Norwegian
Communications
Authority

EFTA Surveillance Authority
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Your ref.: 82766
Your date: 20.11.2018

Contact: Eivind Skaar Briseid

Nkom's response to the Authority's request for information - Markets 3a, 3b and 4

The Norwegian Communications Authority (Nkom) refers to the EFTA Surveillance Authority's (the Authority) request for information dated 20 November 2018 regarding issues related to Nkom's notification of the draft decisions in Markets 3a, 3b and 4.

In the following, Nkom will provide information and explanations on the issues raised by the Authority in its request. Please note that the figure in Annex 1 to this letter is confidential in accordance with EEA and national law on business confidentiality.

Yours sincerely

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Electronically approved. No signature required.

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Markets 3a and 3b

1. In general, we notice that obligations you propose in markets 3a and 3b vary depending on the access type. For the sake of completeness, please provide a short summary form/table indicating remedies you intend to impose on each of the products in both markets.

Nkom: The table below gives an overview of the remedies Nkom intends to impose for each of the access obligations in Market 3a and Market 3b.

	Access Obligation	Non-disc.	Trans-parency	Price regulation	Accounting separation
Market 3a	LLU	Yes	Yes	Modelled costs (LRIC)	No
	SLU	Yes	Yes	Modelled costs (LRIC)	No
	VULA Copper	Yes	Yes	MS test (if Telenor upgrades the copper network)	No
	LLU Fibre (P2P)	Yes	Yes	No	Yes
	VULA Fibre (GPON)	Yes	Yes	MS test	Yes
	Homes Passed	Yes	Yes	The establishment fee must not exceed Telenor's fee for its own customers	No
	Backhaul	Yes	Yes	Cost orientation	No
	Co-location	Yes	Yes	Cost orientation	No
	Passive infrastructure	Yes	Yes	Cost orientation	No
	Information and support systems	Yes	Yes	Cost orientation, except for VULA products where prices are included in MS test	No
	Duty to have SLA's & SLG's	Yes	Yes	N/A	N/A

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Market 3b	Broadband access	Yes	Yes	Modelled costs (LRIC)	No
	VUA copper	Yes	Yes	MS test (if Telenor upgrade the copper network)	No
	VUA Fibre	Yes	Yes	MS test	Yes
	Backhaul-/transportation services	Yes	Yes	Cost orientation	No
	Co-location	Yes	Yes	Cost orientation	No
	Information and support systems	Yes	Yes	Cost orientation, except for VULA products where prices are included in MS test	No
	Duty to have SLA's & SLG's	Yes	Yes	N/A	N/A

2. NKOM refers to initial plans of Telenor to upgrade the copper network. However, it notes that any such upgrades may be less widespread than initially assumed. Against this background:

    a. Please confirm whether any upgrades of the copper network with exclusionary effect, e.g. via vectoring technology, have been implemented in Telenor's network to date?

<u>Nkom:</u> Nkom confirms that upgrades of the copper network with exclusionary effect have not been implemented in Telenor's network to date.

    b. In the event that Telenor does plan to undertake any copper network upgrades (which would render physical unbundling unviable) during the period covered by this review, please clarify the timeline for Telenor to introduce equivalent wholesale access via VULA Copper and VUA Copper in markets 3a and 3b. In this respect, please confirm:

        i. That the applicable notice period for all such upgrades to the copper network would be six months.

<u>Nkom:</u> Nkom confirms that the applicable notice period for such upgrades would be six months, cf. para 755 and 815 in the Market 3a draft decision and para 574 and 633 in the Market 3b draft decision.

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ii. Precisely when (before/during that notice period) fit-for-purpose VULA Copper and VUA Copper products would be available to access seekers, following relevant consultation processes at national and EEA level.

Nkom: Specifications and prices for the wholesale product which is to fulfil the requirements for VULA and VUA Copper must be ready at the latest at the same time as Telenor notifies changes in the access network which entail the lapse of the access granted, cf. para 286 in the Market 3a draft decision. The product itself must be available to access seekers in time for the product being delivered to the end customer no later than the date physical access lapses. Para 285 in the Market 3a draft decision will be clarified accordingly. Similar provisions will be added to the Market 3b final decision.

