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Consultation note regarding MEA assessment

DBA started the consultation on the MEA report the 28th of February 2013. By the end of the consultation period, the 27th of March 2013, DBA had received consultation responses from the LRAIC Working Group (LRAIC WG), TDC and Dansk Energi.

Fibre as MEA for copper and cable

Lack of dimension in the analysis: FTTC

TDC states that DBA's analysis presents a full FTTH network as the only alternative for the current copper and coax network. This approach is however not adequate to make a complete analysis of potential MEA technologies neither can it be justified by the Commission's draft *Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment*. This recommendation suggests that FTTC should be the preferred 'modern efficient NGA network' for copper.

TDC recommends - in line with their reply in the autumn hearing - that a full FTTC network should be MEA for the current copper network. Similar, a coax network with fibre to the 'islands' should be the MEA for the current coax network.

According to TDC, this is underlined in the Commission's comments on the DBA's M4 Decision on price of the FTTC VULA product¹:

[The] Commission considers that DBA could model a hypothetically efficient FTTC network and estimate the cost difference between FTTC and copper based access services by making the relevant adjustments in the engineering model (e.g. replacing the optical elements with efficiently priced copper elements, where appropriate).

TDC finds that the absence of a FTTC MEA analysis is a fundamental lack in the report.

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¹ C(2012) 9841

TDC requests DBA to update the report and include and evaluate a second MEA option based on FTTC (copper and coax) as MEA alternatives.

As stated in the MEA report, DBA believes the concept of MEA should be used to reflect the investment decision for a new entrant, not a company already having invested in a certain technology. In this regard, it is DBA's view that a new entrant would invest in FTTH and not FTTC. Therefore, DBA does not believe that FTTC can be viewed as MEA. However, it should be noted that DBA has proposed and is planning to model both FTTH and FTTC.

Also, the EC Draft Recommendation does not state that FTTC is the MEA but, in the specific context of calculating costs of copper; FTTC **could** be used as a basis. In the DBA's view, this reflects a pragmatic view from the European Commission where copper is closer to FTTC than to FTTH so modeling should be easier.

Definition of MEA

TDC is concerned about DBA's perception of the MEA concept. Originally, MEA was applied on the existing copper network where MEA typically was used to replace electronic equipment with newer versions while the access network [passive infrastructure] was left unchanged with respect to the applied technology. This approach resulted in network costs that allowed competing entrance operators to roll out alternative and cheaper technologies.

With DBA's present MEA concept, the modelled technology will be the newest and possibly cheapest technology on the market. This approach leaves according to TDC no rooms to the entrant operator to invest (build-signal) since the operator can always buy access (price-wise) to the newest technology, i.e. a technology that with regular intervals is revised in the LRAIC-model. Thereby, alternative operators will always be on the forefront technology wise and, at the same time, the operator is secured against a technological lock-in and mis-investments in a real life implemented network.

With the current MEA-approach in the report, TDC finds no building-signals reflected in the future prices. TDC requests DBA to reconsider the MEA approach in light of the objectives of build-or-buy signals and investments incentives for TDC and entrant operators.

DBA does not agree with TDC's comments regarding MEA. As stated in the MEA report, DBA's definition of MEA is in line with the definition used across Europe. The aim of the MEA concept is to set the starting point for striking a balance between service based competition and infrastructure based competition. If MEA does not reflect the modern efficient technology, service based competition will be hampered, which can result in limited infrastructure based competition,

as operators might be unable to enter the market and obtain a critical mass that enable infrastructure investments.

Finally, it should be noted that DBA has proposed and is planning to model both FTTH and FTTC.

