PÓST- OG FJARSKIPTASTOFNUN

Draft Decision

Review of the Míla wholesale tariff for bitstream access (Market 5/2008)

27 April 2017

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1 Introduction

Míla ehf. (Míla) tariff for bitstream access here under discussion is based on the obligations imposed on the company with the Decision of the Post and Telecom Administration (PTA) no. 21/2014 dated 13 August 2014.

The products covered by the Mila tariff belong to the wholesale market for bitstream access which is Market 5 pursuant to the EFTA Surveillance Authority (ESA) Recommendation from 2008[1] (Market 5/2008).

The PTA Preliminary Draft Decision on the Mila wholesale tariff for bitstream access was published for national consultation on 14 December 2016 and the consultation ran until 13 January 2017. This preliminary draft decision was based on Míla's initial cost analysis as updated in a cost model submitted by Mila on 2 December 2016. Comments were received from Síminn hf. and Snerpa ehf. and were sent to Míla for review. The comments received as well as Mila's response to the comments and the position of the PTA are stated in Appendix II.

Concurrent to the PTA review of cost analysis on market 5/2008, PTA has been reviewing Mila proposed tariffs based on cost analysis for terminating segments of leased lines (market 6/2008) and local loop access (market 4/2008). Because of the interdependence of these tariffs it is necessary that they enter into force at the same time. The PTA will therefore publish the Decisions on the review of these tariffs at the same time.

PTA has examined the cost models and Mila's tariff structures in these three markets (4/2008, 5/2008 and 6/2008). Furthermore, stakeholders have had an opportunity to comment on the methodologies used to calculate the prices and the tariff structures. However, as the cost models used costing information from 2014 the PTA requested that Mila would upgrade the cost models in these markets with costing data from the 2016 financial year.

In accordance with the PTA request, Mila submitted an updated cost model for bitstream service on 22 March 2017, which is based on 2016 cost data. The calculated price for bitstream access is based on operating expenses (opex) for the year 2016. Capital expenditure (capex) in the model is based on replacement cost for the year 2016.

The result of Mila's cost model in accordance with the update with 2016 data is shown in Mila draft tariff in Appendix I.

The PTA revised the draft decision in accordance with the update of the cost model with 2016 data and that draft decision was submitted for an additional national consultation which lasted from 31 March 2017 until 19 April 2017. Comments were received from Snerpa ehf., the comments as well as the position of the PTA are stated in Appendix II

The following Sections cover the legal grounds, methodology and calculations that led to the PTA conclusion. The text of the Draft Decision describes the planned PTA position which can be subject to amendment until the final Decision is made, among other things as a result of comments from stakeholders. The wording of the Draft should be read with this in mind.

[1]ESA has now issued a new Recommendation on wholesale market definition for electronic communications services: EFTA Surveillance Authority Recommendation of 11 May 2016 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with the Act referred to at point 5cl of Annex XI to the EEA Agreement (*Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communication networks and services).*

1.1 PTA Decision no. 21/2014

With the PTA Decision no. 21/2014, dated 13 August 2014, the PTA designated Mila as a company with significant market power on the market for wholesale network infrastructure access at a fixed location (Market 4/2008) and on the market for wholesale broadband access (Market 5/2008).

With the authority in Article 32 of the Electronic Communications Act the PTA imposed an obligation on Míla for price control for bitstream access with DSL technology (such as VDSL and ADSL standards). Míla was to submit to the Administration for endorsement its wholesale tariff for access to bitstream at various locations on the network in accordance with specified Access Options, where variations in bandwidth and quality are also taken into consideration.

In the Decision it was stated that Mila should furthermore submit to the Administration for endorsement a wholesale tariff for hosting equipment of other electronic communications companies and for access to other facilities related to bitstream and access to support systems and information necessary for a customer to be able to utilise bitstream. It was to be ensured in each instance that the tariff included all the wholesale bitstream service on offer from Mila to its own retail departments or to related companies, including multicast that enables IPTV service and the technology that enables VoIP service. Furthermore Mila is obliged to review the product offer in its tariff in step with market requirements at any given time and if reasonable requests are received in accordance with the access obligation. Míla shall publish its wholesale tariff and conditions for all its DSL bitstream services provided through copper local loops. All additions and amendments to the tariff shall be endorsed in advance by the PTA and do not come into force until such an endorsement has been provided.

In the Mila cost analysis, when pricing varying services, an assessment of cost shall be made on the share of Internet service, telephone service (VoIP) and the distribution of visual content (IPTV/VoD) in the use of Mila's bitstream system. This shall be done based on the number and size of connections, traffic volume and varying requirements for priority and quality control (Quality of Service (QoS)) in Mila's systems.

Míla shall prepare a special tariff for priority and quality controlled access for transmission of visual content using multicast technology (IPTV) through Mila's DSL systems and for interactive transmissions for video rental (VoD). The same applies to priority and quality controlled transmission of bitstream for IP telephone service (VoIP). The tariff shall relate to Access Options 1-3 to the extent that this is technically possible and in the main shall use the following structure for the tariff.

a) Access that uses a significant bandwidth but without any quality definition (Best Effort) for general Internet service.
b) Access with large bandwidth with high quality requirements (QoS) for IP television distribution (IPTV) with multicast technology.
c) Access to large bandwidth with high quality requirements (QoS) for IP video rental (VoD) with interactive bitstream transmission.
d) Access that uses little bandwidth but makes high-quality requirements for IP fixed telephony service (VoIP).

The above delivery of bitstream through copper local loops (DSL technology) with varying quality control and performance shall be on offer at different locations on the network in accordance with the Access Options 1-3 in the following manner:

1. In DSLAM or equivalent equipment at the place where the copper local loops connect to the telephone exchange distribution frame, street cabinet or other equipment space. (option 1)
2. By ATM/IP transmission in the Míla backbone network, i.e. Mila handles the transition of signals from DSLAM to the connection point of another electronic communications company with the ATM/IP trunk line network. (option 2)
3. After transmission with ATM/IP on the Míla trunk line network to the connection point of another electronic communications company with the previously mentioned network. (option 3)

In those street cabinets, where Mila has exercised exemption from obligation to provide access to the sub loop, Mila shall offer virtual unbundled local access to the sub loop (VULA).

In accordance with article 32 of the Electronic Communications Act the tariff for the DSL bitstream services in question shall be cost-oriented.

The arrangement for wholesale switches which came into force with Decision 30/2002 on Access Option 1, i.e. that the cost of wholesale switches was paid directly by the purchaser of the Access Option, was changed. Should Mila make the decision to continue to use wholesale switches then this cost should be calculated into the traditional access price.

When implementing its cost analysis Míla shall base its methodology on Chapter IV of Regulation no. 564/2011 on bookkeeping and cost analysis in the operations of electronic communications companies, such as on evaluation of operational assets, lifetime and WACC. Furthermore, account shall be taken of the PTA position on criteria and calculations in the Administration's Decision no. 7/2010 with respect to cost analysis for bitstream access. Account shall be taken of the PTA instructions on varying Access Options and to varying bandwidths and quality control.

The Míla cost analysis for bitstream access with DSL technology shall be based on the following main criteria:

- Cost analysis shall cover access with DSL technology (i.e. ADSL and VDSL standards), given Access Options 1-3. The cost for virtual network access to sub-loops (VULA) with the VDSL technology shall also be calculated.
- Basic price for bitstream services for general Internet service best effort without endpoint equipment shall be shown and the price for quality controlled (QoS) bitstream access, i.e. the transmission of TV material with multicast, video rental material (unicast) and IP telephone service (VoIP).
- In addition to the above the Míla tariff shall contain as a minimum the price for all bitstream services and for connections provided today to its own service departments or to other related parties or parties cooperating with Míla and to other electronic communications companies.
- The cost base shall be Míla historic costs (HCA) based on the preceding financial year in each instance.
- The methodology shall be based on allocating all costs to the service in question (FAC).
- Allocation of costs is based on separation of accountancy for wholesale bitstream service, on Míla asset bookkeeping and on costs from the company's bookkeeping system where opex is entered by bookkeeping account.

- The Operating expenses (OPEX) of the bitstream system shall be captured, including the share in indirect costs, i.e. management and IT in accordance with separation of accountancy.
- When assessing investments (CAPEX) the replacement cost of the operational assets shall be used taking into account the next generation of access networks (NGA).

- When evaluating the cost of the Access network, account shall be taken of the share in installation, investment and opex of wholesale switches.
- Evaluation of the lifetime of operational assets shall reflect their economical lifetime.
- The annuity method shall be used to calculate annual costs for operational assets. It is authorised to use the tilted annuity depreciation method based on an estimate of gross replacement cost (GRC) of the bitstream system. The cost of the total number of connections and bandwidth is calculated.
- The required rate of return used shall be based on weighted average cost of capital[2] (WACC real) from capital tied in assets used in connection with provision of service where the risk premium reflects the risk related to operations on the relevant market.
- It is authorised to assume a working capital cycle of 30 days to assure normal operations.
- The average unit cost for individual bitstream access service is calculated as an average cost for the whole country on the basis of allocated opex and capex having taken into consideration varying Access Options, number of connections, bandwidth and their quality management.

When deciding the tariff Míla should base its decisions on the above specified main criteria in its cost analysis and shall submit this to the PTA no later than 6 months after the publication of PTA Decision no. 21/2014. The tariff should then be reviewed annually in accordance with annual updating of the cost analysis. A new wholesale tariff for bitstream access would not come into force prior to endorsement by the PTA, subsequent to national consultation and consultation with ESA in each instance.

The existing Mila wholesale tariff for bitstream access should remain in force until the reviewed tariff is available and has been endorsed by the PTA.

1.2 Mila tariff

The existing Mila tariff for the bitstream market is based on the following PTA decisions:

- Decision no. 18/2015 with respect to prices and conditions for ADSL+ and SHDSL+ connections on Access Option 1, dated 14 July 2015.
- Decision no. 41/2014 with respect to prices and conditions for VDSL+ business connections and domains and ports for interconnection, dated 3 December 2014.
- Decision no. 17/2014 respect to cost analysis for bitstream access. According to Access Options 1 and 3, dated 23 July 2014.

The following prices now apply for Mila bitstream service and will apply until a new tariff according to this Decision enters into force:

[2] In accordance with Article 16 of Regulation no. 564/2011 the PTA decides on an annual basis weighted average cost of capital (WACC) which electronic communications companies should use as a reference in their calculations.

Access Option 1

Connection (upper frequency range of local loop)	Monthly price per unit
ADSL/VDSL access network per user (EUDP)	ISK 912

Multicast, Access Option 1	Monthly price for 1 Mb/s
Dedicated bandwidth (Mb/s) for multicast x number of IP-DSLAM[3]	ISK 13.63

VoIP, Access Option 1	Monthly price per unit
VoIP activity# per end user (EUDP)	ISK 55.85

Access Option 3

Connection (upper frequency range of local loop)	Monthly price per unit
ADSL/VDSL access network per user (EUDP)	ISK 1,367

The above specified tariff for Access Options 1 and 3 is where the upper range of the local loop is used for bitstream access and the lower frequency range of the local loop is also being leased.[4]

If the lower frequency range is however not being leased then the counterparty shall pay ISK 1,042 for the lower frequency range in addition to the above specified price.

Mila also collects a setup charge[5] for local loops with new connections and for changes from ADSL to VDSL in Access Options 1 and 3. The existing setup charge for local loops is ISK 3,166 in the Míla tariff. The price for taking over xDSL service (change of service provider) is ISK 1,329.

Access to wholesale switch

Setup charge for Access Option 1	ISK 93,000

The setup charge is composed of costs for setup and connection of the first port in each wholesale switch for Access Option 1. The setup charge for each port in excess of the first port is collected as per the Mila tariff for billed hours and service.

The charge for the cost of setup and connection of ports which are used for services other than Access Option 1 are collected as per the Mila tariff for billed hours and service.

[3] Calculations of dedicated bandwidth is based on number of set-top boxes.

[4]When access to the copper local loop is divided between two different electronic communications companies then the party which has access to the upper frequency range of the local loop shall pay (ISK 344) for shared access while the party who has access to the lower frequency range pays (ISK 1,042), i.e. the fee for fully unbundled access with the fee for shared access subtracted. Where only the upper frequency range is used ("naked DSL") then payment is the same as for fully unbundled access (ISK 1,386).

[5]Should a customer order ADSL through VDSL compatible equipment and furthermore notifies that he wishes to alter the service to VDSL within 60 days then a setup charge will not be collected for the change.

Monthly charge

Port	Monthly charge per port
1 Gb/s	9,289
10 Gb/s	14,862

Business connections:

Monthly charge		
Service	**Access Option 1**	**Access Option 3**
VDSL+	ISK 2,424	ISK 5,420
ADSL+		
2 Mb/s	ISK 2,416	ISK 3,016
4 Mb/s	ISK 2,868	ISK 3,680
8 Mb/s	ISK 3,440	ISK 4,562
14 Mb/s	ISK 3,550	ISK 4,672
SDHSL+		
2 Mb/s	ISK 3,978	ISK 4,671
4 Mb/s	ISK 6,134	ISK 7,114
5 Mb/s	ISK 6,272	ISK 7,614
10 Mb/s	ISK 9,651	ISK 11,200
15 Mb/s	ISK 11,590	ISK 13,487
20 Mb/s	ISK 14,510	ISK 16,701
Setup charge	ISK 3,166	ISK 3,166

Domains and for interconnection:

Setup charges	
Setting up of the first domain	ISK 114,173
Setting up of additional domain	ISK 28,543

Monthly charge	
Port up to 1 GB/s	ISK 9,986
Port 10 Gb/s	ISK 59,921

1.3 Written communications with Mila

With an email dated **5 January 2015**, Míla requested a postponement on delivery of cost analysis of Markets 4/2008, 5/2008 and 6/2008. This would enable the company to update the

model with bookkeeping information from 2014. The PTA accepted the Mila request for postponement.

On **3 February 2015**, Mila submitted a description of its cost accounting along with a report from an independent auditor in accordance with the PTA Decision on Markets 4, 5 and 6.

With an email dated **21 April 2015**, Míla requested a postponement on delivery of cost analysis of Markets 5/2008 until the end of June. On the same day, the PTA accepted Mila's request for postponement. **On 19 May 2015**, the PTA extended the notice until 31 August 2015.

On **31 August 2015**. Mila submitted a cost analysis for xDSL bitstream access on Access Options 1 and 3, including ADSL+, VDSL+ and G.SHDSL and in addition to this an analysis of multicast, unicast and IP telephone service on Access Option 1. Mila considered there to be no reason to review prices for domains and ports for interconnection for the time being and referred to the PTA Decision no. 41/2014 dated 23 December 2014 with respect to prices and conditions for that service. The Mila cost analysis is covered in more detail in the sections here below. It was stated in the Mila submission that the company was considering the introduction of bonding and requested a meeting with the Administration on that issue, as if this was implemented then it would affect the cost analysis of Markets 4/2008 and 5/2008.

On **14 September 2015** Mila submitted a revised version of the cost analysis.

On **17 September 2015** Mila and the PTA held a meeting on the of the impact on the Mila tariff of Mila implementing bonding in its DSL system.

In an email from Mila dated **5 November 2015** it was stated that Mila had abandoned its plans to offer bonding as a separate product.

On **31 May 2016** Mila submitted cost analysis for VULA and Access Option 2.