As explained in Section 7.2.5.2 in the Market 3a draft decision, the product characteristics of VULA Cu evolved in response to a dialogue between the providers that participated in the Broadband Forum. Furthermore, it is Nkom's assessment that the negotiated product will be sufficient to fulfil the obligation to offer local, virtual access to copper-based access network in Market 3a, cf. para 248. In light of this, Nkom does not foresee any additional consultation processes concerning this obligation. However, the consultation to take place with regard to a VULA Fibre product in Market 3a, may lead to adjustments also in the product characteristics of the VULA Cu product with regard to traffic prioritization.

Similar, as explained in Section 7.2.3.2 in the Market 3b draft decision, the "contended" version of VULA Cu will fulfil the obligation to offer VUA Copper in Market 3b.

Some of the product characteristics of VULA Cu is discussed in Section 7.2.5.2 in the Market 3a draft decision, e.g. contention in para 243. However, in order to give a complete picture of the product characteristics the providers agreed on in the Broadband Forum, Nkom will consider attaching the draft product specification for VULA Cu as an annex to the final decisions.

c. Would alternative providers be allowed to upgrade the copper network?

Nkom: Yes, but they would not be allowed to upgrade the copper network with exclusionary technology, cf. para 179 in the Market 3a draft decision. This conclusion has been reached after consulting with the access seekers. However, para 210 in the Market 3a draft decision describes the alternative providers' possibilities to upgrade the copper network without the use of exclusionary technology.

3. If Telenor plans to decommission (parts of its existing copper network and replace it with a fibre network in specific areas, please clarify the corresponding timeline for it to introduce equivalent wholesale access via VULA Fibre in market 3a. In this respect, please confirm:

   a. That the applicable notice period for any such decommissioning would be three years;

Nkom: Firstly, it should be noted that Telenor does foresee to some extent to decommission the copper network without replacing it by fibre, fulfilling the USO obligation for voice telephony through mobile services.

The applicable notice period for any such decommissioning would be three years if granted access were lost, cf. para 749 and 815 in the Market 3a draft decision and para 569 and 633 in the Market 3b draft decision. However, if the access buyer is offered a relevant replacement product, a notice period of six months is sufficient, cf. para 755 and 815 in the Market 3a draft decision and para 574 and 633 in the Market 3b draft decision. Nkom can see that there is a need to clarify what a “relevant replacement product” can be in the context of replacing existing copper networks with fibre networks and we will make changes in the final decision accordingly.

Where granted access is lost due to copper accesses being taken out of service because of excessive repair costs, the regular notification periods do not apply. However, a specific obligation to notify has been imposed in Section 7.5.5.3 in the Market 3a and Market 3b draft decisions.

   b. Precisely when (before/during that notice period) a fit-for-purpose VULA Fibre product would be made available to the access seekers, following relevant consultation processes at national and EEA level;

Nkom: As explained Section 7.2.7.4.4 in the Market 3a draft decision, Nkom has concluded there is a need for further industry dialogue in order to determine final requirements for VULA Fibre in Market 3a, in particular with regard to issues related to contention, congestion and traffic priority. This dialogue will start immediately after we have made our decision in Market 3a, and we plan to determine the final requirements for VULA Fibre within the end of first quarter of 2019. The relevant consultation processes will follow immediately after that.

Nkom finds it difficult to answer precisely when the new VULA Fibre product will be available for the access seekers. This will depend on the outcome of the discussions with the industry and Nkom’s decision concerning the final requirements for the product. If the current fibre product from Telenor (called VULA) could be further developed to become a product that fulfils the criteria for virtual local access in Market 3a without making significant changes, this will entail a short development period. A longer development period will however be necessary if there is a need for more significant changes. In any circumstance, Nkom finds it important that VULA Fibre is available for access seekers in Market 3a as soon as possible. Nkom will on this background require that Telenor develop the new product without undue delay, and set deadlines for the completion of the development.

Nkom would also emphasize that Telenor's current fibre access product (VULA) will still be available for access seekers; at least until an enhanced VULA Fibre product becomes available. It should also be noted that the traffic prioritization arrangements for the current VULA product corresponds to the handling of Telenor's own retail traffic. The question to be addressed in the industry discussions is hence whether there is a need for more flexibility in terms of priority handling in the VULA product than for Telenor's own retail product.

c. The extent of any such decommissioning of the copper network in favour of fibre to date.