TDC will further recall that the Report's reference to Sweden:

In Sweden, the situation is similar to Denmark at the exception that Telia is deploying FTTH. PTS published two documents in 2010 which addressed in particular the question of whether FTTH is the MEA of copper. As it is the case in Denmark, PTS observed that FTTH as more expensive to deploy than copper but that in the long term, it would be more efficient to deploy FTTH. Therefore, PTS decided that FTTH was the MEA of copper. Today, FTTH and copper regulated prices are set on the basis of FTTH costs. (Report p. 33)

...does not fully reflect the assumptions made by PTS. The Report rightly notices that Telia has chosen a FTTH strategy. But it should be noted that until Telia embarked on a FTTH strategy, PTS made a distinction in their LRAIC guidelines in relation to the use of FTTH as MEA depending on whether Telia actually had rolled out FTTH in a specific area or not:

*”Nu när TeliaSonera har påbörjat utrullning av fiber i accessnätet, **behöver en bedömning göras av i vilken utsträckning fiber och trådlös teknik ska utgöra MEA i det befintliga kopparbaserade accessnätet.** Som utgångspunkt ska inga kostnader allokeras till det kopparbaserade accessnätet i sådana geografiska områden där fiber eller trådlös teknik har bedömts utgöra MEA²”*

Hence, in the situation where the SMP operator had not embarked on FTTH roll-out, PTS's MEA assessment reflected the actual network deployment (with a reasonable forward-looking perspective). Likewise TDC finds, in line with the Commission's approach, that FTTC is the most efficient NGA strategy for the copper network on a 5+ years horizon. On that basis, TDC believes that a similar diversified use of FTTH/FTTC as MEA should be applied in order to reflect forward looking costs associated with a realistic upgrade strategy. This is further underpinned by the recent signal in BEREC's comments on the Commission's draft Guidelines for costing models:

BEREC and the Commission agree that the modelling approach used by an NRA should reflect, among other things, the network

² DNR 10-420/2.1.2 Modellreferensdokument (MRP rev c) Riktlinjer för framtagandet av LRIC-bottom-up och top-down modellerna. 07.05.2010

architecture being pursued, which in turn would generate prices that reflect the actual costs faced by operators in each market (BOR 13(33))

TDC requests DBA to consider FTTC as MEA technology.

The DBA finds that the arguments brought forward by TDC in relations to the Swedish case and the BEREC comment are not in line with the DBA's understanding.

To the DBA's understanding, the decision made by PTS in 2010 is similar to what is proposed in the MEA analysis. That is, even though PTS found that FTTH was more expensive than copper, PTS still decided that FTTH was the MEA of copper (as proposed in the MEA analysis). Further, PTS found that FTTH was the MEA to copper on a nationwide basis, i.e. irrespective of whether FTTH is actually deployed (as proposed in the MEA analysis).

In relation to the quote from BEREC, the DBA believes that FTTH is the architecture being pursued (even though TDC might use FTTC as a step towards obtaining this goal). For a new entrant, DBA finds it unlikely that FTTC would be used as any part in the roll-out strategy. Furthermore, FTTH is also deployed by some cable TV operators in Europe.

Therefore, DBA remains of the view that FTTH is the MEA technology.

Finally, it should be noted that DBA has proposed to model both a copper (including FTTC) and a cable TV network. Hence, the price of FTTC products will be based on a cost modeling of the actual products.

To DBA's understanding, this is in line with TDC's request.

TDC finds, that DBA should be aware that no formal definition of MEA exists and that the ITU definition remains highly theoretical in contrast to the Commissions approach. In the report from DBA where MEA is being defined, the references are partly done to DBA's former descriptions.

TDC finds that, when deciding on a MEA technology, the analysis should emphasize, whether

- the product based on a new technology generally can replace the product produced by the existing technology,
- the unit cost of the new technology are lower than for the existing technology, calculated on equal terms and preconditions, i.e. both technologies are calculated on replacement costs, and
- the behaviour in the market in practice shows that the new technology replaces the old technology, meaning that no further investments are done in the old/existing technology. DBA should be

aware that considerably investments are still done in the copper and coax network.

It is TDC's understanding that DBA had the same approach at the latest evaluation of MEA.

In chapter 2.1, DBA refers to the former conclusion in 2010 where fibre is not defined as MEA. The three conclusions were

- 1) fibre is not the cheapest technology,
- 2) fibre is not available to a large scale, and
- 3) fibre has not sufficient amount of demand.

TDC still finds these conclusions valid despite of the development in the market the last couples of years. These conclusions will, however, be of dispute as long as DBA does not define a proper scenario for the evaluation of the MEA technology.