In a letter from the PTA to Míla dated **24 June 2016**, the Administration requested that Mila review the cost analysis in accordance with the planned conclusion for price for access to copper local loops. In its letter the PTA also commented on capex, division of costs, costs for tied capital and opex.

Mila answered the PTA enquiry in a letter dated **5 September 2016** and submitted a revised cost analysis on 7 September 2016.

In November 2016. Mila and the PTS exchanged several letters. Mila replied to the PTA questions on the Mila tariff for VULA, on the installation of REM equipment, on costs for internal fibre-optic, G.SHDSL tariff, the cost of working capital and the share of TV service in costs. On 2 September 2016, Mila submitted a revised cost analysis, the result of which was published for national consultation on 14 December 2016 that lasted until 13 January 2017.

On **27 February 2017**, PTA requested that Mila updated the cost analysis with cost data from 2016. On 9 March 2017 Mila submitted the updated cost model, which was then corrected on **22 March 2017** and it is on this cost analysis that the following conclusion is based.

2 The PTA conclusion

2.1 General

In Sections 2.2 - 2.11 here below one can find the criteria and conclusions of the PTA Decision on the cost analysis here under discussion. There is discussion on the main aspects that the PTA considers important as criteria for the Administration's position when calculating a tariff for bitstream service. The factors in question are the following:

1. Weighted average cost of capital
2. Opex
3. Investment costs
4. Costs for tied working capital.
5. Number of lines
6. Calculation of lease price

Each sub-section is structured with a description of the Mila cost analysis coming first and then followed by the position of the PTA for each issue. In Section 2.11 the PTA conclusion is then summarised before the wording of the Decision is given.

The position taken by the PTA is based on authority granted to the Administration in the Electronic Communications Act where reference is particularly made to Article 32 on price control and to Article 31 on separation of accountancy and to PTA Decision no. 21/2014.

Mila has submitted a description of the company's cost accounting, along with a report from an independent auditor. Míla has also submitted an analysis of costs for the company's bitstream service, along with further explanations at the request of the PTA. The PTA conclusion is based on Míla cost analysis from 31 August 2015, along with those updates submitted by the company, most recently on last 22 March.

2.2 Weighted average cost of capital

2.2.1 Míla cost analysis

In the Míla cost analysis dated 22 March 2017 the Weighted Average Cost of Capital (WACC) is calculated as shown in the following table:

	2016
Risk-free rate	2.57%
Debt premium.....	3.00%
Cost of debt	*5.57%*
Market premium.....	5.00%
Unlevered beta.....	51.00%
Unlevered beta.....	72.97%
Equity.....	65.00%
Liabilities/Equity.....	53.85%
Other risk (alpha).....	0.00%
Tax rate.....	20.00%
Required rate of return after tax	*6.22%*
Required rate of return pre-tax	*7.77%*
WACC pre-tax	7.00%

2.2.2 The position of the PTA

In Article 16 of Regulation no. 564/2011 on accounting and cost analysis in the operations of electronic communications companies, it is stated that the costs of initial capital tied in assets that are used in connection with the provision of service or service goods shall be calculated. The rate of return shall be based on weighted average cost of capital (WACC) which is calculated from the rate of return requirement on equity and the rate of return requirement on debts in accordance with Regulation no. 564/2011. The CAPM model shall be used when calculating the rate of return on capital assets and the rate shall reflect the time value of money and the risk related to operations on the market in question. The rate of return shall be calculated as the sum of risk-free interest and interest premium which reflects normal mark-up by companies on the market. The PTA shall decide at least once a year the Weighted Average Cost of Capital (WACC) for specific financial markets based on market mark-up, economic indebtedness and the position with respect to working capital and debts.

WACC using the PTA criteria is shown in the table here below:

WACC	*2016*
Risk-free rate	2.57%
Unlevered beta	0.51
Levered beta	0.73
Debts/equity ratio	0.54
Market risk premium	5.00%
Cost of equity	**6.22%**
Risk-free rate	2.57%
Debt premium	3.00%
Cost of debt	**5.57%**
Interest bearing debt %	35%
Equity %	65%
Corporate tax rate	20%
Cost of debt, post-tax	4.46%
Cost of equity, pre-tax	7.77%
WACC (pre-tax)	**7.0%**

In line with the above the PTA proposes that WACC should be 7.0%.

Calculations based on data on comparison companies from the Bloomberg database indicate that the beta value for electronic communications companies lies in the range 0.48-0.52. The PTA decided to use the value 0.51.

The PTA considers it appropriate to set the risk-free interest at the rate of return on HFF 1506 2044 Housing Financing Fund bonds instead of on HFF 1504 2034 as the former bonds today best reflect the payment flow being converted to current value when considering the lifetime.

There has however been uncertainty recently about the future of the Housing Financing Fund and in the opinion of analysts a risk weighting has developed on top of the indexed Housing Financing Fund bonds. This indicates that the rate of return on HHS bond issues no longer reflects risk-free interest on the market. In order to evaluate risk-free interest, the PTA takes into account an adjustment to the amount of estimated "Housing Financing Fund premium" in each instance.

Given the above specified criteria the average risk-free rate for the last 5 years is 2.57%.

In accordance with the above it is the opinion of the PTA that weighted average cost of capital (WACC real) for an electronic communications company in Iceland is 7.0% for the year 2016 in calculations of rate of return for capital tied in assets used in connection with the company's provision of services. Míla raised no objections to this assessment by the PTA and the revised cost analysis takes this into account.

2.3 Access Option 1

2.3.1 Míla cost analysis

In the Mila cost analysis dated 31 August 2015 the following is stated with respect to Access Option 1:

"The Mila cost analysis of Access Option 1 is based on the cost of investment and operations of DSL equipment including Mila wholesale switches and costs for access to local loops. Mila assumes that all costs for operating Mila DSL service (hereafter named 'access system') less costs for transit on the trunk line network belongs to Access Option 1. Estimated income from multicast and unicast and from VoIP is deducted from the cost base as the operation of these service items is included in the cost base for Access Option 1."

2.3.1.1 Opex

Opex in the revised Mila analysis is based mainly on two factors:

- operation of DSL equipment and
- other costs related to operation of Mila DSL service, such as purchase of fibre-optic in street cabinets, access to distribution frames and costs for electricity in street cabinets.

Opex according to the updated analysis of 22 March 2017 is based on 2016 operating expenses.

In the Mila cost analysis dated 31 August 2015 there was also allowance made for costs for leasing the upper frequency range of local loops as in the current Draft Decision on review of the Mila tariff for local loop lease, the local loop charge is no longer divided into upper and lower frequency ranges. This means that the cost for access to local loops is no longer in the operation of the bitstream system, except for those local loops that are used for G.SHDSL service.

Mila calculates costs for local loops which are used in G.SHDSL connections where [...][6] local loops were being used for this Mila service at the end of 2016. Given a local loop price of ISK 1,406/month according to the new Draft Decision on review of the Mila tariff for local loop leasing, the annual costs for local loops are estimated at ISK [...].

Opex for DSL equipment

In the Mila updated cost analysis dated 22 March 2017 is the following table showing an overview of opex for DSL equipment and for comparison the amounts from the last cost analysis of Access Option 1.

[6] Information removed for purposes of confidentiality. The same applies to information provided in square brackets here below.

	2016	2014	2012
DSLAM			
Service agreements.....	[...]	[...]	[...]
Transferred labour and per diem.....	[...]	[...]	[...]
Purchased telecom services.....	[...]	[...]	[...]
Material.....	[...]	[...]	[...]
Office services within Skipti.....	[...]	[...]	[...]
Licence, countervailing and opex costs..	[...]	[...]	[...]
Senior management - and support costs	[...]	[...]	[...]
Rent for premises.....	[...]	[...]	[...]
Electricity costs 48 V.....	[...]	[...]	[...]
Other costs.....	[...]	[...]	[...]
	[...]	[...]	[...]
Underestimated costs			[...]
Service agreements.....			[...]
Operational and countervailing charges.			[...]
48 volt.....			[...]
Hosting, estimated.....			[...]
	[...]	[...]	[...]

Mila stated that opex for DSL equipment is mainly based on costs for the following items:

- Labour for operation of DSL equipment,
- Service agreement and
- Costs for renting facilities.

As can be seen from the table there have been substantial changes in presentation of costs and it seems the costs have increased significantly from the last analysis. A closer examination of 2012 costs indicates however considerable less increase.

Mila states in this context that the cost of licence, countervailing and operating charge in the last cost analysis amounted to just over ISK [...]. This is an operating charge paid to PTA and countervailing charge paid to the universal services compensation fund. These costs do not seem to have been included in the previous analysis, except to a very small degree. Mila's updated analysis shows that these costs are ISK [...] in 2016 and ISK [...] in 2014.

Mila mentioned that senior management costs increases from the previous analysis. It is difficult for Mila to assess whether senior management costs were underestimated in the previous analysis, as Mila does not have access to Siminn financial bookkeeping.

Mila also points out that housing costs increased from the last cost analysis. [...]

Furthermore, Míla also points out that cost use of 48 V electricity was not part of the cost analysis for xDSL service in 2012.

Other costs

In the Mila updated cost analysis dated 22 March 2017 is the following table showing opex for access to distribution frames, fibre-optic and electricity in street cabinets:

	2016	2012
Access to distribution frame.....	[...]	[...]
Fibre-optic in street cabinet.....	[...]	[...]
Electricity in street cabinet.....	[...]	[...]
	[...]	[...]

In the above table, Mila has updated the cost of access to distribution frame and fibre-optic to street cabinets, as explained further here below.

In the Draft Decision on review of Mila tariff for local loop lease and access to distribution frame, it is assumed that access to the distribution frame will increase to ISK 1,104/month for each 100 lines. Costs for access to the distribution frame will be allocated to other opex and this increase will therefore have an impact on that cost.

In Mila's cost analysis the cost of fibre-optic in the street cabinet is based on the cost in December 2016 calculated to 12 months. The same method was used to decide the cost for access to distribution frames but that cost is also updated in accordance with forthcoming increase in the access charges.

Mila pointed out that the increase in cost of access to the distribution frame and fibre-optic in the street cabinet is attributed to the VDSL roll-out. Access systems must use fibre-optic to street cabinets and usage of distribution frames is poorer as there are fewer connections in street cabinets than in telephone exchanges. This constitutes a clear cost increase.

In the opinion of Mila it is fundamental that calculation of lease price should be based on real figures where this is possible. As there is a significant increase in fibre-optic lines and in 100 line connection panels because of the rollout of VDSL, it is not realistic to use the average status of the year, but one should rather in the opinion of Mila use the position that is as close to reality as possible as this is a case of direct cost for Mila Access systems.

According to the revised Mila cost model, the costs for operating DSLAM and other costs related to operation of DSL come to a total of ISK [...]. Opex for lease of local loops for G.SHDSL is estimated as ISK [...], the total cost used for the calculation of Access Option 1 bitstream prices according to the Mila analysis is therefore ISK [...].

In its letter to Mila dated 24 June 2016, the PTA commented on the substantial increase in opex. The PTA requested information on opex for Mila DSL equipment for the operational year 2015 for the bitstream service. The PTA also requested more detailed explanations of the criteria for calculations for access to distribution frame and fibre-optic in street cabinets.

In the Mila reply it is explained that renewal of Mila equipment will in all likelihood lead to higher opex as new equipment is installed in street cabinets instead of in telephone exchanges. With this, all maintenance will be more expensive e.g. when a fault occurs one needs in many instances to visit both the street cabinet and the telephone exchange to rectify the fault whereas previously one only when to the telephone exchange as the equipment was located there. Then there is the fact that usage of the equipment is less and thus there are more units that need to be maintained. Mila submitted overview the 2015 opex and explained the changes in the opex from 2014.

2.3.1.2 Investment costs

The following was stated in the Mila cost analysis dated 31 August 2015 with respect to capex:

"Calculation methodology

In the cost analysis submitted PTA 2013 capex was calculated based on the indexed purchase price of equipment. Annual capital cost was calculated using the tilted annuity depreciation method.

In the Decision of the PTA no. 21/2014 on wholesale broadband access the following is stated about assessment of Mila capex and calculation of investment costs:

- *When assessing investments (CAPEX) the replacement cost of the operational assets shall be used, taking into account the next generation of access networks (NGA).*
- *When evaluating the cost of the Access network, account shall be taken of the share in installation, capex and opex of wholesale switches.*
- *Evaluation of lifetime of operational assets shall reflect the useful life of assets.*
- *The annuity depreciation method shall be used to calculate annual costs for operational assets. It is authorised to use the tilted annuity depreciation method based on estimated gross replacement cost (GRC) of the bitstream system. The cost of the total number of connections and bandwidth is calculated.*
- *The real rate of return shall be used, based on WACC real from capital tied in assets used in connection with providing service where the risk premium reflects the risk related to operations on the relevant market.*

In accordance with the above, Mila has calculated the replacement cost of investments in xDSL equipment. Investments are assumed in VDSL equipment for all telephone exchanges and if Mila was faced with the reality of investing in bitstream equipment today, then the company would invest in the newest type of equipment and thus take into account next generation networks. Calculations are therefore made based on developing the system as it is today and that investments will be made in the newest VDSL technology. It is assumed that copper local loops will continue to be used.

Type of equipment

Here below follows a description of the equipment used for Access Option 1.

ISAM (Intelligent Service Access Manager)

ISAM is DSLAM equipment (Digital Subscriber Line Access Manager) based on IP (Internet Protocol) technology. ISAM equipment is available in various configurations where the difference between them is mainly in the number of line cards that they can contain and how many street cabinets (REMs) can be connected to them. ISAM equipment handles user xDSL connections and interconnections with IP networks. ISAM provides users with services such as Internet, TV and VoIP. ISAM is based mainly on a controller card and up to 18 different xDSL line cards.

VDSL line card

VDSL line card is part of ISAM structure. Cards are fitted in ISAM equipment and they handle input/output on a maximum of 48 VDSL user lines. Each ISAM can take a maximum of 18 VDSL line cards.

REM (Remote expansion module)

What is called REM equipment is usually installed in street cabinets. REM is composed of an optical connector and power card and VDSL line cards (one or two). REM is connected by

optical thread to ISAM in a telephone exchange and line cards in this equipment are in reality part of and an extension of the relevant ISAM.

G.SHDSL card

In ISAM it is possible to install G.SHDSL line cards (Symmetrical high-speed Digital Subscriber Line) which are intended for business connections. G.SHDSL connections offer synchronous data transfer speed. It is possible to use a maximum of 4 copper pairs for each connection and with 4 pairs is possible to achieve 20 Mb/s synchronous speed to and from the customer.

Wholesale switches

Wholesale switches serve the purpose of providing Mila customers on Access Option 1 direct access to the ISAM network. A wholesale switch is installed in a telephone exchange and it connects to all ISAM equipment at that exchange and also to customers on Access Option 1. Possible data transfer speed is 1 or 10 Gb/s.

I/O card

An I/O can be installed in ISAM equipment to enable connection of REM to the equipment. Ports on I/O cards are also sometimes used for back feed with IP networks and also for Ethernet business connections directly from ISAM.

SFP for line cards in REM and SFP back feed SFP (Small Form-factor Pluggable) is mainly used to connect equipment to fibre-optic.

SFPs are available in several types, i.e. for varying data speeds (for example 1 or 10 Gb/s) or connected to one or two fibre-optic threads. Various SFP equipment is used for connecting ISAMs with REM, with back feed ISAM, interconnection between ISAM and wholesale switches etc.