Nkom: Nkom does not have exact numbers concerning the extent of decommissioning of the copper network in favour of fibre. However, it is our understanding that the extent has been very limited to date.

4. If Telenor plans to decommission (parts of) its existing copper network and replace it with a HFC or LTE network in specific areas, please confirm:

   a. That the applicable notice period for any such decommissioning would be three years;

Nkom: The applicable notice period for any such decommissioning would be three years if granted access were lost, cf. para 749 and 815 in the Market 3a draft decision and para 569 and 633 in the Market 3b draft decision. However, if the access buyer is offered a relevant replacement product, a notice period of six months is sufficient, cf. para 755 and 815 in the Market 3a draft decision and para 574 and 633 in the Market 3b draft decision.

   b. Any access options available to existing access seekers under such circumstances;

Nkom: The access seekers would have limited access options under such circumstances. However, it seems unlikely that Telenor will decommission (parts of) its existing copper network and replace it with an HFC or LTE network to any significant extent. For further details, see Section 7.2.5 in the Market 3b draft decision for HFC and section 7.2.6.2 in the Market 3b draft decision for fixed radio access (including LTE). It can also be noted that the estimated national

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coverage of HFC networks is in decline[1]. In this context, Nkom cannot see that the access seekers' lack of access options in such cases would represent a major potential competition problem.

Notwithstanding our assessment that access to LTE is not part of Markets 3a and 3b, Nkom recalls that Telenor, on the basis of our current regulation in former market 15, is obliged to meet any reasonable request for access to its LTE network.

c. The extent of any such decommissioning of the copper network in favour of HFC or LTE to date.

Nkom: Nkom does not have exact numbers concerning the extent of decommissioning of the copper network in favour of HFC or LTE. However, it is our understanding that the extent has been very limited to date.

5. Can NKOM please clarify the annual uptake of Telenor's VUA Fibre offer in market 3b to date?

Nkom: Telenor's VULA Fibre wholesale product in former Market 5 was introduced to the market in January 2015. The uptake from access buyers at the end of 2015, 2016 and 2017 were 5547, 6765 and 9515 accesses respectively. At the end of 1st half of 2018 the uptake from the access buyers was 11 417 accesses.

6. NKOM proposes to include HFC networks in market 3b on the basis that an offer of wholesale access at a centralised level on the HFC network would be substitutable with wholesale access in copper or fibre networks (para 214 of the draft market analysis). At the same time, NKOM notes (in para 213 of the draft decision) that any wholesale access to Telenor's HFC network would entail a need to upgrade the network with associated investments for Telenor and that it is not proportionate to impose an access obligation on Telenor's HFC network at this time. Against this background:

    a. How does NKOM anticipate that constraints from HFC would be sufficiently effective during the forthcoming market review period to justify inclusion in market 3b if there are technical challenges in making such wholesale access available in Telenor's network?

[1] *See figure 12 in the Broadband Coverage report 2018*

Nkom: As described in Section 7.2.5 in the Market 3b draft decision, Nkom believes that there are some technical challenges in making wholesale access available in Telenor's HFC network. The challenges are mainly related to providing TV services, and the lack of capacity required for this, cf. para 196 and 197 in the Market 3b draft decision. Telenor's HFC network is not currently dimensioned to deliver TV via the Internet access. However, Nkom's conclusion that it is not proportional to impose an access obligation for Telenor's HFC network in Market 3b is not based on that fact alone. The number of HFC accesses that would be available are relatively limited and Nkom expects this number to decrease further in the years ahead. At the end of 2017, Telenor delivered broadband via their own HFC networks to around 114,000 customers. This represents around 18 percent of the HFC customers and around 5 percent of the total number of fixed broadband customers in Norway at that time. The vast majority of these customers are also covered by other access technologies.