TDC requests DBA to substantiate why these criteria are no longer fulfilled.

DBA does not agree with TDC's argument regarding the contrast between ITU's and EC's definition of MEA.

DBA would like to underline that the logic behind the MEA concept, set out by the ITU, is to define the appropriate "build or buy" signal. This requires setting the appropriate level of cost which is established by considering a new efficient operator investing today in fixed electronic communication networks. Hence, as long as the regulated access prices are set on the basis of the MEA, it is equivalent for an alternative operator to buy access or to build an equivalent asset which therefore does not deter investment in alternative infrastructure and can promote, when desirable, infrastructure based competition. This is in line with EC's draft recommendation to NRAs:

*"NRAs should adopt a BU LRIC+ costing methodology that estimates the current cost that a hypothetically efficient operator would incur to build a modern efficient network, which is in principle an NGA network"*³.

Therefore, DBA believes that there is no contrast between EC and ITU's definition of MEA. On the contrary, they both suggest taking into account the new operator strategy criterion.

It should be noted that, in DBA's view, the Commission's reference to FTTC as MEA in its draft Recommendation should be seen as a

³ Source: COMMISSION DRAFT RECOMMENDATION on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment

pragmatic approach, i.e. because it is more practical to calculate copper costs starting from a FTTC cost model rather than a FTTH cost model. However, DBA believes that the Commission's main focus is to assure that actual copper costs are calculated which is equivalent to DBA's conclusions in the MEA report.

Furthermore, DBA does not find that the former conclusion in 2010 is still valid. DBA believes that the market has developed significantly since 2010, as has been described in the MEA report. Also it should be taken into considerations, that the coming LRAIC regulation will be applicable to at least 2018.

Regarding the cost criterion, DBA believes that the gap between fibre and copper cost will narrow in the coming years (as described in the draft MEA report). As mentioned, there are two main reasons for this development: (1) copper cost will continue to increase and at the same time fiber cost will steadily decrease; (2) OPEX related to fiber networks are expected by numerous stakeholders to be much lower than those supported by operators providing communications services through copper and cable TV networks.

Second, regarding the coverage rate of FTTH, the DBA does not believe that this is (still) limited. Mid-2012 41% of all Danish households and businesses could potentially gain access to a fibre connection (FTTH or FTTB). Mid-2011 and mid-2010 the share was respectively 36% and 31%. Hence, assuming that the increase in the coverage rate observed from 2010 to 2012 continues, the coverage rate will be above 55% mid-2015. Therefore, DBA is of the view that FTTH is already available on a large scale and that it will even increase in the coming years. FTTH coverage might increase even more, assuming the existing cable TV networks are "converted" to FTTH in the future.

Finally, the take-up of fibre connections has increased by more than 60% from 2010 to 2012 and fibre connections now make up more than 10% of the total broadband market.

Summing up, the DBA finds that the conclusions drawn in 2010 should be reconsidered.

On top of that, DBA would like to underline that the fundamental criterion set out by BEREC, the ITU and other regulatory authorities when assessing the MEA technology is a new operator strategy criterion. To that extent, taking into account this additional criterion, it is clear that FTTH is the MEA technology, as the vast majority of alternative operators in Europe, including some cable TV operators, deploy FTTH networks.

TDC states, that by defining a MEA technology, DBA should consider how this modelled technology will serve the day-to-day regulatory issues. How will the modelled technology be able to model not only the access

line but also remote DSLAM's, pair bonding, vectoring, shared access, sub-loops etc.? The related network conditions are specific for copper and have yet to be dealt with, but these conditions will also have to be dealt with when modelling e.g. a MEA fibre network. For the coax network, restrictions on shared capacity, frequency allocations etc. are similar issues that cannot be handled by a MEA fibre network.

TDC requests DBA to consider the practical implication of choosing a MEA fibre network.

