant differences regarding the incumbent costs and those of alternative operators, AKOS corrected them with data	No comment

			from alternative operators and, where not available, with publicly available industry prices.	
Spain	ES/2008/0804	Market 3a: wholesale unbundling services for copper pairs, excluding FTTH and cable	CMT did not impose access to FTTH	-
Spain	ES/2015/1818	Market 3a: Wholesale local access market provided at a fixed location in Spain CNMC now proposes to include fibre access networks as part of the relevant	Geographical differentiation When in the area of an MDF the level of competition in the retail market as well as the NGA deployment is above the Spanish average, it is considered as an UFB MDF. The municipality containing at least one UFB MDF becomes an UFB municipality Telefónica would be obliged to provide virtual access to fibre (NEBA) in the whole territory of Spain with the exception of the UFB municipalities. A demonstrable competitive constrain exists, due to the existence of a copper anchor (LLU). As a consequence, no cost orientation but margin squeeze obligation has been chosen for NEBA pricing.	The proposed geographic differentiation of remedies is highly complex (in particular, the fact that the geographic differentiation for the wholesale local access market is based on municipalities and the deregulation of the wholesale central access market is based on MDF areas) The Commission notes that CNMC does not envisage updating the proposed measure as new data becomes available, which appears preferable in terms of regulatory predictability.

		product market		
Sweden	SE/2015/1687	3a Wholesale local access (includes copper and fibre-based local loops)	Until 30 November 2016: For fibre, price caps are set according to geotype. From 1 December 2016: no price caps but margin squeeze obligation. The lifting of price regulation will be conditional on sufficient competition constraints deriving from the successful and timely implementation of EoI and of the margin squeeze obligation. Justification: prices on the retail market will be sufficiently constrained by competing copper-based products, the wholesale inputs for which will continue to be price regulated, and alternative infrastructures. Margin squeeze obligation: access seekers can economically replicate retail offers on the basis of the NGA wholesale inputs. Key parameters: downstream costs on the basis of an EEO and BULRIC+. The reference price for wholesale inputs will be calculated as a national average for fibre access.	In line with the 2013 EC recommendation. For the next review, assess competition by market segment and geographic area, in the light of the locally varied competitive constraint from other NGA infrastructures. In future copper may become less viable at the retail level.

			Retail products - the two most relevant products in the single dwelling units (SDU) and multi-dwelling units (MDU) segment in terms of volumes and values.	
			The reference period - 12 months, for costs and revenues - average customer lifetime, 36 months.	
Sweden	SE/2015/1688	Wholesale central access (includes copper-based, fibre-based and cable TV networks)	Not susceptible to ex ante regulation	-
UK	UK/2010/1064	Wholesale local access market (including copper, cable and fibre-based)	Price flexibility for VULA (geographic variations, volume discounts and tiered pricing) under condition of EoI.	The Commission commented on the lack of price control remedy for VULA, while acknowledging fair and non-discriminatory terms under EoI.
UK	UK/2014/1606	Wholesale local access market	Idem	-
UK	UK/2015/1692	3a	Margin squeeze obligation between VULA and retail	A static period-by-period approach looking at a short time interval (6 months) in isolation unduly limits BT's flexibility

			BT's own costs and revenues with two adjustments: 1) the lower average customer life 2) lower bandwidth costs of alternative operators	An adequate reference period would be the average customer lifetime
			LRIC+	
			Portfolio approach to grant BT more flexibility	
			Include the cost related to premium content (over 5 years)	