Even though there are some technical challenges in making wholesale access available in Telenor's HFC network, Nkom still believes, as stated in paragraph 214 and 215 in the draft market analysis, that it is both technically and commercially possible to offer HFC access in Market 3b, although such access is currently not offered. Telenor is no longer the largest provider of internet access via HFC networks in Norway. Get provided internet access via their own HFC network and networks owned by housing associations to around 46 % of the total HFC customers in Norway by the end of the second half of 2018. Get has announced that they will update the HFC network with DOCSIS 3.1 in the autumn of 2018, which will increase the capacity in the network significantly. Telia has purchased Get this summer and this may have impact on Get's strategy regarding wholesale products in their HFC network. In Nkom's view there is a potential to viably offer HFC-based access in Market 3b. Nkom further believes that such access would constitute a substitute to other access forms included in this market. Based on this, we are of the opinion that there is sufficient basis to include HFC-based access in Market 3b based on direct effects.

b. Would NKOM consider re-visiting its non-imposition of an access obligation on the HFC network if Telenor were to de-commission (parts of) its copper network in favour of HFC?

Nkom: Yes, Nkom would consider re-visiting its non-imposition of an access obligation on the HFC network if Telenor were to de-commission (parts of) its copper network in favour of HFC. However, Nkom believes that it is highly unlikely that Telenor will deploy new HFC to replace existing copper accesses. It is more likely that copper accesses might be decommissioned in areas where they constitute an infrastructure in parallel with an HFC network. At a meeting with Nkom on 24. April 2018, Telenor expressed that the company has focus on building fibre all the way to the end users, cf. para 198 in the Market 3a draft decision. Telenor also stated that they no longer are building any new HFC-networks. Nkom would also point out that the Coverage Report for 2018 shows that many new fibre networks are built in areas with existing HFC networks, either as replacements for or supplements to the HFC networks.

7. In addition to the retail price comparison undertaken as part of NKOM's assessment of the geographic scope of markets 3a and 3b, can NKOM please confirm if there has been any geographic variation in the wholesale prices applied by Telenor in markets 3a and 3b since the previous market review.

Nkom: There has been no geographic variations in the wholesale prices applied by Telenor in former Markets 4 and 5 since the previous market review. Telenor has offered the same prices in every part of Norway. Nkom will include this information in the Market analysis.

8. We notice that NKOM intends to impose a non-discrimination obligation in the form of equivalence of outputs (EOO) in both markets. In its Recommendation on consistent non-discrimination obligations and costing methodologies, the Commission considers that equivalence of inputs (EoI) is, in principle, the surest way to achieve effective protection from discrimination as it is better equipped to deliver transparency and address the problem of information asymmetries. The NRA may impose an obligation to provide regulated wholesale inputs on an EOO basis, if EOI basis is disproportionate. In this regard, please provide a detailed explanation of the costs and technical complexity issues that justify your proportionality analysis and the choice of EOO.

Nkom: In May 2017, Nkom requested a complete overview of Telenor's systems and routines in connection with ordering, delivery and O&M for copper- and fibre-based access products. Furthermore, Nkom requested a specification of which systems are the same and which systems differ for Telenor's end-user business and access buyers. Nkom also requested a statement of possible planned changes in relevant information and support systems.

The received documentation showed that Telenor's end-user business and access buyers have access to the same information via the same information lines, through different channels/interfaces, cf. Annex 1.

An important difference between Telenor's end-user business and the access buyers proved to be the functionality of the channels/interfaces. Telenor's channels/interfaces has for example more fault handling functionality and are more automated. In the Market 3a draft decision para 669-670 and Market 3b draft decision para 489-490, Nkom therefore made it clear that Telenor must offer wholesale products to external access buyers with the same price, functionality and conditions as apply to Telenor’s internal retail operations. The draft decisions also state that

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system access, delivery, fault correction and migration are examples of aspects where there must be no discrimination between Telenor and external buyers of access.

As a further precaution to avoid that the different interfaces lead to a discrimination between internal retail operation and wholesale customers, Nkom has proposed to carry on the obligation on Telenor to report on core KPI's related to delivery and O&M, cf. Market 3a draft decision para 814 and Market 3b draft decision para 632[2].

Telenor worked for several years to gather more of its IT services on a common platform (STAR project). This work became very complicated and costly, and the project was finally terminated in 2016. According to Telenor, a requirement of non-discrimination based on EoI, will require a very comprehensive reorganization of the systems. Based on experience from the STAR project, Telenor expressed that is difficult to make a reliable cost estimate of such a reorganization of the systems.