DBA would like to underline that choosing FTTH as MEA technology does not mean that copper and cable TV networks will not be modeled appropriately. On the contrary, as TDC does not intend to deploy FTTH networks on a large scale but will continue to rely on copper and cable TV networks, DBA will model them meticulously, *i.e.* including the cost of the different specific active equipment and particularly amplifiers for the cable TV network and DSLAMs for the copper network.

As specified in the MEA Consultation document at section 2.4, DBA is of the view that the costs of passive components on the access part will be the same for the FTTH and cable TV networks but specific for the active equipment. Regarding the copper access network the associated cost will be determined for active and passive equipment specifically.

Technology	Passive components- Access	Active components - Access	Active and passive components - core
Copper	Trenches, copper and sometimes fibre (FTTC)	DSLAM, Aggregation nodes	TDC IP core infrastructure
Cable TV	Trenches, fibre, splitters	MPEG station, CMTS, Amplifiers, Optical nodes	
Fibre		OLT	

It should also be highlighted that FTTC is included in the copper modeling and therefore the modeling of FTTC costs is included in the project.

Evaluation Scenario

TDC principally supports the approach of benchmarking the technologies against the defined criteria. The application of this method is however not transparent, since the objectives the MEA technology should fulfil are not defined.

Before a technology can be evaluated as a potential MEA technology, a realistic real-life scenario must be defined:

- The demand for broadband services supplied by the technology in terms of market share

- The demand for broadband services supplied by the technology in terms of bandwidth demanded by customers
- The reference year

When the scenario is defined, the technology can be evaluated in order to test if the technology fulfils the scenario.

It is TDC's supposition that defining such a scenario gives a more realistic picture of the requirements for the MEA technologies and will show technologies that do not require a full rebuilding of the network to be adequate as MEA technologies. Further, the defined scenario ensures that the modelled network is correctly scaled, thereby calculating comparable unit cost across the analysed technologies.

Ad pt. 1:

TDC finds that in the future 5-10 years, there will be four different access technologies.

- Copper based solutions e.g. upgraded with remote DSLAMs, VDSL, vectoring and/or pair bonding.
- Coax based solutions with fibre deployed to islands.
- FTTH solutions based on PTP or PON.
- Mobil broadband solutions.

Investments will probably be done in all four platforms. This means that each platform will constitute no more than 20-30% of the market. The market shares are relevant for both the MEA evaluation and the unit cost calculation in the final model, All four technologies are included in the Danish Government's 2020-plan. TDC does not support DBA's approach of comparing cost of technologies by assuming 100% market shares since this approach has no relations to real life network deployment.

An appropriate penetration rate is of outmost importance in the final costing model, since a penetration rate higher than the one that can be obtained in reality will cause low unit costs and alter investment initiatives from TDC and other operators.

Ad pt.2:

DBA should bear in mind that not all customers require 100 Mbit/s bandwidth and thereby extensive network investments.

Ad pt. 3:

It is TDC's understanding that DBA, on a regular basis, should evaluate potential MEA technologies. The time horizon should therefore be limited to next model update 3-5 years ahead.

TDC requests DBA to define an evaluation scenario in order evaluate the technologies in a transparent way.

First of all, DBA does not agree that the objectives to be fulfilled by the MEA technology are not defined: this has been clearly set out in section 1 (and especially 1.3) of the draft MEA report.

DBA agrees with TDC that there most likely will be several competing technologies on a forward looking basis, and that fibre networks most likely will not gain 100 per cent market share. Therefore, the model will be able to calculate prices based on different market penetration rates.

DBA does, however, not find it relevant in relation to the MEA discussion that there are several competing technologies. A new entrant will invest in the technology that is most efficient, regardless of competing older technologies (to select its preferred technology, such an operator will compare the cost of technology all things being equal).

In relation to TDC's comments about demand and unit cost, this is treated in the model reference paper. Generally speaking, however, DBA does not believe that the LRAIC model should necessarily reflect TDC's actual network coverage and the demand served by each technology. That is, even though TDC (due to historical circumstances) serves the demand with three different overlapping platforms, having several platforms in parallel in a given area is very questionable from an efficient point of view.

Specific comments regarding cable TV

The report concludes that for the vast majority of criteria, the analyses support the assumption that FTTH is the MEA of copper and cable TV.