Fibre-optic to optical distribution frame

When REM equipment is installed in a street cabinet, the connection is carried by fibre-optic from the street cabinet to an optical distribution frame in Mila technical space. In order to connect from the optical distribution frame to the ISAM equipment one has to lay internal fibre-optic cable. This is a 24 thread optic cable.

Cable to distribution frame

When users are connected directly to a Mila copper distribution frame a cable is laid from the frame to each line card in ISAM."

Purchase price of equipment

In its letter dated 24 June 2016, the PTA requested confirmation of those unit prices that Mila uses in its calculations. The PTA considered it furthermore normal that a new system would be developed in such a way that the electronic communications company made a bulk purchase and therefore enjoyed discounts that were on offer.

In its reply dated 5 September 2016, Mila specified that the same equipment is not used at all locations, but it is rather the case that circumstances call for use of varying equipment. To make things simple, calculations were based on the equipment that was most frequently purchased.

The basis for unit prices is the Alcatel price list for Mila. A special agreement was made the purchase of vectoring equipment at the end of 2014 [...].

The discount was not only for bulk purchase but Alcatel had also been making concessions to Mila for prior purchase of software licenses which were not needed when the new equipment was purchased as the licenses were included in the price. [...]

Mila also pointed out that part of the software licenses that were purchased at the end of 2014 were not included in the cost analysis. They represented an investment of [...]. This investment therefore needed to be added to the cost analysis. A copy of invoice for this purchase was attached to the Mila letter.

ISAM (Intelligent Service Access Manager)

Mila submitted a new calculation for ISAM unit price:

New calculation	List price	Proportion	Total
7330 Shelf.....	[...]	[...]	[...]
NDPS-B.....	[...]	[...]	[...]
NDPS-C.....	[...]	[...]	[...]
			[...]
		Discount	[...]
		New unit price	**[...]**

In the calculations of unit price for ISAM, Mila uses one ISAM and two types of vectoring cards. The difference between the cards is that the more expensive equipment can connect twice as many line cards as the less expensive version. Míla evaluates it such that a card of type NDPS-B was about [...] of the equipment and NDPS-C was [...]. About [...] of DSLAM equipment has fewer than [...] connections. Investment also must be made in ISAM (7330 Shelf, where the controller card is included).

In these calculations Mila uses [...]% discount and then the unit price is [...] EUR.

Mila's calculations are based on exchange rate for 1 Euro of ISK 134 (average exchange rate 1.1.2016 to 31.12 .2016)[7].

VDSL line card in ISAM

Mila submitted a new calculation for unit price of line cards in ISAM:

New calculation	Card	Splitter	Total	Proportion	Unit price
NDLT-C.....	[...]	[...]	[...]	[...]	[...]
Cable (3FE67437AA).....	[...]	[...]	[...]	[...]	[...]
NDLS-E.....	[...]	[...]	[...]	[...]	[...]
					[...]
				Discount	[...]
				New unit price	**[...]**

[7] Mila updated the Exchange Rate reference period from 1.1.2015-31.7.2015 to 1.1.2016-31.12.2016.

Mila stated that in the unit price calculations for line cards the company used two types of equipment, on the one hand with what is called a NDLT-C card with inbuilt vectoring where all local loops must connect to this card, and on the other hand NDLS-E card which is equipment that needs to connect to a separate vectoring controller card. The former equipment is used where one line card is needed and the latter equipment where more than one line card is needed. With each NDLS-E line card one needs to use a special vectoring cable between the card and the vectoring controller card. NDLT-C equipment cost, according to the price list, [...] EUR and one also needed to invest in a splitter and cable which cost [...] EUR. The total purchase price amounts to [...] EUR.

NDLS-E purchase price is [...] EUR according to the price list and one also must purchase a vectoring cable at [...] EUR. The total purchase price amounts to [...] EUR.

In December 2014 [...] units of NDLT-C were purchased and [...] units of NDLS-E. When calculating unit price. The same proportion of equipment was used i.e. [...]% of NDLT-C and [...]% of NDLS-E.

Mila proposes that [...]% discount from the list price be used which means that the unit price is therefore [...] EUR.

REM (Remote expansion module)

Mila submitted a new calculation for unit price of REM:

	Unit	Proportion	Unit
Double REMs			
NDLS-E (2 units).....	[...]		
SBB2012_14.....	[...]		
	[...]	[...]	[...]
Single REMs			
NDLT-C.....	[...]		
SBB_00124B.....	[...]		
	[...]	[...]	[...]
		Full unit price	[...]
		Discount	[...]
		New unit price	**[...]**

Mila stated that what is called REM equipment was usually installed in street cabinets. This equipment can be single or double, i.e. with 1 or 2 line cards. About [...]% percent of street cabinets in Mila systems are double. The reason why double REMs cost more than double the price of single REMs is that in the case of double REM there also needs to be a vectoring processing card. In its calculations, Mila uses [...]% discount from list price.

The following was stated in the Mila cost analysis dated 31 August 2015 with respect to purchase price of equipment:

"G.SHDSL card

G.SHDSL cards have been installed in more than 40 technical spaces. Each card costs [...] EUR which is ISK [...] given an exchange rate of ISK [...].

Wholesale switches

Investment in wholesale switches is based on real investment in this equipment.

I/O cards

Míla has invested in [...] I/O cards at [...] EUR per piece, which amounts to ISK [...]. A similar investment is allowed for in this cost model.

SFP for line cards in REM and SFP back feed

In each street cabinet (REM) what is called an SFP pair is needed, i.e. in REM and for each port in ISAM. Such an SFP pair costs [...] EUR and one pair is needed for a single REM and two pairs for a double REM.

SFP for back feed in each ISAM costs [...] EUR.

Fibre-optic to optical distribution frame

Mila needs to setup a fibre-optic line (cable, trunk) from ISAM equipment to an optical distribution frame for the purpose of for example connecting REM equipment to ISAM. Each cable line costs about ISK [...] and each cable has 24 threads which means that more than one cable is needed as line cards in street cabinets that connect to telephone exchanges are more than 24.

Cable to distribution frame

A cable between the distribution frame and line cards in ISAM costs about [...] EUR."

Installation and other costs

Mila stated that according to the assessment of employees of Access network it took about [...] man hours to install ISAM equipment in the Capital City Area plus [...] hours of preparation and testing and transfer of customers between equipment where this was appropriate. The work is thus about [...] hours and even longer in the countryside. Mila expected it would take on average, about [...] hours in the countryside and in addition they would have to pay per diem [...]. In Mila's opinion travelling time is very moderately estimated. Mila allows for [...]% of ISAM equipment being installed in the countryside and [...]% in the Capital City Area and this is based on current proportional division of locations in the Capital City Area and in the countryside.

Installation of cards in ISAM takes about [...] hours in the Capital City Area and Mila allows for [...] hours in the countryside plus per diem. The proportion of installed cards in ISAM in the countryside is [...]% and the same proportion is used for calculations of installation costs.

Installation of G.SHDSL cards takes about [...] hours in the Capital City Area and Mila allows for [...] in the countryside plus per diem. The proportion of installed G.SHDSL cards in the countryside is approximately [...]%. Mila states that the reason why more time is assumed for installation of G.SHDSL cards than for other line cards is that in most instances only one G.SHDSL card is installed, but when VDSL cards are installed then there are normally more.

Installation of REM is considered to take about [...]. Míla allows for [...] minutes work by a specialist in Access network to start the equipment and about the same for an employee at the Service desk for making and registering user information and configuration.

It was then stated that in 2014, Mila had installed about [...] G.SHDSL cards, [...] line cards in ISAM, [...] ISAMs and [...] REMs. The total labour component in the investment xDSL equipment amounted to ISK [...] not counting work for installing wholesale switches. Based on

the above-mentioned criteria, Mila calculates installation cost and other costs. Other costs cover various work such as time spent for configuration and activating equipment, purchasing, ordering, design, organising tasks and senior management.

	Number	Number of hours Capital City Area	Number of hours countryside	Proportion countryside	Unit price	Per diem	Cost of installation	Other costs	Total	Cost per unit	2014 calculation	Updated to 2016
G.SHDSL card.....	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
Other line card in ISAM	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
REM.....	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
ISAM.....	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]	[...]
							[...]	[...]	[...]			

Mila divides costs other than direct installation costs in the same proportion as in Mila estimates of cost for installation. Other costs include among other things, vehicle costs.

In accordance with the above, Mila estimated installation costs of line cards as ISK [...]; for ISAM this cost is ISK [...] and for REM it is ISK [...]. In the Mila updated cost analysis dated 22 March 2017 the unit prices of installation costs were indexed using the wage index. Accordingly, the installation cost of the line cards will be ISK [...], ISK [...] of the ISAM and ISK [...] of the REM.

Mila stated that installation and connection to the distribution frame in street cabinets is booked on Access network and thus not part of this cost analysis.

With respect to the PTA comment regarding hourly rates, Mila specified that all installation work is done by Mila specialists. This is very specialised work where work is being done on complex equipment. These employees have attended courses with suppliers, which means it is easier said than done to find someone “from the street” to do the job. This is the reason why Mila has not outsourced this work. When assessing the hourly rate, this was taken into account and also specialist services on the market. This work is done both by engineers who configure settings on the equipment and make tests and by Electronics technicians who work on installation. In many instances, this work must be done on night shift.

Capex

In the initial Mila cost analysis the number of units were decided according to the number of users when the analysis was made. In the updated analysis dated 22 March this year these figures are updated based on the status of ISAM and REM equipment in 2016.

ISAM equipment

Mila stated that the intention is to install one or more ISAM at each location. Where ISAM has already been installed, the installations are according to the number that need to be in place to provide service for the users.

The number of units of ISAM and ASAM equipment was [...] in 2014 but as it is possible to decommission a number of units, the estimated number needed in the case of reinvestment would be [...] units.

The unit price for ISAM, according to Mila’s latest update of the model dated 22 March 2017, is ISK [...].

Investment in ISAM is therefore an ISK [...]

Mila mentioned that ISAM is also used for GPON connections. The share of GPON the cost of ISAM therefore needs to be estimated.

Using the number of line cards, Mila calculates the GPON share as [...]% of total investment which is ISK [...]. This amount is therefore subtracted from investment in ISAM.

REM in street cabinets

According to Mila, the number of REM in street cabinets is [...]. It is assumed that [...] are double and [...]% single which is the same proportion as in the Mila system today. The unit price is ISK [...] and the total investment therefore ISK [...].

Line cards in ISAM

The number of line cards is decided by the number of users in ISAM but the main calculation rule is 48 users for each card. When deciding the number of cards in the calculation of replacement cost, Mila allows for all users being transferred to the newest equipment.

The Mila conclusion is that if the system would be upgraded as a whole it would require [...] line cards.

The unit price for a VDSL line card in ISAM is [...].

The investment for line cards in ISAM therefore amounts to [...].

I/O cards

There is a total of [...] I/O cards which cost EUR [...] each. The total investment is therefore ISK [...].

SFP for line cards in REM and SFP back feed

The number of street cabinets according to the Mila cost model is [...]. In about [...]% they are single and in [...]% of instances they are double. Each SFP pair costs EUR [...] for a single REM and EUR [...] for a double REM. Weighted average unit price is therefore EUR [...]. The total investment is therefore ISK [...].

SFP for back feed is connected to each ISAM and unit costs. EUR [...]. The total investment is therefore ISK [...].

Internal fibre-optic cables

Míla has calculated that [...] fibre-optic cables (24 thread) are needed to connect users in street cabinets with ISAM. Each card needs one thread. The cost is ISK [...] for each cable. The total investment is therefore ISK [...].

Cable to distribution frame

Each line card must be connected to the copper distribution frame with the appropriate cable. A cable costs about EUR [...]. The number of line cards is calculated at [...]. Total investment is ISK [...].

Wholesale switches

Mila uses real investment for the initial cost of wholesale switches. In the last analysis of wholesale switches, investment amounted to ISK [...] and investment in 2014 to 2016 is added to this investment. Then the paid setup fees of wholesale switches are deducted. Total investment is therefore ISK [...].

Investment- cost analysis 2014	[...]
Investment 2014	[...]
Paid setup fees 2014	[...]
	[...]
Investment 2015	[...]
Investment 2016	[...]
Paid setup fees 2015	[...]
Paid setup fees 2016	[...]
	[...]

Investments are not indexed as these are very new investments.

G.SHDSL cards

It is stated in the Mila analysis that the company has [...] G.SHDSL cards. There is no intention to change the number in the cost calculation. Total investment is therefore ISK [...].

Investment GRC - summary

In the revised Mila cost analysis dated 22 March 2017, there is the following conclusion on investment GRC:

	Number	Unit price, equipment	ISK	Labour	Unit price	Total
ISAM.....	[...]	[...]	[...]	[...]	[...]	[...]
Share of GPON in ISAM.....	[...]	[...]	[...]	[...]	[...]	[...]
REM in street cabinets.....	[...]	[...]	[...]	[...]	[...]	[...]
Line cards in ISAM.....	[...]	[...]	[...]	[...]	[...]	[...]
I/O cards.....	[...]	[...]	[...]	[...]	[...]	[...]
SFPs for line cards in REM.....	[...]	[...]	[...]	[...]	[...]	[...]
SFP back feed.....	[...]	[...]	[...]	[...]	[...]	[...]
Internal fibre-optic cables.....	[...]	[...]	[...]	[...]	[...]	[...]
Cable to copper distribution frame.	[...]	[...]	[...]	[...]	[...]	[...]
Wholesale switches.....	[...]	[...]	[...]	[...]	[...]	[...]
SHDSL cards.....	[...]	[...]	[...]	[...]	[...]	[...]
Software licenses.....	[...]	[...]	[...]	[...]	[...]	[...]
						[...]

Annual capex

It is stated in the Mila cost analysis that the company allows for 7 year useful life of all equipment apart from fibre-optic cables where the useful life is set at 20 years. In the prior cost analysis an 8 year useful life period was used, but in Mila's opinion, this is too long. In 1999 Siminn began to offer its ADSL service and only six years later the renewal of equipment for a new generation of ADSL had commenced. Introduction of VDSL commenced in 2010. It is therefore clear that useful life of equipment does not reach 8 years. One can expect Mila to continue renewal in line with the newest technology, and in addition to this GPON rollout will impact the usage of equipment in coming years. For this reason it would be irresponsible of Mila continue to use the useful life period adopted in the prior analysis.

With a letter dated 24 June 2016 the PTA expressed doubt as to whether it was timely to reduce the useful life of equipment from 8 years to 7 years and requested further arguments in favour of this.

In the letter from Mila dated 5 September 2016 it is stated that Mila totally disagrees with this position. Mila points out that rollout of fibre-optic local loops is fully under way in the Capital City Area and across the whole country. The estimate for 2016 is that [...] fibre-optic local loops will be connected and this will have direct impact on Mila xDSL service. There is serious competition from GR, and there are indications of reductions in connections to xDSL service. In the near future these connections will decrease rapidly. Mila considers it therefore irresponsible to continue use of 8 year useful life of equipment and that the useful life should be shortened even more than is done in the analysis.

Míla uses the tilted annuity depreciation method to calculate annual capital cost. The same price development (tilt) is used as in the prior analysis, -5%.