While no quantified cost estimate for a full EoI solution has been prepared by Telenor, estimates are available from other markets: An estimate prepared in Austria indicated a cost level in the range of 50 million Euros[3]. In light of the high level of uncertainty of any such estimate and the regular reporting of critical KPI's, see above, investments in this range do not seem proportionate.

Since future technology and/or structural changes in Telenor's access network might have an impact on access and other conditions that are regulated, Nkom has imposed on Telenor a requirement to notify Nkom as early as possible on any major technology changes, cf. Market 3a draft decision para 670 and Market 3b draft decision para 490. Nkom will consider to clarify in the final decision that this obligation also covers major IT projects of relevance to Markets 3a and 3b.

9. In your market analysis you provide a summary of complaints filed by operators and explain the timeframe and outcome. We notice that, on average, it takes a year or more before a claim is settled. In this regard, do you envisage any changes to complaint procedures, which would lead to quicker outcomes?

Nkom: Nkom established an external complaint handling procedure in the middle of 2016 and revised its corresponding internal procedure at the end of 2016. Thus, the current procedures

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[2] *The KPI publication based on the current decisions are available on* https://www.telenorwholesale.no/aktuelt/statistikk/

[3] *Cf. section 2.5.2.2 of Decision M 1.5/15-115 by TKK:* https://www.rtr.at/de/tk/M_1_5_15

did not apply to the complaints described in the notified market analysis. In Nkom's view the procedures has contributed to a more efficient complaint handling procedure. The potential need to take measures with regards to settle complaints speedily, is something we are watching closely. However, at present we do not foresee to make any further changes to the complaint handling procedure.

10. Could you please elaborate on the methodology you use to calculate WACC? In particular, we would be interested in:
    a. How you establish the following parameters: (i) risk free rate, (i) equity risk premium, (iii) beta, (iv) cost of debt and (v) gearing;

Nkom: Nkom uses one specific WACC for fixed networks and one for mobile networks. The Norwegian professor Thore Johnsen has calculated both on behalf of Nkom. Prof Johnsen is an expert in valuation and risk management. He has been a professor at the leading business school in Norway (NHH) since 1980. Prof Johnsen has calculated WACC for mobile and fixed networks for Nkom since 2005. All the reports made by him are public and available from Nkom's website[4]. The reports are available in Norwegian only. The WACC calculations are updated approximately every third year. The CAP-M formula is used for the WACC calculation, and all the parameters represents normal, long-term capital market conditions. The latest WACC assessment for fixed networks is from 30 August 2017. The nominal pre-tax WACC was then calculated to be 8.3%.

(i) Risk free rate:
The nominal risk free rate post tax in the latest WACC calculation for fixed networks was 3.5%. When deciding the level of the risk free rate Prof Johnsen has looked to the domestic bond with a 10 years bond length. However, the risk free rate is not calculated directly from government bond rates. The rate is set on an expected long-term normal level. The risk free rate is the sum of the real interest rate and expected normal inflation. Expected normal inflation in Norway is 2.5%, which was the target for annual inflation set by the central bank of Norway at that time. The real interest rate has been set to 1%. The low real interest rate reflects the fall in Norwegian and international real interest rates and an assumption of sustained low real interest rates.

(ii) Equity risk premium:
The equity risk premium in the latest WACC calculation for fixed networks was 5.5%. The equity risk premium is based on historical arithmetic average excess return for stocks in a number of

[4] *The latest report for fixed networks is*
«Kapitalkostnad for norsk telekom fastnettvirksomhet - januar 2017. revidert august 2017»

European countries and USA. Information from Dimson, Marsh and Staunton is used. The equity risk premium reflects the required long-term expected normal premium for a professional, internationally diversified investor.

(iii) Beta:
The asset beta in the latest WACC calculation for fixed networks was 0.5. Prof. Johnsen has estimated this number based on international beta estimates for 14 listed European telecom companies.

(iv) Cost of debt:
The cost of debt is the sum of a risk free rate and a debt premium. The debt premium in the latest WACC calculation for fixed networks was 1.5%. The debt premium is measured as the difference between effective interest rates on 10 years bonds for a telecom operator and government bonds in the same currency and with the same length. Prof Johnsen has estimated the debt premium based on the observed debt premium for both Telenor and Telia. The estimated debt premium is in accordance with the debt premium for companies with a BBB credit rating in the American bond market and the median debt premium for European regulated fixed network operators.