The overview in table 5 shows that FTTH and cable TV are equal based on cost criteria, retail price criteria and best practices. According to the table, FTTH is superior on the technological criterion, subscriber criterion and operator strategy criterion.

TDC finds that the analysis concerning these 3 criteria is questionable, as described below:

Technological criterion:

In a number of cases, the analysis of the cable TV technology is incorrect and lacks information.

- *Bandwidth available on cable TV.*

Figure 4 shows the structure of the bandwidth available on cable TV. In the figure the total frequency spectrum available is 0-860 MHz. This reflects the state of most existing cable TV networks. A new build network would be able to use the frequency spectrum up to 1 GHz and within a very foreseeable future even 1.5 GHz, resulting in a significant increase in capacity available. In itself, this would enable a significant increase in the number of both up- and downstream channels.

The reflection in figure 4 on the placement of broadcast- and broadband channels is not a reflection of the actual situation in Denmark.

- *DOCSIS – data speeds.*
On page 15 maximum up- and downstream speeds for different versions of DOCSIS is listed. These maximum speeds are based on an assumption that a modem can only use maximum 4 channels (up- or downstream). This limitation is already outdated, since existing modems already use up to 8 or even 16 channels – and vendors are currently presenting modems able to handle 24 channels.
- *Identification of options to increase the capacity of the cable TV network.*
The report has identified 3 options to increase the capacity of the cable TV network:
 - Node splitting
 - Use of RFoG-technology
 - Switch to EPOC

A number of other methods are available:

- Higher modulation rates (up to QAM 4096 is being specified)
- Allocating more down- or upstream channels (with use of frequencies up to 1 or 1.5 GHz there will be plenty of room – upstream spectrum is being specified to range from 0-200 MHz)
- Switch to DOCSIS 3.1 (alternative to EPOC) – under specification

In total, there are plenty of ways to increase the capacity in cable TV networks and from a technological criterion cable TV networks with FTTC (fibre to the last amplifier) will be able to match FTTH for all customer relevant perspectives for many years to come.

Furthermore, the conclusion below table 3 states: “*The analysis of the technological criterion suggests that FTTH may be the MEA for both copper and cable TV since it offers greater capabilities (higher and symmetric speeds) among the standardized technologies.*”

- There is nothing in the standards that prohibits cable TV networks to deliver symmetric speeds. YouSee has a current commercial decision not to offer symmetric speeds (cf. comments to customer criterion).

- Since the model focuses on the time span from 2015, the analyses should include technology improvements (like EPOC and DOCSIOS 3.1) that are likely to be available within the relevant time. In table 3 EPOC will be superior to GPON.

Subscriber Criterion.

The analyses suggest that “*users tend to migrate on FTTH-offers*”. However, the coverage with fibre (homes passed) is increasing, which would normally lead to an increase in number of subscribers and therefore (in a saturated market) to an increase in market share. Since the data are (apparently) not normalized – this suggestion may be overestimated.

In the report, it is also concluded that the apparent migration towards FTTH primarily may be a result of aggressive pricing strategies from the fibre providers rather than actual demand from the customers.

The analyses are therefore extended to include a view on the demand for higher upstream speeds. But since FTTH providers as standard offers symmetric speeds – and cable TV operators still offers asymmetric speeds only – the conclusion must still be that the demand is more likely to stem from FTTH providers aggressive pricing schemes than from actual demand.

YouSee has been considering increasing upstream speeds a number of times but market surveys show only a limited demand. According to the most recent analyses, more than 2/3 of the customers prefer higher download speeds over higher upload speeds and more than 10% are undecided. Less than 25% of customers have a preference for higher upstream.

Operator’s strategy criterion:

As the analysis points out, there are a number of operators across Europe who are building fibre networks. But likewise, cable TV operators (including YouSee) are still building coax networks even in Greenfield areas, and even if they have solutions for FTTH.