	Number	Unit price	Total	Annual capital cost	Lifetime
ISAM.....	[...]	[...]	[...]	[...]	7
Share of GPON in ISAM.....	[...]	[...]	[...]	[...]	7
REM in street cabinets.....	[...]	[...]	[...]	[...]	7
Line cards in ISAM.....	[...]	[...]	[...]	[...]	7
I/O cards.....	[...]	[...]	[...]	[...]	7
SFPs for line cards in REM.....	[...]	[...]	[...]	[...]	7
SFP back feed.....	[...]	[...]	[...]	[...]	7
Internal fibre-optic cables.....	[...]	[...]	[...]	[...]	20
Cable to copper distribution frame.	[...]	[...]	[...]	[...]	20
Wholesale switches.....	[...]	[...]	[...]	[...]	7
SHDSL cards.....	[...]	[...]	[...]	[...]	7
Software licenses.....	[...]	[...]	[...]	[...]	8
			[...]	[...]	

2.3.1.3 Costs for tied working capital

In the Mila cost analysis dated 31 August 2015 it is stated that Mila costs for the xDSL system are ISK [...]. Given 7.4% WACC and a working capital cycle of 30 days, then the cost of tied capital is ISK [...].[8]

Account also had to be taken of capital tied in inventory. Inventory in Mila Access systems amounted to ISK [...] at the end of 2014, not counting stocks of vectoring equipment which had been purchased at the end of 2014. Given 7.4% WACC, the cost of capital tied in inventory was ISK [...].

Mila calculated total costs for tied working capital and capital tied in inventory amounted to ISK [...].[9]

In its letter dated 24 June 2016, the PTA raised objections to costs for tied capital being calculated both on working capital and inventory. The PFS referred to the ruling of the Appellate Committee for Electronic Communications and Postal Affairs no. 4/2009 where it

[8] In the Mila update of the model dated last 7th September, these costs fell to ISK [...] as the total costs had fallen to ISK [...] as costs for renting copper local loops for VDSL/ADSL service were no longer included.
[9] In the update of the model dated last 7th September, tied capital totalled ISK [...].

was prescribed that account should be taken of Mila capital tied in inventory to the amount of average level of inventory.

In the Mila letter dated 5 September 2016 it is stated that Mila feels that it is inappropriate to use a 7 year old Ruling from the Appellate Committee for copper local loops (then Market 11) which is based on the criteria of an older market analysis. This not least when the PTA specifically prescribes in Decision no. 21/2014 on market analysis of Markets 4/2008 and 5/2008 that it is authorised to use a working capital cycle of 30 days to ensure normal operation. Mila here refers to Paragraph 962 in Appendix a in Decision no. 21/2014 where it is specified that it is authorised to use a working capital cycle of up to 30 days used to ensure normal operation.

Mila points out that the cost of tied working capital was calculated according to the methodology from Analysis Mason which uses 30 days expenditure and a required rate of return calculated from these funds. This methodology has been recognised by the PTA and Mila indicated in this connection the PTA Decision no. 15/2011 on Siminn cost analysis of wholesale prices in the public telephone network provided at a fixed location.

Mila points out that the Ruling of the Appellate Committee applied to the local loop market and not to the bitstream market and that, despite that Ruling, it is not the case that it is normal that cost analysis should not take account of the cost of working capital, which is the normal thing to do.

Mila requests that the PTA review its position with respect to calculation of costs for tied working capital as its position would conflict with prior PTA decisions and with Decision no. 21/2014 on which the cost analysis should be based.

Mila points out that because of changes to draft analyses of tariff for access to local loops and to distribution frames, opex has fallen substantially and will be ISK [...]. The cost of tied working capital will thus be ISK [...].

The PTA considers it normal to use the average level of inventory for the year 2014 instead of the level at the end of 2014. The average inventory level using 31.12.2013 and 31.12.2014 is ISK [...] (level at end of 2013 is ISK [...]). According to this, the cost of capital tied in inventory is ISK [...]. Mila points out that at the end of 2014, vectoring equipment had been purchased for ISK [...] million. As this equipment had been used fairly rapidly, it was decided to leave it out of the calculations despite the fact that it would have been normal to allow for costs for a number of months for this binding of capital.

In an email from the PTA to Mila, dated 28 November 2016 it is stated that the Administration did not intend to endorse the Mila calculations of tied capital which were based on costs for tied capital being the sum of cost of capital tied in inventory and for a working capital cycle of 30 days. The Administration referred to PTA Decision no. 21/2014 to the effect that it was authorised to use a working capital cycle of up to 30 days to ensure normal operations. The PTA therefore agreed that Mila was authorised to calculate costs for tied working capital based on 30 days expenditure and that the required rate of return would be calculated from these funds. On the other hand the PTA rejected an additional calculation being made of capital tied in inventory as it was not appropriate to use this as a basis while at the same time calculating capital tied in inventory based on tied capital resulting from expenditure. The PTA requested that Mila revise the analysis in accordance with the above.

In the Mila reply dated 28 November 2016 it was stated that Mila disagreed with the PTA with respect to capital tied in inventory, i.e. the view that it was not necessary to calculate this

binding of capital separately. Tied working capital relates to capital tied in operations, where no allowance is made for costs in investments. Inventory in the case of Access networks is only for investments and is thus not related in any way to operations and is therefore not part of the calculation of tied working capital. It is therefore in the opinion of Mila not possible to accept the view that it is not normal to calculate this tied capital in the same manner as other investments. Mila therefore requested that the PTA review this Decision.

Mila also stated that were the company operating as a wholesaler and this inventory was sold concurrently (and thus entered in operations concurrently), then it would be normal not to calculate this tied capital separately, but this was an instance of investment and not of products that became immediately part of commercial operations. In addition to this, part of the inventory was spare parts and they never became part of commercial operations or investment, but were always entered as inventory on the balance sheet. This is why tied capital must be calculated for this item.

In an email dated 29 November, the PTA reiterated its position with respect to calculation of tied capital and referred in this connection the wording of the tariff obligation in the PTA Decision no. 21/2014.

On that same day Mila submitted a revised cost analysis in accordance with the PTA request but Mila however made a reservation on its position with respect to calculation of capital tied in inventory. According to the revised analysis, the cost of tied capital is ISK [...].

In an update of the cost analysis dated 22 March 2017 it is stated that the cost of 30 days working capital for the year 2016 is ISK [...].

2.3.1.4 Income from ports, transmission of multicast, IP voice telephony service and setup charges.

It was stated by Mila that income from access to ports, transmission of TV and unicast and IP voice telephony service is deducted from the cost base as the cost for these operational parts is included in the cost base.

Setup charges for xDSL service are in fact local loop setup charges. This income is therefore allocated to local loops are not to xDSL service. This has been taken into account in cost analysis for local loops. Income for taking over xDSL service has on the other hand been allocated as income to Mila bitstream service. Mila began to collect this income in September 2014 and the income has been on average about ISK [...] thousand. This income has been calculated for a whole year and deducted from the cost of bitstream service, see here below.

The Mila revenue for these services in 2016 were ISK [...].

2.3.1.5 Total costs

The Mila conclusion according to the latest revision of the cost analysis is that total costs for Access networks are as follows:

	2016
Local loop: rental	[...]
DSLAM opex	[...]
Other opex	[...]
Annual capital cost of equipment	[...]
Tied working capital	[...]
Income for ports in wholesale switches	[...]
Income for setup charges	[...]
Income from multicasting	[...]
income from VoIP	[...]
Income from domains and for interconnection	[...]
Total costs	[...]

As stated in Section 2.4, Mila calculates that income from ports in wholesale switches and analogous equipment will be ISK [...] per annum. This income is deducted from costs for bitstream access as the cost for ports is included in the cost base.

As stated in Section 2.6, Mila estimates that annual income from multicast and unicast is ISK [...] . Mila takes into account the revenues from multicast in 2016 including tariff changes. This amount is deducted from costs for bitstream access as the cost for multicast is included in the cost base.

As stated in Section 2.7, the Mila annual income in 2016 from IP voice telephony service (VoIP) was ISK [...]. This income was deducted from costs for bitstream access as the cost of VoIP is included in the cost base.

As stated in Section 2.8, Mila income from domains and ports for interconnection was ISK [...] in 2016. This income is deducted from costs for bitstream access as the cost for ports is included in the cost base.

2.3.1.6 Number of line equivalents:

According to updated Mila cost analysis dated 22 March 2017 the number of ADSL, VDSL, ADSL+, VDSL+ and G.SHDSL was as follows in December 2016:

	Number
ADSL, A1.....	[...]
ADSL, A3.....	[...]
VDSL, A1.....	[...]
VDSL, A3.....	[...]
ADSL+ 2 Mb/s.....	[...]
ADSL+ 2 Mb/s A1.....	[...]
ADSL+ 4Mb/s A3.....	[...]
ADSL+ 4 Mb/s A 1.....	[...]
ADSL+ 6 Mb/s A3.....	[...]
ADSL+ 8 Mb/s A3.....	[...]
ADSL+ 8 Mb/s A 1.....	[...]
ADSL+ 14 Mb/s A3.....	[...]
ADSL+ 14 Mb/s A 1.....	[...]
VDSL +50 Mb/s A3.....	[...]
VDSL +50 Mb/s A1.....	[...]
VDSL +100 Mb/s A3.....	[...]
VDSL +100 Mb/s A1.....	[...]
SHDSL+ 2 Mb/s A3.....	[...]
SHDSL+ 2 Mb/s A 1.....	[...]
SHDSL+ 4 Mb/s A3.....	[...]
SHDSL+ 4 Mb/s A 1.....	[...]
SHDSL+ 5 Mb/s A3.....	[...]
SHDSL+ 5 Mb/s A 1.....	[...]
SHDSL+ 10 Mb/s A3.....	[...]
SHDSL+ 10 Mb/s A 1.....	[...]
SHDSL+ 15 Mb/s A3.....	[...]
SHDSL+ 15 Mb/s A 1.....	[...]
SHDSL+ 20 Mb/s A3.....	[...]
SHDSL+ 20 Mb/s A 1.....	[...]
	[...]

In the Mila cost analysis dated 31 August 2015, the following is stated regarding the calculation of the line equivalents:

"*In Mila's opinion, the number of line equivalents needs to be calculated in a number of ways according to the nature of the costs:*

- *The number of underlying line equivalents for local loop lease should be based on the number of local loops being used for each connection.*
- *The number of line equivalents for other opex should be based on an assessment of the scope of the operation of the xDSL service as plus connections and G.SHDSL are much more demanding in operation per unit than normal xDSL connections.*
- *Line equivalents need to be calculated separately for annual capital cost, where the number of line cards is taken into account.*

Calculations of the number of line equivalents is based on the equivalence coefficient 1 for ADSL and VDSL."

Line equivalents for local loops:

Mila states that the actual line equivalents for local loop lease are not calculated.

The upper frequency range of the local loop is used for ADSL, ADSL+, VDSL and VDSL+ connections. With the planned alterations to the tariff for access to local loop lease, a separate charge will no longer be collected for the upper frequency range, which means that one will not need to allow for costs for this when deciding the charge for ADSL, ADSL+, VDSL and VDSL+ connections.

Both frequency ranges of the local loop are however used for G.SHDSL service. Mila allows for costs for local loop lease in the charge for its G.SHDSL service. In the Mila analysis it is stated that the number of underlying local loops varies according to data transfer speed.

The following is stated in the Mila cost analysis dated 31 August 2015:

"Number of line equivalents for other opex:

Other and greater requirements are made for plus connections than for traditional xDSL connections. It is therefore normal that plus connections and G.SHDSL are allocated more costs than other connection. Examples of items that support the above are as follows:

- *Plus connections and G.SHDSL are installed in separate VLAN service. These are separate software settings in the equipment.*
- *Plus connections and G.SHDSL normally have much greater underlying data traffic than traditional ADSL and VDSL connections as they are business connections where in many instances many parties are using the same connection.*
- *Plus connections and G.SHDSL are treated in a different manner to normal connections; there is for example much greater and more expensive manpower allocated to fault diagnosis on business connections than on residential connections.*
- *As in many instances these are connections that cannot tolerate interruption of service for an extended period of time because they are businesses, they are in a higher priority than other connections for fault diagnosis and repair.*
- *When upgrading to new equipment, for example from ASAM to ISAM, plus connections are treated in a special manner, even to the extent of contacting the owner of a connection and waiting while he tests the connection.*
- *The risk of faults from interference from plus connections is greater than from other connections.*

Mila therefore considers it normal that each ADSL + and VDSL + connection is allocated [...] opex over ADSL and VDSL. The coefficient for plus connections will therefore be [...] per connection minimum for opex with DSL equipment.

Data transfer speed of G.SHDSL connections also has an impact on the number of ports and number of underlying local loops. Mila has offered the following service for G.SHDSL:

- *2 Mb/s: 1 Port and 1 Copper local loop*
- *4 Mb/s: 2 Ports and 2 Copper local loops*
- *5 Mb/s: 1 Port and 1 Copper local loop*
- *10 Mb/s: 2 Ports and 2 Copper local loops*
- *15 Mb/s: 3 Ports and 3 Copper local loops*
- *20 Mb/s: 4 Ports and 4 Copper local loops*

The reason why 5 Mb/s connections uses fewer ports and local loops than 4 Mb/s is that in the 5 Mb/s new technology is used which makes it possible to use fewer local loops for the connections.

Mila considers it most reasonable that when calculating line equivalents for G.SHDSL costs for lease of local loops will be twice as high per port than for ADSL/VDSL. 2 Mb/s and 5 Mb/s connections will however be allocated 3 times the cost of ADSL/VDSL.

The reason why triple cost is not used for SHDSL+ (except for 2 Mb/s and 5 Mb/s) as is the case with the plus connections, is that one connection is using up to four ports while there is only one port in ADSL/VDSL + connections. One can thus assume that there is some kind of sharing taking place in the case of connections with more than one port. It is therefore Mila's opinion that it is normal to use the coefficient 2 and not 3. Connections with 2 Mb/s and 5 Mb/s data transfer speed have one underlying local loop like ADSL/VDSL and for this reason it is appropriate to use the coefficient 3 in this case , as one does in evaluating ADSL/VDSL.

Coefficient for annual capital cost

As ADSL, VDSL, ADSL+ and VDSL+ use one port for each connection the coefficient for calculating unit price for capex is 1.

G.SHDSL connections generally have half the number of connections per line card that other xDSL connections have. In ISAM there are 24 ports per linecard on G.SHDSL and 48 ports on ADSL/VDSL. As stated here above, from 1 up to 4 ports are used for connections.

It is therefore the assessment of Mila that the weighting of G.SHDL in capital costs is double for each port. The coefficient is therefore from 2 up to 8 for G.SHDSL.

Coefficient for speed:

It is normal to have varying prices for ADSL+ and VDSL+ connections depending on speed. The faster the speed, the greater the likelihood of interference and faults in the connection. To redress this, Mila considers it important that the greater the speed the more expensive the connection should be, as is the case with digital leased lines in Access network (M6). Mila allows for the coefficient being as follows:

	Speed coefficient
ADSL, A1.....	1.0
ADSL, A3.....	1.0
VDSL, A1.....	1.0
VDSL, A3.....	1.0
ADSL+ 2 Mb/s.....	1.0
ADSL+ 4 Mb/s.....	1.2
ADSL+ 6 Mb/s.....	1.3
ADSL+ 8 Mb/s.....	1.35
ADSL+ 14 Mb/s.	1.4
VDSL +50 Mb/s.....	1.6
VDSL +100 Mb/s.	2.0
SHDSL+ 2 Mb/s.....	1.0
SHDSL+ 4 Mb/s.....	1.1
SHDSL+ 5 Mb/s.....	1.2
SHDSL+ 10 Mb/s.....	1.35
SHDSL+ 15 Mb/s.....	1.4
SHDSL+ 20 Mb/s.....	1.5

Line equivalents - summary

In the calculation of line equivalents the speed coefficient is multiplied by the coefficient per connection. In this way one finds the line equivalent for calculation of opex other than local loop lease per unit and line equivalent for the calculation of annual capital cost per unit."