(v) Gearing:
The gearing used in the latest WACC calculation for fixed networks was 40%. This percentage is based on the observed debt ratio for Telenor and Telia.

b. Any difference in the WACC value and calculation method currently applied compared to your previous decision?

Nkom: Prof Johnsen has applied the same method to calculate the current WACC as for the WACC used in previous decisions. The previous WACC calculation for fixed networks was from December 2013. The result of the calculation was 8.9% nominal pre-tax. The following table shows the parameters that has been adjusted from December 2013 to August 2017.

Parameter	**August 2017**	**December 2013**
Risk free rate	3.5%	4.5%
Equity risk premium	5.5%	4.5%
Asset beta	0.50	0.45

11. As regards the margin squeeze test for VUA Fibre in market 3b, please explain:

a. How the portfolio of flagship products, combined with the gross margin test for standalone fibre products, will address the relevant competition problems identified and be proportionate and justified?

Nkom: The portfolio in the MS test for VUA Fibre in Market 3b consists of the most commercially attractive products based on revenue (flagship products). The flagship products can be single, double and/or triple play products, and cover at least 70% of the total product market. Telenor has flexibility to adjust the wholesale prices in the portfolio, as long as the portfolio and the gross margin for individual products are at least zero.

Nkom is of the opinion that this regulation is suitable to balance the consideration of giving incentives for investments in high-capacity broadband and the consideration of ensuring competition for services, for the benefit of the end users.

b. How NKOM plans to verify discounts from the retail prices (listing rates) as referred to in Principle 5 of Annex 3 to the market 3b notification, e.g. via reporting of net revenues?

Nkom: Telenor reports to Nkom all kinds of retail promotions and discounts that has been offered for the last 12 months, for the identified flagship products. The reported information includes the value of each promotion, and the number of customers that have received the promotion for the last 12 months. This information is taken into account when Nkom conducts the margin squeeze test.

c. NKOM's approach in case one of the products fails the test, e.g. will Telenor always be required to adjust the wholesale price?

Nkom: To pass the MS test, the portfolio as a whole and the gross margin on individual products must be at least zero. If the margin squeeze tests are not passed, i.e. they do not give a result of at least zero, Nkom will normally impose on Telenor, pursuant to the Electronic Communications Act, Section 10-6, to correct the company's wholesale prices for access in this market to a level that Nkom based on the margin squeeze tests considers to provide economic replicability, cf. Market 3b draft decision para 378.

Telenor has the flexibility to choose which wholesale prices to adjust in order to reduce the total wholesale costs, as long as the requirements on the portfolio as a whole and the gross margin on individual products are fulfilled.

Nkom believes that allowing Telenor to increase its retail prices to remedy an ascertained margin squeeze would normally not be a sufficiently good option, compared to requiring Telenor to reduce its wholesale prices for central access in Telenor's fibre-based access network, cf. Market 3b draft decision para 376.

12. As no price regulation is proposed for physical access to fibre in market 3a, would NKOM consider revisiting this proposal in the forthcoming regulatory period if there is any material change in the number of point-to-point fibre accesses available in Telenor's network (e.g. if increased through acquisition or if existing accesses are not converted to GPON as envisaged)?

Nkom: The main reasoning in Nkom's draft decision for not imposing price regulation for physical access to Telenor's fibre network is that the number of Telenor's point-to-point fibre accesses is very limited[5]. Given the limited potential for physical access, it is our assessment that it is not proportionate to impose price regulation. If the basis for this assessment should change, i.e. if the number of point-to-point fibre accesses should increase and become a more substantial part of Telenor's fibre network, Nkom will reassess the conclusion not to impose price regulation. However, Nkom has so far no indications that Telenor will change its current practice, which is to convert the network to GPON within a few years after acquisitions of point-to-point networks, cf. para 536 in the Market 3a draft decision.

Market 4

13. As NKOM's last decision for market 6/2008 was adopted in April 2012, can NKOM please elaborate on the reasons for the delay in conducting an updated analysis of this market?