Retail Price criterion:

The analysis quotes TDC’s response about YouSee experience about customers’ willingness to pay more for fibre. The conclusion that YouSee’s price premium is 30-50% is not correct. The price premium is connected to the underlying TV product and is therefore only indirectly linked to broadband. It could be argued, that once users already subscribes to TV, there is no price premium on broadband – but a more balanced approach would be to consider the price premium on the combined product offering. In that case, the price premium is in the range 12-25%.

Comment on chapter 2.2

DBA disqualifies mobile broadband in the analysis, since, among other things, mobile network use a medium that is shared ‘*to a much more significant degree*’ than fixed network. The cable TV network is, however, shared to the same degree as the mobile network and differs fundamentally from a PTP fibre (and copper) network, where the customer specific part is much larger. Since both cable TV and mobile broadband make use of shared mediums, and mobile broadband is excluded in the analysis, so should cable TV network in TDC’s view. Hence, fibre cannot be defined as MEA for cable TV.

Based on the above, table 5 should conclude that there is no indication that FTTH is MEA for cable TV. TDC requests DBA to revise the conclusion.

In light of the different information provided by TDC, DBA wishes to review the different criteria and explain why mobile broadband has not been considered in this analysis.

DBA agrees with TDC that bandwidth potentially available on cable TV networks currently is 1GHz and that the available bandwidth is likely to increase in a foreseeable future. However, DBA would like to underline that several problems may occur amongst other interference and signal attenuation. Indeed, due to insufficient cable equipment isolation, there may be interference above 860MHz between the cable signal and mobile communications signals. As soon as all these issues are solved, the extension of the frequency spectrum will of course increase the available capacity significantly and therefore the number of both up-and downstream channels. To that extent, DBA agrees with TDC on the fact that modems use up to 16 channels and may increase up to 24 channels in the future. This will be reflected in the final MEA paper. DBA also agrees with TDC on the different ways to increase the capacity of the cable TV network, including higher modulation rates, allocating more down- or upstream channels and the switch to DOCSIS 3.1. This will also be reflected in the final MEA paper.

Regarding the subscriber criterion, DBA still believes that users will migrate to FTTH (data used for this interpretation has been normalized by DBA).

Regarding the operator strategy criterion, even if TDC invests in cable TV networks in greenfield areas, the very vast majority of alternative operators choose FTTH rather than cable TV. Moreover, as specified above, even cable TV operators, already in place on the market, invest in FTTH today. In light of the MEA definition set out by DBA⁴, this clearly indicates that FTTH is the MEA technology. Also, in Sweden,

⁴ “The MEA is the asset that can produce the stream of services produced by the existing asset at lowest cost. Where the operating cost or other performance characteristics of the MEA differ from the existing asset, these should be reflected in the asset valuation.” Source: NITA, Model reference paper dated 18 September 2008, p.27.

and very recently in Switzerland⁵, FTTH has been considered as the MEA.

Last, on the retail price criterion, DBA will update the MEA report to explain that the price premium is in the range of 12-25%.

While DBA's analysis should be updated to include new technological elements provided by TDC, DBA believes that its conclusion should remain unchanged. Hence, DBA still believes that FTTH can be defined as the MEA technology based on the technological criterion and – even if this was not the case – the operator strategy criterion clearly highlights the fact that FTTH is the MEA technology.

Besides the fact that both mobile broadband and a cable TV network use a shared medium, DBA finds that there are significant differences between the two technologies. This is highlighted by the fact that mobile broadband was excluded from the latest market 5 decision (contrary to cable TV). On an end-user level, the DBA believes that broadband products delivered via cable TV networks and fibre networks are much more similar than products delivered via mobile broadband. On that basis, the DBA finds it coherent to include cable TV but not mobile broadband.

Specific comments regarding copper

Chapter 2.2.2 Cost Criterion

TDC finds that the DBA's full cost modelling in the LRAIC-model is doubtful since:

- the modelling of a full scale PTP- or PON-network has not been revised in depth and the calculated full cost are therefore uncertain,
- the installation costs in the PTP/PON model are not reflecting real life experience where installation cost for fibre are significant higher than for copper in terms of handling and installation-equipment,
- the comparison with copper cannot be done before DBA has defined the risk premium for deploying fibre. DBA did put such a question into hearing in the autumn but no conclusion has been communicated to the operators. The risk premium may significantly impact the total cost of the network, and
- the lifetime of fibre CPE equipment is remarkably shorter than the NTP copper point. This will cause higher reinvestment cost over the years, which are not reflected in the initial investment comparison that DBA has made.