In the Mila updated cost analysis dated 22 March this year the result of the calculation of line equivalents is summarized in the following table:

	Number	Speed coefficient	Coefficient per connection Other costs	Coefficient per connection Annual capital cost	Equivalent for other cost	Equivalent for annual capital cost
ADSL, A1	[...]	1.0	1	1	[...]	[...]
ADSL, A3	[...]	1.0	1	1	[...]	[...]
VDSL, A1	[...]	1.0	1	1	[...]	[...]
VDSL, A3	[...]	1.0	1	1	[...]	[...]
ADSL+ 2 Mb/s	[...]	1.0	3	1	[...]	[...]
ADSL+ 2 Mb/s A1	[...]	1.0	3	1	[...]	[...]
ADSL+ 4Mb/s A3	[...]	1.2	3	1	[...]	[...]
ADSL+ 4 Mb/s A 1	[...]	1.2	3	1	[...]	[...]
ADSL+ 6 Mb/s A3	[...]	1.3	3	1	[...]	[...]
ADSL+ 8 Mb/s A3	[...]	1.35	3	1	[...]	[...]
ADSL+ 8 Mb/s A 1	[...]	1.35	3	1	[...]	[...]
ADSL+ 14 Mb/s A3	[...]	1.40	3	1	[...]	[...]
ADSL+ 14 Mb/s A 1	[...]	1.40	3	1	[...]	[...]
VDSL +50 Mb/s A3	[...]	1.60	3	1	[...]	[...]
VDSL +50 Mb/s A1	[...]	1.60	3	1	[...]	[...]
VDSL +100 Mb/s A3	[...]	2.00	3	1	[...]	[...]
VDSL +100 Mb/s A1	[...]	2.00	3	1	[...]	[...]
SHDSL+ 2 Mb/s A3	[...]	1.00	3	2	[...]	[...]
SHDSL+ 2 Mb/s A 1	[...]	1.00	3	2	[...]	[...]
SHDSL+ 4 Mb/s A3	[...]	1.10	4	4	[...]	[...]
SHDSL+ 4 Mb/s A 1	[...]	1.10	4	4	[...]	[...]
SHDSL+ 5 Mb/s A3	[...]	1.20	3	3	[...]	[...]
SHDSL+ 5 Mb/s A 1	[...]	1.20	3	3	[...]	[...]
SHDSL+ 10 Mb/s A3	[...]	1.35	4	4	[...]	[...]
SHDSL+ 10 Mb/s A 1	[...]	1.35	4	4	[...]	[...]
SHDSL+ 15 Mb/s A3	[...]	1.40	6	6	[...]	[...]
SHDSL+ 15 Mb/s A 1	[...]	1.40	6	6	[...]	[...]
SHDSL+ 20 Mb/s A3	[...]	1.50	8	8	[...]	[...]
SHDSL+ 20 Mb/s A 1	[...]	1.50	8	8	[...]	[...]
	[...]				[...]	[...]

2.3.1.7 Calculation of lease price of Access Option 1

Unit price for local loop lease

As stated here above, underlying Copper local loops are allowed for in the price of G.SHDSL+.

Mila estimates [...] local loops for its G.SHDSL+ service, so the cost for this is ISK [...] per annum given the planned price for access to the local loop of ISK 1,406/month.

Míla calculates the number of local loops for G.SHDSL+ in the following manner:

	Number	Coefficient local loops	Equivalent
SHDSL+ 2 Mb/s.....	[...]	[...]	[...]
SHDSL+ 4 Mb/s.....	[...]	[...]	[...]
SHDSL+ 5 Mb/s.....	[...]	[...]	[...]
SHDSL+ 10 Mb/s.....	[...]	[...]	[...]
SHDSL+ 15 Mb/s.....	[...]	[...]	[...]
SHDSL+ 20 Mb/s.....	[...]	[...]	[...]
			[...]

The unit price for local loop lease is calculated on the basis of actual cost and number of lines. The result is that the cost per local loop is ISK [...] per month.

The price for local loop lease used for SHDSL+ will therefore be as follows:

SHDSL+ 2 Mb/s.....	[...]
SHDSL+ 4 Mb/s.....	[...]
SHDSL+ 5 Mb/s.....	[...]
SHDSL+ 10 Mb/s.....	[...]
SHDSL+ 15 Mb/s.....	[...]
SHDSL+ 20 Mb/s.....	[...]

Unit price for opex

Mila calculates the unit price for opex in the following manner:

DSLAM.....	[...]
Other opex.....	[...]
Tied working capital.....	[...]
Deducted income.....	[...]
	[...]
Total equivalents	[...]
Unit price	[...]

Unit price for annual capital cost

Mila calculates the unit price for annual capital costs in the following manner:

	xDSL	Line cards ADSL/VDSL	SHDSL line cards
ISAM.....	[...]	[...]	[...]
Share of GPON in ISAM.....	[...]	[...]	[...]
REM in street cabinets.....	[...]	[...]	[...]
Line cards in ISAM.....	[...]	[...]	[...]
I/O cards.....	[...]	[...]	[...]
SFPs for line cards in REM.....	[...]	[...]	[...]
SFP back feed.....	[...]	[...]	[...]
Internal fibre-optic cables.....	[...]	[...]	[...]
Cable to copper distribution frame	[...]	[...]	[...]
Wholesale switches.....	[...]	[...]	[...]
SHDSL cards.....	[...]	[...]	[...]
Software licenses.....	[...]	[...]	[...]
	[...]	[...]	[...]
Total equivalents	[...]	[...]	[...]
Price per month per equivalent	[...]	[...]	[...]

Mila states that the first column contains all joint costs for ADSL, ADSL+, VDSL, VDSL+ and G.SHDSL; the middle column is separate costs for ADSL, VDSL, ADSL+ and VDSL+ while the last column is separate costs for G.SHDSL.

Unit price - conclusion

According to the above, the conclusion of the Mila calculations is as follows:

Unit price	Joint	ADSL/VDSL	SHDSL+
Local loops.....	[...]	[...]	[...]
Other opex.....	[...]	[...]	[...]
Annual capital costs.....	[...]	[...]	[...]
Unit price total	[...]	[...]	[...]

The price on the basis of varying service and data transfer speed will thus be as follows:

	Local loop	Annual capital cost	Annual capital cost - line cards	Other costs	Total
ADSL and VDSL..	0	[...]	[...]	[...]	691
ADSL+ 2 Mb/s.....	0	[...]	[...]	[...]	1,573
ADSL+ 4Mb/s.....	0	[...]	[...]	[...]	1,888
ADSL+ 6 Mb/s.....	0	[...]	[...]	[...]	2,045
ADSL+ 8 Mb/s.....	0	[...]	[...]	[...]	2,124
ADSL+ 14 Mb/s....	0	[...]	[...]	[...]	2,203
VDSL + 50 Mb/s...	0	[...]	[...]	[...]	2,517
VDSL + 100 Mb/s..	0	[...]	[...]	[...]	3,147
SHDSL+ 2 Mb/s....	[...]	[...]	[...]	[...]	3,368
SHDSL+ 4 Mb/s....	[...]	[...]	[...]	[...]	6,158
SHDSL+ 5 Mb/s....	[...]	[...]	[...]	[...]	4,144
SHDSL+ 10 Mb/s..	[...]	[...]	[...]	[...]	6,918
SHDSL+ 15 Mb/s..	[...]	[...]	[...]	[...]	10,605
SHDSL+ 20 Mb/s..	[...]	[...]	[...]	[...]	14,749

Mila allows for unchanged setup charge and takeover of xDSL service:

Setup charge ISK 3,166

Taking over xDSL service ISK 1,329

2.3.1.8 Effect of price changes

Mila has summarised the effects of changes in the following table:

Access Option 1				Lower frequency range		Total		
	Price	Previous price	Change	Price now	Previous price	Price now	Previous price	Change
ADSL og VDSL	691	912	-24%	1,406	1,042	2,097	1,954	7%
ADSL+ 2 Mb/s	1,573	2,416	-35%	1,406	1,042	2,979	3,458	-14%
ADSL+ 4Mb/s	1,888	2,868	-34%	1,406	1,042	3,294	3,910	-16%
ADSL+ 6 Mb/s	2,045	3,440	-41%	1,406	1,042	3,451	4,482	-23%
ADSL+ 8 Mb/s	2,124	3,440	-38%	1,406	1,042	3,530	4,482	-21%
ADSL+ 14 Mb/s	2,203	3,550	-38%	1,406	1,042	3,609	4,592	-21%
VDSL + 50 Mb/s	2,517	2,424	4%	1,406	1,042	3,923	3,466	13%
VDSL + 100 Mb/s	3,147			1,406	1,042	4,553		
SHDSL+ 2 Mb/s	3,368	3,978	-15%			3,368	3,978	-15%
SHDSL+ 4 Mb/s	6,158	6,134	0%			6,158	6,134	0%
SHDSL+ 5 Mb/s	4,144	6,272	-34%			4,144	6,272	-34%
SHDSL+ 10 Mb/s	6,918	9,651	-28%			6,918	9,651	-28%
SHDSL+ 15 Mb/s	10,605	11,590	-8%			10,605	11,590	-8%
SHDSL+ 20 Mb/s	14,749	14,510	2%			14,749	14,510	2%

2.3.2 The position of the PTA

2.3.2.1 Opex

Mila has submitted information on opex for the company's bitstream service for the year 2014 and 2016 and furthermore, the opex for 2015 is submitted for comparison. The PTA uses information supplied by Mila in its assessment. The PTA also builds on data that shows financial separation in Mila's operations in accordance with the obligation for separation of accountancy.

As stated by Mila there is a significant increase in opex from the last analysis, where the opex used as a basis calculation of access prices for bitstream service was that of Siminn. In the opinion of Mila one can partly attribute the substantial increase in opex between 2012 and 2014 to Siminn having at that time underestimated costs. Costs for [...] were underestimated in the Siminn analysis. One can in part attribute this to the fact that a complete year of operations was not used as a reference. Mila also pointed out that with the rollout of street cabinets, the scope of operations increased.

In the light of this discrepancy in opex between 2012 and 2014, the PTA requested information on opex for Mila bitstream service in 2015, see Section 2.3.1.1 here above. Mila presented a overwiev of operating expenses in 2015 and gave explanations to the changes since 2014. From

Mila's overwiev it is evident that the total cost (including the costs of the local loop) had increased slightly from 2014 to 2015, from ISK [...] million to ISK [...] million. If, however, the cost of shared access and fibre to the street cabinet is excluded the cost remains almost the same between the years.

On 22 March 2017 Mila submitted the cost analysis updated with 2016 operational data. When opex for the years 2014, 2015 and 2016 are compared it comes to light that there is no great difference in the cost of Mila bitstream service between the years. In the Mila cost model the increase in the monthly fee for access to the distribution frame is taken into account when determining operating expenses. Also, the cost of fibre lines to the street cabinet is updated with the situation in December 2016. The cost of access to distribution frames and fibre lines to the street cabinet is increasing between years which can be attributed to Mila's VDSL roll-out and therefore the status at the end of the year is considered instead of the entire year. PTA does not object to these updates which take into account changes that are now taking place in the system. A comparison of the calculated opex of the bitstream services provided by Access 1 of the years 2014 and 2016 reveals that the increase in cost is insignificant or 0.16%. At the same time equivalents because of operating expenses increased by 3.85%.

A large element in opex of bitstream service today is the lease of the upper frequency range of the local loop but according to the Draft Decision on review of Mila tariff for local loop lease, the local loop charge will no longer be divided into upper and lower frequency ranges but instead only one charge will be paid for access to the local loop. This will mean that the cost for access to local loops will no longer be part of operation of the bitstream system, except for those local loops that are used for G.SHDSL service. The new Mila tariff for access to the copper local loop will come into force at the same time as the tariff for Mila bitstream service. For this reason there is no allowance for lease of local loops with the exception of local loops used for Mila G.SHDSL service. Míla calculates the cost of local loops for G.SHDSL based on the number of local loops used for the service.

The PTA conclusion is thus that the Míla opex for the year 2016 used as a basis for calculation of bitstream service provided through Access Option 1 amounts to a total of ISK [...] million.

2.3.2.2 Investment costs

In the PTA Decision no. 21/2014 it is stated that evaluation of investments shall be based on replacement cost of operational assets where next generation access networks (NGA) are taken into account. It was also stated in the Decision that installation, investment and opex of wholesale switches should be calculated into the monthly charge for Access Option 1.

According to PTA Decision no. 21/2014 the annuity depreciation method shall be used to calculate the cost of operational assets. When deciding annual capital cost for investments in the bitstream system, Mila is authorised to use the tilted annuity depreciation method. Evaluation of the lifetime of operational assets shall reflect their economical lifetime.

The company's investments (capex) in € for the years 2014 and 2015 are taken into account, using the average rate of exchange over the year 2016. At the request of the PTA, Mila submitted a copy of invoices as confirmation. The PTA considers that the Mila evaluation is mainly based on the replacement cost of operational assets where account is taken of the next generation access networks (NGA) in accordance with the tariff obligation to this effect. The PTA raised objections to the discount used by Mila on the purchase price of equipment, but

accepted the use of a [...]% discount on suppliers' list price as shown on invoices from Mila suppliers.

In accordance with instructions in PTA Decision no. 21/2014, investment cost of wholesale switches is now included in the total investment which is used as a basis for calculations of monthly prices for Mila xDSL service. Income from setup charges for wholesale switches that Mila has collected, are deducted from investment cost of the wholesale switches.

Replacement cost of investments is estimated at a total of ISK [...] million. Useful life of equipment is assessed at 7 years, internal cabling 20 years and software licences 8 years. The PTA endorses the shortening of useful life of DSL equipment from 8 years to 7 years because of the fibre-optic local loop rollout by Mila and other parties on the market and because of technical developments such as in mobile networks. The PTA does not raise objections to the 20 year useful life of the fibre-optic cabling in question. Useful life of 25 years has generally been used for fibre-optic in trunk lines and local loops, but in that case a mixture of useful life of trenches, conduits fibre-optic cable etc. are under consideration.

Mila uses the tilted annuity depreciation method when calculating annual capital cost with respect to price development. The same price development (tilt) is used as before, -5%.

PTA accepts the result of the cost model, which is that the that the annual capital cost used as a basis for calculations of the tariff for the bitstream service provided through Access Option 1 amounts to ISK [...] million.

2.3.2.3 Costs for tied working capital

It is normal to assume that funds may be tied in order to maintain operability and also normal to make a financial demand on this tied capital.

In Paragraph 962 in Section 10.5.5 (Obligation for price control) in PTA Decision no. 21/2014, which relates to market analysis of the wholesale market for broadband access (M5) it states:

"It is authorised to assume a working capital cycle of 30 days to assure normal operations."

Price control obligations pursuant to PTA Decision no. 21/2014 are still in force, as the Decision was not appealed to the Appellate Committee for Electronic Communications and Postal Affairs nor referred the courts and therefore has legal force with respect to Mila.