Nkom: The European Commission adopted a revised Recommendation on relevant markets on 9 October 2014. ESA adopted a similar Recommendation on 11 May 2016. The revised Recommendation contains new market definitions which have implications on former market 6.

The new Market 4 corresponds to former market 6, but could also, according to the revised recommendation, include a wider range of access products necessary to fulfil the needs of business service providers, possibly also products that were included in former market 5. Due to the close connection between Markets 3a, 3b and 4, Nkom has considered it most appropriate to analyse Market 3a, 3b and 4 within the same process, thus making sure that the delimitation of the three markets is consistent. This implied a delay in conducting an updated analysis of former market 6.

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[5] *Nkom receives data on available point-to-point fibre accesses every six months, in connection with the data collection for the MS test.*

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14. Please confirm that the wholesale market share figures presented for alternative providers include revenues for capacity products and data communications services generated entirely on the alternative providers' own infrastructure?

Nkom: The market share figures for both the retail market and the wholesale market are based on revenues reported to Nkom for the regular statistics reports.

The revenues reported for the retail market are generated from services produced on the basis of

- regulated and unregulated wholesale products from Telenor,
- unregulated wholesale products from Broadnet and other alternative providers,
- operator’s own infrastructure, and
- combinations of own infrastructure and wholesale products.

The market share figures for the wholesale market are essentially based on revenue from services produced on own infrastructure.

The regulated products from Telenor could be LLU, Bitstream access, and leased lines with speeds 8 Mbit/s and lower. Leased lines above 8 Mbit/s, wavelengths and dark fibre have not been regulated in Norway after 2012.

15. NKOM notes that alternative access infrastructure is still very fragmented and Telenor is still the only provider in the Norwegian market with infrastructure that enables high-quality access solutions to be offered across the entire country to companies with geographically spread locations. Against this background, can NKOM please clarify:

    a. The extent to which alternative providers will still depend on purchasing wholesale terminating segments of leased lines from Telenor post deregulation;

Nkom: Alternative providers are expected still to purchase wholesale terminating segments of leased lines from Telenor post deregulation. However, according to figures 1 and 2 below, the number of wholesale lines in the lower speed category and the corresponding revenues are declining.

Figure 1 below describes the development in wholesale revenues for leased lines, dark fibre and wavelengths.

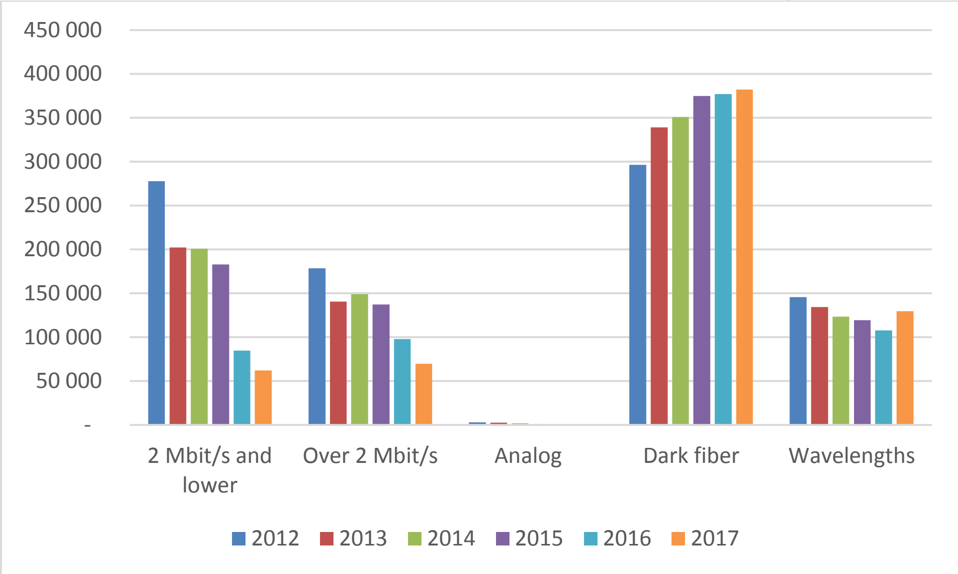

Figure 1. Revenues from wholesale of leased lines, dark fibre and wavelengths, 2012 - 2017.

Figure 2 below describes the development in number of wholesale leased lines, dark fibre and wavelengths.