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<http://www.bakom.admin.ch/dokumentation/gesetzgebung/00909/04220/index.html?lang=fr>

In light of these cost effects, TDC finds that FTTC is the cheapest technology even if the network is established in a green-field approach.

A number of European incumbent operators still prefer FTTC when high capacity broadband networks are established in a cost effective way. Likewise, cable operators all over Europe and US continuously invest in coax technology. This supports TDC's opinion that a combined fibre/copper and fibre/coax network is the MEA for the next five years.

Chapter 2.3.4 Conclusion

TDC does not see how DBA's conclusion is in line with the draft Recommendation. Calculations of cost differences between the current network and the MEA network cannot be used as a stand-alone argument regarding why FTTC should *not* be considered as the MEA network, like DBA states.

TDC requests DBA to consider FTTC as MEA technology.

First, regarding the use of the LRAIC model, DBA would like to emphasize that this model has been approved by all stakeholders during its last update in 2010. Arguing that inputs and results of this model are "uncertain", "doubtful" or "not reflecting real life experience" seems unfounded, especially since all explanations on how the model has been adjusted have been specified in the Annex of the MEA Consultation document.

Furthermore, as costs related to trenches accounts for the largest part of the costs in an access network, and since the trench network is similar to a high degree, DBA would expect that the cost differences between the technologies to be limited.

The basis for the cost comparison in the MEA analysis is a new operator who would have to choose between deploying a new copper or FTTH network. Hence, whatever technology is chosen by this new operator there is no existing infrastructure and no initial end-user take-up. Therefore, the risks faced by this new entrant are the same whether copper or FTTH is chosen. On that basis, the DBA does not find it relevant, as suggested by TDC, to include a specific risk premium for fibre deployment in regards to the cost comparison performed in the MEA analysis.

In addition, DBA believes that it is not relevant to compare the lifetime of different types of equipment and particularly NTP and CPE. When looking at the lifetime of fiber NTP equipment and copper NTP equipment in the LRAIC model, it appears that they are both at the same level. Setting the lifetime of fiber CPE is also difficult as there is not enough feedback from experience due to the short time from which fiber has been installed. Given the available information and experience

DBA is therefore of the view that the cost criterion analysis has been treated appropriately and that the associated conclusion remains valid.

Finally, as explained above, DBA considers that it is not relevant to look at the investment strategy of incumbents in Europe and in particular the fact that they deploy FTTC.

Indeed, according to the MEA definition it is more relevant to take into consideration the new operators strategies and as mentioned in the MEA Consultation document, the strategies followed by these companies are the deployment of FTTH networks.

It should also be noted that the cost criterion analysis has been carried out by comparing copper vs. FTTH and not FTTH vs. FTTC.

Implementing FTTC technology leads to the deployment of a much higher number of DSLAMs closer to the customers at the cabinet which leads to a higher network cost than for the copper network itself. In that sense, DBA remains of the view that FTTH shall be considered as the MEA technology rather than FTTC.

The LRAIC WG states that DBA and TERA suggest that FTTH is MEA for both a copper network and a cable TV network. The suggestion is based on seven criteria comparing FTTH, copper and cable TV networks: Technological, cost, subscriber, operator's strategy, retail price and best practice criterion. The LRAIC WG finds that for a new operator building a completely new network to serve Danish households and companies, fibre would be the technology of choice. Furthermore, it makes sense for a new operator to build one single network to accommodate the total consumer demand instead of – as in the current model – to roll out and spread demand on three different infrastructures. The latter seems a very inefficient approach for a new rational operator. As such, DBA's conclusion that FTTH is MEA for copper and cable TV seems valid.