In accordance with the above specified obligation to this effect, Mila is authorised to calculate costs for a working capital cycle based on 30 day expenditure where a required rate of return is calculated on this amount. In accordance with the above, annual cost of tied capital is approximately ISK [...] million.

The PTA points out that the provision in the obligations is in accordance with recognised methodology, and has among other things been applied by the consultancy company Analysys Mason which has worked for Siminn to which Mila properly refers in a letter dated last 5 September. This is a rough estimate of the funds necessary to maintain normal operations at any given time.

The PTA also points out that working capital can be fully funded with accounts payables and other short-term debt, and furthermore that a short term asset base can provide higher revenue than interest costs in the short term debt base. One must therefore take more factors into account than Mila does when assessing working capital cycle, such as funding with short term debts which do not bear interest, and it seems that working capital, such as inventory and accounts receivable, are largely funded by trade payables and other Mila short term debts if one takes

into account the beginning and end of the year 2014. Mila has not demonstrated that funding of inventory for the company's bitstream service, is such that the company needs to be recompensed for this in excess of what the 30 day calculation rule gives.

2.3.2.4 Total costs

The following table shows a summary of total Mila costs for bitstream service through Access Option 1:

Total costs	
Local loop rental	[...]
DSLAM opex	[...]
Other opex	[...]
Total opex	**[...]**
Calculated replacement cost of investments	[...]
Annual capital costs	**[...]**
Tied working capital	**[...]**
Income from ports in wholesale switches	[...]
Income from setup charges	[...]
Income from multicasting	[...]
Income from VoIP	[...]
Income from domains and ports for interconnection	[...]
Total deductions	**[...]**
Total costs	**[...]**

2.3.2.5 Number of line equivalents:

The costs for Mila xDSL service in Access Option 1 are taken as a whole and then divided between varying services with the use of equivalents. The varying costs of service items and the speed of connections are taken into account when deciding line equivalents.

Mila uses 3 coefficients to decide line equivalents: a speed coefficient, a coefficient for opex and a coefficient for capex.

Business connections have a higher coefficient for opex than normal xDSL connections and Mila has specified the factors in operations that are taken into account in this connection. In addition to this, the number of ports in the number of underlying local loops affects the coefficient for G.SHDSL connections.

The Mila conclusion with respect to equivalents for G.SHDSL connections was that an equivalent for opex of a 4Mb/s G.SHDSL connection was higher than that for a G.SHDSL 5 Mb/s connection. Last 24 November, the PTA requested a further explanation of this. In Mila's

reply was stated that 4 Mb/s G.SHDSL connections were built with two G.SHDSL connections that had been bonded to form one 4 Mb/s connection. In this instance older technology is being used that is based on ATM which can only handle 2 Mb/s per line and port. For a 5 Mb/s connection one needed on the other hand a G.SHDSL.bis connection, which required one line and one port. G.SHDSL.bis is based on Ethernet protocol. Then it was stated by Mila that the company planned to stop offering new connections on 4 Mb/s G.SHDSL and to offer instead 5 Mb/s on G.SHDSL.bis.

The coefficient for capex takes into account the number of ports used for each service.

The number of equivalents for opex is calculated at [...] but because of capex the equivalents are [...].

The PTA makes no objections to Mila calculations of line equivalents or to the Mila conclusion on line equivalents for each service.

2.3.2.6 Calculation of lease price

The main criteria of the updated Míla cost model are as follows:

- Opex is mainly based on operations of the year 2016. The opex of the years 2014 and 2015 was also provided by Mila for the purposes of comparison. The cost for fibre-optic in the street cabinet is based on the cost in December 2016 calculated to 12 months. The cost of access to distribution frames was also updated.
- Capex is calculated based on replacement cost of investments. The company's investments in Euro over the years 2014 and 2015 are used for this purpose. The cost is converted to ISK using the average exchange rate of the Euro for the year 2016. Real costs for installation of equipment in the year 2014 is used and the installation cost for individual equipment items is estimated from this. The installation cost is indexed with the wage index.
- The number of units is based on the number of connections at the end of 2016.
- The weighted average cost of capital (WACC) is 7,0% for the year 2016.

Mila calculates total cost of operation of its xDSL service and this cost belongs to Access Option 1 less transmission cost through the Mila trunk line network and the Siminn MPLS-IP network. Estimated income from setup charges, access to ports, multicasting and VoIP along with domains and ports for interconnection are deducted from opex in order to decide the monthly charge for xDSL connections. Deducted income is estimated on the basis of sold units.

The unit price comprises a share in annual capital cost of line cards of other annual capital costs and of opex. Added to this are costs for local loops and unit costs for G.SHDSL connections.

Opex per equivalent is ISK [...] /month. This cost is calculated based on total opex and tied working capital after deducting income. As specified here above the number of equivalents, [...], is used for opex.

Annual capital cost for line cards varies depending on whether the cards are for ADSL/VDSL or for G.SHDSL. Annual capital cost for ADSL/VDSL line cards for each line equivalent is ISK [...] /month while the cost for G.SHDSL line cards is ISK [...] /month. There are [...] ADSL/VDSL line equivalents while G.SHDSL line equivalents are [...]. Other capital costs for each equivalent are [...] /month and those calculations are based on [...] equivalents for annual capital costs of equipment.

Equivalents are used to calculate the monthly price of varying xDSL connections where account is taken of characteristics and speed. The equivalence coefficient of each connection can be seen in the following table:

Service	Local loop	Annual capital cost	Annual capital - line cards	Opex
ADSL and VDSL	0	1.00	1.00	1.00
ADSL+ 2 Mb/s	0	1.00	1.00	3.00
ADSL+ 4Mb/s	0	1.20	1.20	3.60
ADSL+ 6 Mb/s	0	1.30	1.30	3.90
ADSL+ 8 Mb/s	0	1.35	1.35	4.05
ADSL+ 14 Mb/s	0	1.40	1.40	4.20
VDSL + 50 Mb/s	0	1.60	1.60	4.80
VDSL + 100 Mb/s	0	2.00	2.00	6.00
G.SHDSL 2 Mb/s	1	2.00	2.00	3.00
G.SHDSL 4 Mb/s	2	4.40	4.40	4.40
G.SHDSL 5 Mb/s	1	3.60	3.60	3.60
G.SHDSL 10 Mb/s	2	5.40	5.40	5.40
G.SHDSL 15 Mb/s	3	8.40	8.40	8.40
G.SHDSL 20 Mb/s	4	12.00	12.00	12.00

The cost for each equivalent is multiplied by the equivalents of each connection to find the unit price for varying connections. The conclusion can be seen in the following table:

Service	Local loop	Annual capital cost	Annual capital cost- line cards	Opex	Total
ADSL and VDSL	0	[...]	[...]	[...]	691
ADSL+ 2 Mb/s	0	[...]	[...]	[...]	1,573
ADSL+ 4Mb/s	0	[...]	[...]	[...]	1,888
ADSL+ 6 Mb/s	0	[...]	[...]	[...]	2,045
ADSL+ 8 Mb/s	0	[...]	[...]	[...]	2,124
ADSL+ 14 Mb/s	0	[...]	[...]	[...]	2,203
VDSL + 50 Mb/s	0	[...]	[...]	[...]	2,517
VDSL + 100 Mb/s	0	[...]	[...]	[...]	3,147
G.SHDSL 2 Mb/s	[...]	[...]	[...]	[...]	3,368
G.SHDSL 4 Mb/s	[...]	[...]	[...]	[...]	6,158
G.SHDSL 5 Mb/s	[...]	[...]	[...]	[...]	4,144
G.SHDSL 10 Mb/s	[...]	[...]	[...]	[...]	6,918
G.SHDSL 15 Mb/s	[...]	[...]	[...]	[...]	10,605
G.SHDSL 20 Mb/s	[...]	[...]	[...]	[...]	14,749

In accordance with that stated above, the PTA endorses the Mila calculations of share of individual service items in opex and annual capital cost.

2.4 Access to ports on wholesale switches and analogous equipment

2.4.1 Míla cost analysis

In the Mila cost analysis dated 31 August 2015 the following is stated with respect to the number of wholesale switches:

"In the PTA, market analysis of wholesale bitstream access, the PTA decided that the cost of wholesale switches should be part of the monthly charge for Access Option 1.

Mila points out that one must take account of the fact that wholesale switches and analogous equipment are also used for business connections and that it is therefore necessary to charge separately for access to ports for business connections.

In addition to offering ports for business connections on ISAM and wholesale switches, Mila can offer this service on MPLS-TP equipment (insofar as the party in question is on Access Option 1). This equipment is in the opinion of Mila, comparable with wholesale switches with respect to ports for business connections.

It is therefore rather unclear to which market this product should belong. The ports are for connections to leased line connections within the access network or trunk line network. ISAM equipment and wholesale switches belong to Market 5, MPLS-TP belongs to the trunk line market, but as was stated previously business connections can belong to Market 6, the trunk line market, or to both markets.

Despite this lack of clarity, this product will be presented on Market 5.

The price difference between 1 Gb/s and 10 Gb/s for ports on wholesale switches is in the opinion of Mila far too small today. A company which leases more than two to three 1 Gb/s ports will rather setup its own equipment when the price difference is so small, and Mila customers have already cancelled ports and setup their own equipment where this is economical. It is therefore necessary to correct this when a new tariff is decided.

Mila is interested in offering access to ports on equipment comparable to wholesale switches where such equipment is available, such as for example MPLS-TP or ISAM equipment, in order to minimise investments. In the opinion of Mila it is therefore normal to have the same price for ports whether in the case of wholesale switches, MPLS-TP or ISAM equipment. The price for ports on Ethernet service with 1 Gb/s data transfer speed is ISK 7,000 per month while 10 Gb/s costs ISK 35,000. This price difference is normal in the opinion of Mila.

Mila therefore expects that access to ports for business connections on ISAM, MPLS-TP and Ethernet service will be ISK 7,000 for 1 Gb/s connections and ISK 35,000 for 10 Gb/s connections."

According to the Mila updated cost analysis dated 22 March 2017 the estimated revenue of the business ports connections are ISK [...] annually and are deducted from the cost base for Access Option 1.

Mila mentioned that the condition for access to ports is that the customer in question offers bitstream service on Access Option 1 at the location where access is requested to ports.

The following table shows Mila prices for access to ports for business connections in wholesale switches and comparable equipment:

	Monthly fee
1 Gb/s.....	7,000
10 Gb/s.....	35,000

2.4.2 The position of the PTA

As stated by Mila it was prescribed in PTA Decision no. 21/2014, that the cost for wholesale switches should be included in the monthly price for Access Option 1 in the same manner as for cost for ISAM equipment. As Mila also uses ISAM and wholesale switches for bconnections, income from this source is deducted from the cost used as the basis for monthly prices for Access Option 1.

The PTA makes no objections to Mila harmonising prices for access to ports for business connections and for linking the price to the price for access to Ethernet service ports (MPLS-TP). Estimated income from these ports which is deducted, takes into account this change in price.

The monthly charge for access to ports will therefore be ISK 7,000 for a 1 Gb/s port and ISK 35,000 for a 10 Gb/s port.

2.5 Transmission of TV material - multicast and unicast

2.5.1 Míla cost analysis

In the Mila cost analysis dated 31 August 2015, Mila points out that in the PTA Decision no. 21/2014 on the designation of a company with significant market power and on the imposition of obligations on the markets for wholesale access to access networks provided at a fixed location (M4) and wholesale broadband access (M5) it was stated that Mila should offer quality controlled (QoS) bitstream access, i.e. transmission of TV material - multicast and unicast.

End-users with multicast have in most instances also access to unicast and vice versa. Mila was upgrading and predicted that all end users with TV service would also have access to unicast. In Mila's opinion, it is therefore not necessary to offer separate tariffs for transmission of multicast and transmission of unicast.

Mila assumes that transmission of unicast will be included in the tariff for transmission of multicast.

Mila proposes that the price for multicast should be calculated in the same manner as the existing price, i.e. to assume that the cost of the service would be [...]% of the cost of DSLAM, annual capital cost and funds tied in inventory.

In the light of the fact that the cost division [...] between services was based upon older traffic statistics when TV service (multicast) was relatively new, the PTA requested permission about the division of traffic in a letter from the Administration to Mila dated 24 June 2016.

The following was stated in Mila's reply dated 5 September 2016:

"*Mila has not been measuring traffic by type but when this request was made, Mila technical staff examined whether it was possible to measure traffic in the existing measuring systems of the xDSL system. After studying the matter for some time the conclusion is that the existing measuring system does not provide this possibility, i.e. to measure traffic in each VLAN. Mila therefore examined other possible ways to measure traffic. Mila has access to traffic measurements from Siminn, and according to them the maximum download traffic on Siminn BBRAS is about [...] Gb/s. At the same time there is a maximum of [...] connections with activity on the Siminn BRAS system. One can therefore conclude that the average Internet traffic download at peak time is about [...] kb/s for each connection. Mila also has access to total traffic to Siminn in Breiðholt where the peak download traffic is about [...] Gb/s. The total number of users passing through the connection is [...] as of 2 September 2016. Given these figures, the total download traffic per connection is about [...]. kb/s i.e. independent of type Of this, Internet traffic is [...] kb/s which means that IPTV and VoIP are [...] kb/s. According to Siminn measurements the average maximum bandwidth on each VoIP connection is approximately [...] kb/s. At Breiðholt, [...] VoIP connections are registered so one may conclude that maximum VoIP traffic through Breiðholt is [...] kb/s which represents about [...] kb/s/connection. IPTV is thus about [...] kb/s. It should be noted that in these calculations, upload traffic is not taken into account, but as the PTA is aware there is almost no TV traffic going from users.*

If one uses this division of traffic to divide the system side of costs, then this [...] is divided such that Internet has about [...]%, TV about [...]% and telephone service [...]%.

Mila considers however that one can regard Internet as basic service on the connection and IPTV and VoIP as value-added service on the systems. One can support this view by looking at the new rules on net neutrality where strong emphasis is placed on Internet connections ahead of other service such as IPTV. In support of this one can also point out that both IPTV and VoIP service can today be provided almost seamlessly through the Internet with OTT service. OTT has the competitive advantage over traditional IPTV and VoIP that one does not need to pay for traffic in the xDSL system or Internet. Mila therefore considers it reasonable, even though one could argue that today, IPTV takes a greater proportion than the [...]% of costs, that one should not change these coefficients, in order to avoid distorting this market more than will happen without intervention. [...] Internet will then need to bear all this cost, come what may."

In a letter from the PTA to Mila, dated 20 November 2016, the Administration requested that a [...]% share in costs should be used in accordance with what was indicated by the traffic. In the opinion of the Administration it was not possible to ignore the increase in traffic that had taken place and it was normal that TV service would take its share of total cost.

In the revised Mila cost analysis dated 22 March 2017, one can find the following calculations of TV costs:

	2016
DSLAM opex.....	[...]
Annual capital cost of equipment.....	[...]
Capital tied in inventory.....	[...]
	[...]
Share of multicasting.....	[...]
Total costs.....	[...]
Number Mb/s.....	[...]
Price per month. Mb/s.....	**22.33**

The Mila conclusion on the price for transmission of TV material - multicast and unicast will therefore be:

Price per month per Mb/s.....	22.33

The Mila tariff is based on the number of set-top boxes on each DSLAM. It is assumed that data volume will increase as set-top boxes increase. The following table shows estimated data transfer needs with reference to the number of set-top boxes:

Number	Data volume
-9	50
10 -29	130
30 -49	160
50 -99	240
100 -199	360
200 -399	560
400-	600

Mila estimates that the annual revenues from multicast- and unicast, are ISK [...]. The estimate is based on the income from multicast in 2016 taking into account the changes in the tariff.