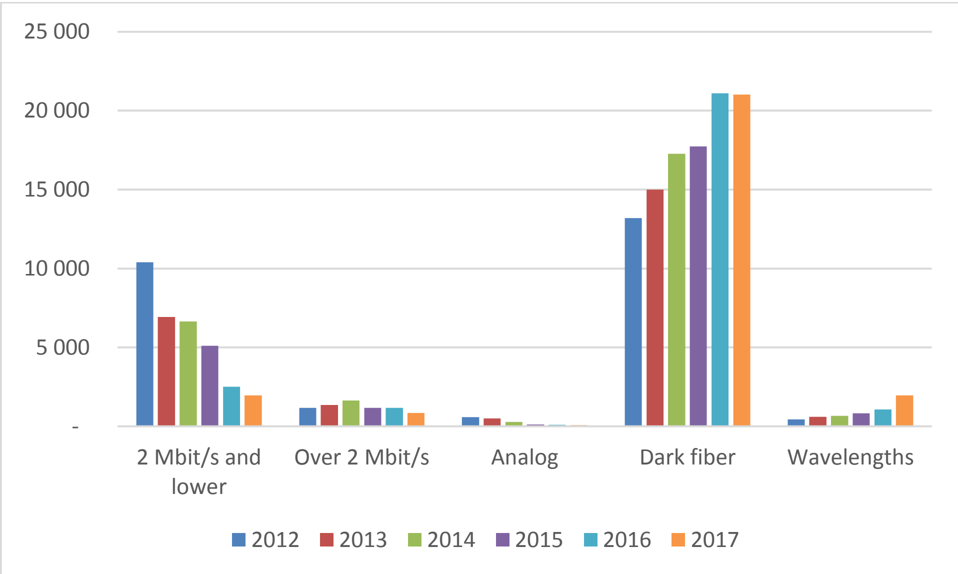

Figure 2. Number of wholesale leased lines, dark fibre and wavelengths.

The data communication services, mainly IP-VPN and Ethernet VPN, are produced on both broadband accesses (both copper and fibre, but also mobile access) and capacity services. VPN services are increasingly substituting leased lines services.

There are different kinds of alternative providers in the end user market. Some operators essentially use their own infrastructure, some operators combine use of own infrastructure and wholesale services from Telenor, Broadnet and other operators, and some operators mainly use wholesale services from other operators.

The two largest system integrators, Evry and Atea, essentially depend on wholesale services from Telenor, Broadnet, TDC and others. Which operator they choose to buy from will vary from case to case, depending on which of the wholesale operators that is able to give the best offer, e.g. on price, QoS, demands and specifications from the relevant end customer, or geographic location.

There is a strong expansion in fibre networks from local/regional operators. This development represents actual and potential competition and gives an alternative to regulated and non-regulated services from Telenor. There are also different kinds of co-operation between these operators which means that they are able to offer alternatives to Telenor in more locations than before.

b. Telenor's incentives for continuing to provide effective wholesale access to terminating segments of leased lines post-deregulation; and

Nkom: The development in actual and potential competition from Broadnet, TDC and local/regional operators means that Telenor will have incentives to provide effective wholesale access to terminating segments of leased lines post deregulation.

There is substitution between the regulated services up to 8 Mbit/s and higher speeds, cf. para 119 in the Market 4 analysis. Lower speeds will to some extent be disciplined by higher speeds. Nkom also expects, on the basis of the recent market developments, that there will be more demand for higher speeds and also more demand for dark fibre and wavelengths, at the expense of lower speed leased lines. As mentioned earlier, leased lines are also increasingly substituted by VPN services.

c. Whether any remedies foreseen in markets 3a and 3b may help to mitigate possible concerns arising in market 4 due to the more geographically fragmented nature of the alternative providers' networks?

Nkom: Telenor will still be regulated in Market 3a and 3b. This means that LLU and Bitstream access still will be subject to regulation. These services could in many cases help alternative operators to complement their services, and thereby help to mitigate possible concerns due to the more geographically fragmented nature of alternative operators’ networks.

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As mentioned above Nkom emphasizes real and potential competition from local/regional operators as a consequence of extensive fibre deployment and initiatives to connect these local/regional fibre networks.