2.5.2 The position of the PTA

In PTA Decision no. 21/2014 is stated that in the Mila cost analysis a cost based assessment of the share of Internet service, telephony service (VoIP) and distribution of video material (IPTV/VoD) in use of Mila bitstream system shall be made when pricing various kinds of service. This shall be done on the basis of the number and size of connections, traffic volume and varying requirements for priority and quality of service (QoS) in Mila systems.

In a letter from Mila dated 5 September 2016 it is stated that although traffic related to IPTV had increased, Mila requested an unchanged division of costs between Internet, IPTV and VoIP, i.e. that the share of multicast remain at [...]% of the cost of DSLAM, of annual capital costs of equipment and of capital tied in inventory, in accordance with the older division. The PTA cannot accept this and with reference to the text of the above specified decision, the [...] % indicated by the traffic is the minimum share of cost, as this figure does not take into account increased weighting for priority and quality of service. It was not possible to ignore the increase in traffic that had taken place and it was normal that TV service takes its due share in the cost.

Increased share of multicast in costs causes a significant increase in unit prices but at the same time this increase decreases the share of Internet service in total costs which results in unit prices being lower than they would be otherwise.

2.6 IP voice telephony service (VoIP)

2.6.1 Míla cost analysis

In the Mila analysis dated 31 August 2015. It is stated that very few end users have been using IP voice telephony service over Mila copper lines. At that time there were only about [...] VoIP connections on the Mila system. For this reason Mila considered there to be no reason to embark on cost analysis of this product and proposed that the price continued unchanged. The Mila tariff for IP voice telephony service (VoIP) will therefore be as follows:

Price per month per unit (EUDP).	55.85

In the updated cost analysis the income from VoIP are estimated is ISK [...] per annum and this amount is deducted from the cost base for Access Option 1.

2.6.2 The position of the PTA

The PTA raises no objections to the Mila prices for IP voice telephony service remaining unchanged. As has been stated here above, the income from this service is deducted from total costs for Access Option 1. In Mila's updated analysis with bookkeeping information for the year 2016 it is evident that the income from VoIP has increased from 2014. According to what has been stated by Síminn about the forthcoming closing of the PSTN system it can be expected that the VoIP service will continue to increase within the next few years. PTA therefore believes it is necessary to review Mila's tariff for VoIP in the next update of the bitstream cost analysis.

2.7 Access Option 3

2.7.1 Míla cost analysis

In the Mila cost analysis it is stated that Mila leases access to the Siminn MPLS network for traffic in Access Option 3.

In the spring of 2015 Siminn started to cancel connections that were used for Access Option 1 at those locations where Siminn does not offer TV service. The company decided to transfer to Access Option 3 at the same time at these locations. Mila's Access Network will therefore need to lease these connections from the Mila Trunk Line Network. This will cause the unit price to increase substantially as the Siminn tariff is based on average price which means that the large number of customers in the Capital City Area subsidise locations with few inhabitants in the countryside. All locations where Siminn transferred to A3 were very small places in rural areas which means that leased line costs for these locations is high for each user. The lease price for those locations that Mila leases directly between departments is ISK [...] according to the updated cost analysis dated 22. March 2017.

Mila spreads this cost in the same proportion as Siminn does in its tariff. The price for transit will therefore be as follows:

	Siminn unit price	Quantity	Lease price to Siminn	Internal lease	Total cost	Unit price
ADSL - Access Option 3.....	[...]	[...]	[...]	[...]	[...]	[...]
VDSL , Access Option 3.....	[...]	[...]	[...]	[...]	[...]	[...]
VDSL + 50 Mb á Aðgangsleið 3.	[...]	[...]	[...]	[...]	[...]	[...]
VDSL+ 100 Mb.....	[...]	[...]	[...]	[...]	[...]	[...]
ADSL+ 2 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
ADSL+ 4 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
ADSL+ 6 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
ADSL+ 8 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
ADSL+ 14 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
SHDSL+ 2 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
SHDSL+ 4 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
SHDSL+ 5 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
SHDSL+ 10 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
SHDSL+ 15 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
SHDSL+ 20 Mb/s.....	[...]	[...]	[...]	[...]	[...]	[...]
			[...]	[...]	[...]	

In the revised Mila cost analysis dated 22. March2017 the conclusion on price for Access Option 3 is as follows:

	Transit	A1 price	A3 Total
ADSL and VDSL.....	515	691	1,205
ADSL+ 2 Mb/s.....	819	1,573	2,392
ADSL+ 4Mb/s.....	1,108	1,888	2,996
ADSL+ 6 Mb/s.....	1,337	2,045	3,383
ADSL+ 8 Mb/s.....	1,531	2,124	3,655
ADSL+ 14 Mb/s.....	1,892	2,203	4,094
VDSL + 50 Mb/s.....	4,089	2,517	6,606
VDSL + 100 Mb/s.....	5,789	3,147	8,936
SHDSL+ 2 Mb/s.....	946	3,368	4,314
SHDSL+ 4 Mb/s.....	1,337	6,158	7,495
SHDSL+ 5 Mb/s.....	1,831	4,144	5,975
SHDSL+ 10 Mb/s.....	2,114	6,918	9,032
SHDSL+ 15 Mb/s.....	2,589	10,605	13,194
SHDSL+ 20 Mb/s.....	2,990	14,749	17,739

Setup charge and takeover of xDSL service are to remain unchanged:

Setup charge *ISK 3,166.*

Taking over xDSL service *ISK 1,329"*

2.7.2 The position of the PTA

The price for Access Option 3 is based fundamentally on criteria and calculations for Access Option 1 with the addition of costs for data transit. Mila purchases transit in most instances from Siminn, where traffic goes through the Siminn MPLS-IP network. This is in accordance with the Competition Authority Settlement with Siminn from 2013 (which was reviewed in 2015) as Mila has considered that option more economical than to develop its own transit system for this service by leasing its own trunk line connections. As stated by Mila here above,

Siminn no longer offers connections to all locations through its MPLS-IP network and Mila therefore needs to purchase its own connections for this transit in some instances. Mila divides this cost between types of connections in the same proportion as other transit costs are divided.

The above specified prices for Access Option 3 are in accordance with the Mila criteria and calculations that the PTA endorsed with amendments.

2.8 Interconnection of Internet service providers to Mila xDSL and GPON systems for Access Option 3

2.8.1 Míla cost analysis

In the Mila cost analysis dated 31 August 2015, the following is stated with respect to access to domains and ports:

"In PTA Decision no. 21/2014. there is specific discussion on access to domains and ports for interconnection. On 23 December 2014 the PTA published Decision no. 41/2014 on price and conditions for domains and ports for interconnection. Mila considers there to be no reason to review these prices for the time being.

The prices for domains and ports are as follows:"

Domains and ports	
Set up charge	
Setting up of the first domain.....	114,173
Setting up of additional domain.....	29,543
Price per month:	
Port up to 1 GB/s.....	9,986
Port 10 Gb/s.....	59,921

2.8.2 The position of the PTA

The PTA raised no objections to the Mila prices for interconnection of Internet service parties with Mila xDSL and GPON systems for Access Option 3 remaining unchanged. These prices are based on Siminn prices in which there has been no increase since Mila began providing this service subsequent to PTA Decision no. 41/2014 and there is therefore no reason to change this tariff for the time being.

2.9 Access Option 2

2.9.1 Míla cost analysis

Mila submitted a cost analysis for Access Option 2 on 31 May 2016. In the Mila analysis the following is stated:

"Analysis of Access Option 2 is quite problematic. Mila considers that there is a maximum of two customers for Access Option 2 and there is every indication given the situation today that only one customer will be interested in the product. Cumulative impact on leased line costs is therefore small and even none at all and it is clear that the price for Access Option 2 will be

much higher than the price for Access Option 3 as urban areas subsidise the lease charge for Access Option 3 through the MPLS tariff.

Many factors influence calculation of the lease price, for example what are the locations, how many users are there at these locations and what are the request for bandwidth. It is therefore extremely problematic to make a tariff where price criteria hold, whether customers choose to use Access Option 2 at the relevant location or not.

There are obligations on Mila for separation of accountancy between operational units. According to these obligations, Mila is unauthorised to sell products within Mila at a price other than applies to other parties. To be able to offer Access Option 2, Mila Access network must therefore purchase a leased line connection from Trunk network at the same price as other electronic communications companies. If more than one party requests Access Option 2, it is possible to share this connection and electronic communications companies must pay a proportionately lower price than they would have done if they had had to lease the connection separately.

As things are today, only one party has declared an interest in access to Access Option 2, which means that there is no prospect of the sharing of leased line connections being possible. Mila is not prepared to have Access network take the operational risk of leasing connections at full price and allowing for some kind of sharing as the loss on the connections could be very significant if only one party chose this service.

The tariff for Access Option 2 will be according to the tariff for Ethernet service and Mila Trunk line network will sell this service directly to customers.

In addition to this, Access network customers pay a price for connection to end users according to the tariff for Access Option 1."

2.9.2 The position of the PTA

The PTA accepts that Mila shall charge for the service in the following manner:

Pricing of Access Option 2 will be according to the tariff for Ethernet service and Mila Trunk line network will sell this service directly to customers. In addition to this, customers will pay for connection to end users according to the tariff for Access Option 1.

If more than one party requests Access Option 2 at the relevant location, then Mila shall endeavour to share connections to Mila counterparties in order that he can enjoy lower unit prices. Reduction of unit prices shall be in accordance with the benefit gained by sharing. This is in accordance with the Mila stated position that if more than one party requests Access Option 2, it is possible to share this connection and electronic communications companies can thus pay a proportionately lower price than they would have done if they had had to lease the connection separately.

2.10 Open virtual access (VULA)

2.10.1 Míla cost analysis

Mila submitted a cost analysis for VULA on 31 May 2016. In the Mila analysis the following is stated:

"***Setup costs***

There are two types of Mila setup costs for access to VULA. On the one hand there is a specific cost for each customer that requests VULA and on the other hand a cost which is possible to use for more than one customer.

As this is a project which has previously not been undertaken at Mila, there is considerable uncertainty about what the real cost will be. It will require significant software work, both internal and external work, testing and project management. Calculations of setup costs are therefore only based on the evaluation by specialists Mila of the work that needs to be done.

Specific tasks:

When customers request VULA, the following tasks always need to be done:

1. *Functionality for identifying customers:*

   This is work for an employee at Access network concerning monitoring and testing, work in Disa (access systems control system) and IT work on the service web and NMS.

   Settings need to be entered Access network equipment and the functionality needs to be programmed into support systems such as Dísa, service web, communications portal and NMS. There is also management and testing of the service. This constitutes both internal and external work. Mila estimates that work on these tasks is about 120 man-hours.

2. *Special VLAN ID on interconnection and end user devices.*

   This is work for an employee at Access network concerning monitoring and testing, work in Disa (access systems control system) and work on the service web and NMS.

   Settings need to be entered into Access network equipment and the functionality needs to be programmed into support systems such as Dísa, service web, communications portal and NMS. There is also supervision and testing of the service. This constitutes both internal and external work. Mila estimates that work on these tasks is about 110 man-hours.

3. *Supervision, project management and communications with service purchasers during the introduction phase.*

   This is work for specialists at Access network and IT systems and for Access network product managers. Mila estimates that work on these tasks is about 50 man-hours.

Mila estimates that the cost of setting up the possibility of VULA for each customer is about 280 man-hours. Given an hourly rate of ISK 15,000, the cost is ISK 4,200,000.

Work which can be used by more than one customer:

Mila has evaluated the work that can be used by more than one party with VULA:

1. *Varying speed*

   This is work for an employee at Access network concerning monitoring and testing, work in Disa (access systems control system) and work on the service web and NMS.

Settings need to be entered into Access network equipment and the functionality needs to be programmed into support systems such as Dísa, service web, communications portal and NMS. There is also management and testing of the service. This constitutes both internal and external work. Mila estimates that work on these tasks is about 150 man-hours.

2. *Employ G.INP error correction*

   This is work for an employee at Access network concerning monitoring and testing, work in Disa (access systems control system) and work on the service web and NMS. Settings need to be entered into Access network equipment and the functionality needs to be programmed into support systems such as Dísa, service web, communications portal and NMS. There is also management and testing of the service. This constitutes both internal and external work. Mila estimates that work on these tasks is about 120 man-hours.

3. *Possibility of using SRA*

   This is work for an employee at Access network concerning monitoring and testing, work in Disa (access systems control system) and work on the service web and NMS. Settings need to be entered into Access network equipment and the functionality needs to be programmed into support systems such as Dísa, service web, communications portal and NMS. There is also management and testing of the service. This constitutes both internal and external work. Mila estimates that work on these tasks is about 120 man-hours.

4. *Number of MEC addresses on each port*

   This is work for an employee at Access network concerning monitoring and testing, work in Disa (access systems control system) and work on the service web and NMS. Settings need to be entered into Access network equipment and the functionality needs to be programmed into support systems such as Dísa, service web, communications portal and NMS. There is also management and testing of the service. This constitutes both internal and external work. Mila estimates that work on these tasks is about 150 man-hours.

5. *Management of DLM at each end user*

   This is work for an employee at Access network concerning monitoring and testing, work in Disa (access systems control system) and work on the service web and NMS. Settings need to be entered Access network and equipment and the functionality needs to be programmed into support systems such as Dísa, service web, communications portal and Network Analyzer-Copper. There is also management and testing of the service. This constitutes both internal and external work. Mila estimates that work on these tasks is about 100 man-hours.

6. *More VoIP channels on each connection*

This is work for an employee at Access network concerning monitoring and testing, work in Disa (access systems control system) and work on the service web and NMS. Settings need to be entered into Access network equipment and the functionality needs to be programmed into support systems such as Dísa, service web, communications portal and NMS. There is also management and testing of the service. This constitutes both internal and external work. Mila estimates that work on these tasks is about 60 man-hours.

It is therefore Mila's assessment that work with programming and technical registration in Mila systems, the service web, Dísa and NMS is about 700 man-hours which is ISK 10,500,000. It is assumed that the useful life of the investment is 5 years and WACC is 7.3% as the PTA has decided WACC for the year 2015 at 7.3%. Annual capital cost is thus ISK 2,581,456.

Mila must pay software licenses for SRA and G.INP which is based on the number of VULA connections. Estimated cost is ISK [...][10] or EUR [...] per connection. A Euro exchange rate of ISK 134[11] is used and costs are spread over a period of 6.67 years Annual capital cost is thus ISK [...].

Opex

Mila estimates other opex as twice the amount of annual capital cost which is in accordance with the proportion of annual capital cost in cost analysis for Market 5 which was a little under twice the amount of annual capital cost in the analysis. The opex is mainly in maintenance of computer systems and general management and participation in Mila support systems. One could in reality justify even higher opex than for normal ADSL or VDSL connections as the level of complexity in VULA is much greater than on Access Option 1. Opex is estimated at ISK 5,162,912 per annum which is the equivalent of about 344 man-hours per annum.

Number of connections

It is not at all clear whether or which customers will request VULA. In April, just under 72,000 VDSL and GPON connections were invoiced, of which about 12,000 were in Access Option 3. When evaluating the number of connections that Mike transferred to VULA, the number of connections on Access Options 1 and 3 were examined by customer.

Here below one can see the number of customers and the division of connections on Access Options 1 and 3: [...]
It is assumed that only [...] could possibly use VULA. It is also assumed that 50% of the connections of [...] in Access Option 3 would transfer to Access Option 1 and become VULA connections if the company in question chose to go to VULA. In this way, there would be [...] possible customers with [...] connections. There is a great deal of uncertainty as to how many of them would use VULA. For this reason it is assumed that half of the connections and customers would order VULA which means [...] customers and [...] connections.

Lease price:

A separate setup charge is allowed for in calculations for the price for VULA, ISK 4,200,000, which is equivalent to the cost that Mila considers will be incurred for each customer in VULA

[10] Updated in accordance with a new reference for the rate of exchange for the year 2016.
[11] Updated in accordance with a new reference for the rate of exchange for the year 2016.

access. In addition to this, the intention is to have a fixed monthly charge for access to VULA and a monthly charge per connection.

The annual total cost of VULA is assessed as follows: [...]
Mila considers it normal that each customer pay a fixed monthly charge for VULA access, regardless of the number of connections. VLA requires a significant amount of management and maintenance on computer systems, which is independent of the number of connections. Mila assesses the fixed charge for VULA access as 20% of the setup charge which is ISK 840,000 per annum or ISK 70,000 per month.

It is assumed that [...] customers will order VULA access. Annual income for them will be ISK [...] and this will be deducted from total costs. The remainder is ISK [...]. The number of VULA connections is estimated at [...]. The lease price per unit is accordingly ISK 79.

According to the above the tariff for VULA is:

Set up charge.....	4,200,000	ISK
VULA access charge.....	70,000	ISK per month
VULA monthly charge.....	79	ISK per connection

Other service

If separate service is requested, other than service specified in the Mila reference offer such as measurements from Network Analyser or special information regarding TV service, then this work is charged according to Mila service tariff."

In an email to Mila dated 11 November 2016, the PTA requested further explanations on the Mila tariff for VULA. With reference to the Mila draft reference offer on Mila VULA service, the PTA requested more detailed explanation of what was included in the Mila VULA tariff.

In the Mila answer, dated 17 November 2016, the company submitted more detailed information on how Mila planned to collect the cost of service related to VULA. It was stated there that the cost in question in the cost analysis for VULA was solely for setup of VULA and for its possibilities for use. In addition to this the customer paid according to Access Option 1 (A1) for each connection and service. This would be modelled on the following A1 tariff[12]:

	Price
VDSL.....	691
VDSL + 50 Mb/s.....	2,517
VDSL + 100 Mb/s.....	3,147

VDSL is according to residential connections with speeds of 50 Mb/s or 100 Mb/s.

In the reference offer currently being prepared, there is a table with the speed options on offer:

[12] Prices for access to VDSL connections in the text below have been adapted to the changed result of the cost model Mila that was updated on 22. March 2017.

VDSL 2, line speed and TV service

Product	Line speed download	Lines speed upload	Multicast channels (quantity)	Multicast CAC
VDSL2 30	30 Mb/s	10 Mb/s	<= 5	<= 30 Mb/s
VDSL2 70	70 Mb/s	30 Mb/s	<= 5	<= 40 Mb/s
VDSL2 100	Max	30 Mb/s	<= 5	<= 40 Mb/s
VDSL2 business 30	30 Mb/s	10 Mb/s	<= 5	<= 30 Mb/s
VDSL2 business 70	70 Mb/s	30 Mb/s	<= 5	<= 40 Mb/s
VDSL2 business 100	Max	30 Mb/s	<= 5	<= 40 Mb/s

The above specified table shows the technical options available in settings, but not necessarily the categorisation shown in the tariff.

Mila stated that there is the same price for VDSL (ISK 691) regardless of whether the equipment is configured for VDSL2 30, 70 or 100.

There is however another price for business connections. For the connections with 30 Mb/s and 70 Mb/s connections the price is equivalent to VDSL+ 50 Mb/s (ISK 2,517) and for VDSL business 100 Mb/s the price is as per VDSL+ 100 Mb/s (ISK 3,147). The reason why the price for 70 Mb/s is equivalent to the price for VDSL+ 50 Mb/s is that on top of this speed there is an additional 20 Mb/s added for TV service.

The tariff will thus be as follows:

	VULA access charge	A1	Total
VDSL2 30.....	79	691	770
VDSL2 70.....	79	691	770
VDSL2 100.....	79	691	770
VDSL2 business 30.....	79	2,517	2,596
VDSL2 business 70.....	79	2,517	2,596
VDSL2 business 100.....	79	3,147	3,226

Mila also stated that settings for multicast were included in the VULA tariff and that multicast would be invoiced in the same manner as in Access Option 1.

Mila then specified that access to ports would be included in the price for VULA in line with the way cost analysis for A1 was structured.

With respect to the PTA question on whether the setup charge was independent of the number of locations where customers wish to purchase VULA service, Mila pointed out that the VULA setup charge was a one-off charge which meant that the additional locations had no impact on costs to the customer.

2.10.2 The position of the PTA

The PTA has examined the criteria and calculations for VULA service and has examined the tariff for analogous service in neighbouring countries. For the time being, the PTA raises no objections to the Mila conclusions.

The criteria allow for [...] customers having access and that the minimum number of connections is just under [...] thousand which is based on the number of connections in Access Option 1 and half of the connections in Access Option 3.

This is a new service that Mila has not previously provided which makes it difficult to estimate demand for the service, and in addition to this there is a great deal of uncertainty about the cost of setup and of the operation of the service. For this reason the PTA considers it necessary that Mila identify in a precise manner the recorded work hours and other costs for licence fees, implementation and operation of VULA access if the access is actually introduced. The above will be used as a basis for review of the tariff which is expected to take place within a year from the publication of this Decision.

The conclusion is that the setup charge for Mila VULA service will be ISK 4,200,000 while the monthly charge will be on the one hand, a fixed charge of ISK 70,000/month and on the other hand, ISK 79/month for each connection. The Mila VULA tariff applies both to VDSL and fibre-optic connections.

2.11 The PTA conclusion

In PTA Decision no. 21/2014, the Administration imposed an obligation on Mila for price control for the company's bitstream service with the authority of Article 32 of the Electronic Communications Act. With reference to Paragraph 4 of Article 32 of the same Act, it was prescribed that the tariff for Mila bitstream service be cost oriented on the fulfilment of certain conditions, see Section 1.1 here above.

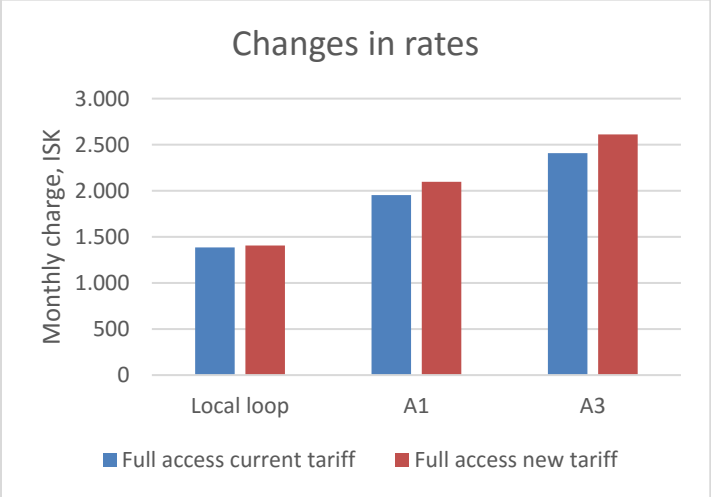
Pursuant to the PTA Decision, Mila submitted a cost analysis for the company's bitstream access on 31 August 2015. The cost analysis is based on information from Mila bookkeeping. Opex is based on Mila opex for the company's bitstream service for the year 2016 but opex in the years 2014 and 2015 are also considered for the purposes of comparison. Capex in the Mila calculations was based on the replacement cost of operational assets where account was taken of the next generation access networks (NGA) in accordance with the tariff obligation to this effect.

During processing of the cost analysis at the PTA, the Mila cost model was revised a number of times subsequent to comments from the Administration. In response to a request from the PTA Mila updated the cost model on 22 March 2017 with costing data from 2016,. This model shows the Mila final conclusion. Calculated prices for bitstream access are based on the opex for the year 2016 and capex based on replacement cost for the year 2016.

The capex in the cost analysis is based on the estimated number of necessary equipment needed to fulfil the need of the current number and location of end-users. The current structure of Mila's network is also taken into account. Since Mila has recently invested in VDSL systems the unit prices used in the cost model are current costs. PTA has examined in detail Mila's assumptions in calculating replacement cost of the investment required for the provision of the bitstream service.

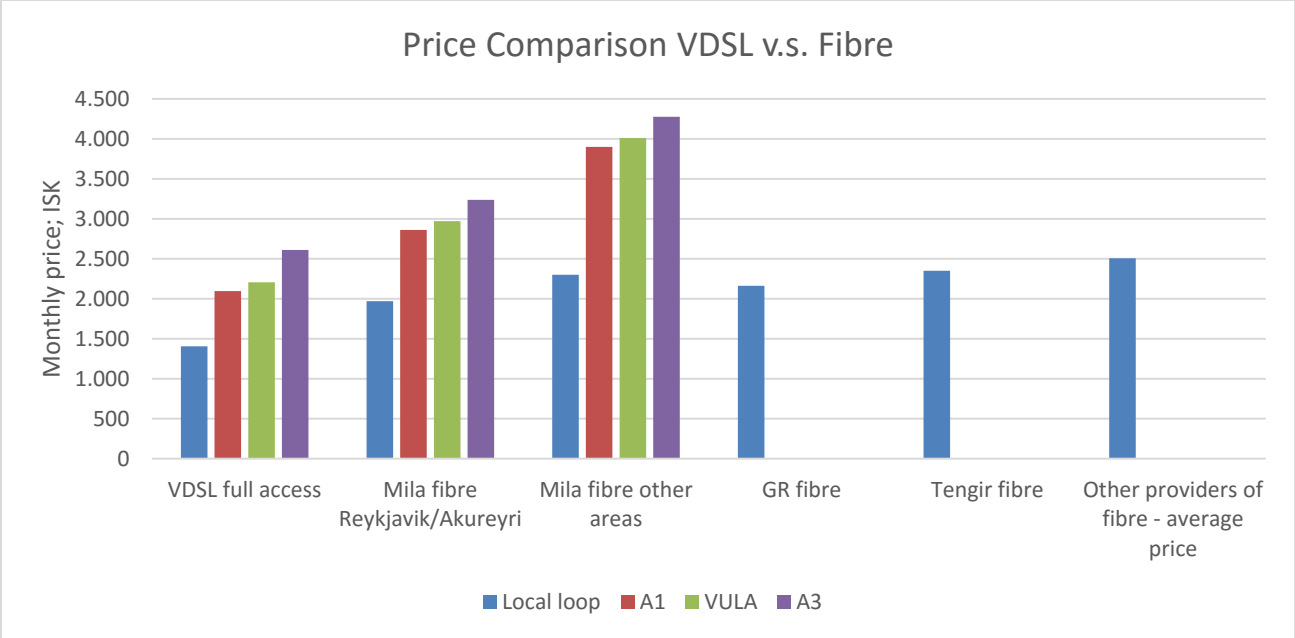
With respect to opex then PTA has now a comparison of three years after the bitstream was transferred from Síminn to Mila. PTA does not object to the increase in opex as compared to Síminn cost analysis, taking into account the explanations that Mila has presented.

The following figure shows the changes in the tariff resulting from this conclusion for full access to the local loop to individuals:



As can be seen from the figures, the increase is relatively low and will not disrupt the price relationship between the local loop, Access Option 1 and Access Option 3.

PTA has gathered information about corresponding service available in this country. With the increase of fibre local loops the supply of fibre bitstream access has increased. In the following figures available VDSL products are compared to similar fibre products:



As can be seen the VDSL product is a cheaper choice compared to similar fibre products. The fibre products do offer higher data rate, also it has the image of being a more stable product and more future proof. It is therefore justifiable that fibre products are priced higher than VDSL

products. The Gagnaveita Reykjavíkur (GR) also offer bitstream service (internet, VoIP and multicast). The GR internet service offering is what currently can be considered as the product with most similarity to the Mila's A3 internet access.

The figure above also show the price relationship of access to local loop, Access Option 1, Access Option 3 and VULA (given certain assumptions). For new players entering the market Access Option 3 is the easiest way to enter the market with few end-users. For alternative operators with above 750 end-user Access Option 1 is available, this way will open new possibilities for the operators with respect to multicast and to use the operators own backhaul network if already in place or rent lease lines for the IP transfer. More investments may therefore be required or a certain economy of scale. VULA offers further possibilities in control and hence in differentiation in product offers. For an operator, the question is whether to invest further in its own VDSL system or use offers like VULA. With an operator with 5,000 end-users and investment time-frame of 5 years the additional cost per end-user is 110 ISK per month (shown in the figure above)[13]. This amount will decrease with more end-users; for 30,000 end-users, this additional cost will become 84 ISK per user per month. Comparing this additional cost with an investment in a complete VDSL system the PTA find these VULA costs justifiable.

In accordance with the criteria discussed here above, the PTA endorses the prices specified in Appendix I to this Decision.

Concurrent to the PTA review of cost analysis on market 5/2008, PTA has been reviewing Mila proposed tariffs based on cost analysis for local loop access (market 4/2008) and terminating segments of leased lines (market 6/2008). Because of the interdependence of these tariffs it is necessary that they enter into force at the same time. The PTA will therefore publish the Decisions on the review of these tariffs at the same time.

In the PTA Decision no. 21/2014 it is stated that the tariff should be reviewed annually in accordance with the annual update of the cost analysis in accordance with the cost model which has now been approved. Accordingly, Mila shall submit an update of the cost model before 1 April 2018. If no major changes occur in the cost model, PTA expects that the authority will publish a decision on the new charges before the end of 2018. It should be noted in this context that the PTA has begun the analysis of markets 3a and 3b according to the new ESA recommendation from 2016 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation, these markets include similar services as markets 4/2008 and 5/2008. After the Authority has analysed these markets it will be decided whether the obligations that were imposed on Mila in accordance with the PTA Decision no. 21/2014 will be maintained.

[13] Plus additional cost in their own systems to be able to use VULA.

The Decision

The Post and Telecom Administration endorses the Mila ehf. cost analysis, according to the most recent revisions of the analysis received by the Administration on 22 March 2017.

The Mila tariff for bitstream access is in Appendix I to this Decision.

The new tariff shall come into force concurrently with the new Mila Tariff for access to local loops. Míla ehf. shall notify the coming into force of the new tariff with at least 60 days' notice. Míla shall also update its reference offer for bitstream access no later than on the coming into force of the above specified price changes.

This Decision can be appealed to the Appellate Committee for Electronic Communications and Postal Affairs, see Article 13 of Act no. 69/2003 on the Post and Telecom Administration. The appeal shall have reached the Appellate Committee four weeks from the time that the party in question became aware of the Decision of the Post and Telecom Administration. Costs for an appeal are according to Paragraph 5 of Article 13 of the same Act, and in addition to this there is a special appeal charge to the amount of ISK 150,000, pursuant to Article 6 of Regulation no. 39/2009 on the Appellate Committee for Electronic Communications and Postal Affairs.

Reykjavik, xx xx 2017

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Hrafnkell V. Gíslason

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Óskar Þórðarson

Appendix I: Price list
Appendix II: Results of the national consultation