The main challenge, however, is how to model and price copper based wholesale products in a model based on FTTH. The LRAIC WG does not question that we are in a transition phase from copper to fibre technologies but this phase could last many years from now. During this transition phase, there will still be a need to price – and thus model – TDC wholesale products that are fully or partially based on copper infrastructure.

DBA does on the one hand initiate a discussion on the impact of the MEA choice on prices. It is concluded that adjustments based on costs might be more relevant than adjustments based on consumer preference and relative technological performances. On the other hand, DBA does not get into any detail on what the relevant cost base to include is at this stage.

From the LRAIC WG's perspective, decisions on possible MEA adjustments should not be made until a complete description of modeling options (cost bases, network topology, and handling of demand in transition etc.) has been made publicly available by the DBA, hereby enabling parties to make informed impact assessments. A decision on MEA adjustments is clearly a pricing decision which should follow after – and not precede – specifics on the preferred actual modeling approach.

DBA agrees that the final MEA adjustment is a decision that should be made in the pricing stage of the project.

However, it is necessary to decide on a method at the present stage as the different methods involve comprehensive calculations. Due to practical reasons, it is not a possibility to present a complete description of the modeling options. Further, DBA notes that there will be several consultation rounds later in the process.

A complete revision of the current copper and cable TV models is needed

It is the LRAIC WG's current understanding that DBA intends to model separate copper and cable TV models in order to be able to price wholesale products based on TDC's copper and cable TV infrastructures. If DBA is indeed going to maintain separate copper and cable TV models – besides the proposed FTTH model – the LRAIC WG would like to stress the importance of a true revision through development of new models instead of relying on a continuation of the existing copper and cable TV models. The revision phase is a chance to address errors and change assumptions that no longer hold true in the existing models. Furthermore, the chance of simplifying the existing models would also be missed – and a simplification is urgently needed.

DBA agrees with the LRAIC WG that a thorough revision and simplification of the models is needed. DBA will investigate which parts of the models that can be reused and which parts that should be rebuilt.

In both cases, the LRAIC WG and other stakeholders will have the opportunity to identify errors and assumptions that, in their view, do not hold true.

VoIP as modern equivalent technology for PSTN

The LRAIC WG states that in the analysis DBA and TERA suggest that PSTN simulated over NGN (hereafter "VoIP") is MEA for PSTN. For a new fibre based operator, VoIP would clearly be the MEA.

In the context of building separate copper/cable TV models in order to price wholesale products based on TDC's current copper and cable TV infrastructures it might be relevant to consider a mixture of PSTN emulated and PSTN simulated services to take account of the fact that a sig-

nificant proportion of current PSTN customers do not want to substitute to VoIP, despite being the cheaper option. Regarding interconnection technology, the LRAIC WG supports DBA's intention of modeling both TDM and SIP interconnection regimes. While it is true that Telia and Telenor currently use TDM interconnection, this is primarily due to historic investments in this platform. The LRAIC WG agrees that a new operator would consider SIP as the preferred interconnection technology.

TDC supports DBA's conclusion that voice over NGN must support TDM interconnection.

As specified in the MEA Consultation document and in line with the MEA definition, DBA considers that the most appropriate criterion to look at when assessing the MEA is the new operator strategy criterion.

To that extent, DBA would like to highlight that alternative operator prefer to use PSTN simulated over NGN rather than PSTN emulated over NGN. Indeed, this requires using DSL cards that are less expensive than POTS cards. This move toward PSTN simulated over NGN is not limited to Denmark but is also observed in other European countries. This therefore suggests that PSTN simulated over NGN shall be the MEA instead of PSTN emulated over NGN.

In that sense, DBA remains of the view that PSTN simulated over NGN shall be the MEA.

Dansk Energi finds the MEA Assessment report highly relevant and a good framework for the modification and development of the LRAIC model for fixed networks in Denmark.

In the report it is concluded very clearly that FTTH is the MEA of copper and cable TV access networks. It is also concluded that VoIP is the modern equivalent Technology of PSTN. Dansk Energi agrees on both conclusions.

The comparisons on costs, bandwidth evolution, consumer choices and market development clearly shows that an efficient modern operator today will choose an access network based on a FTTH technology rather than extending/upgrading a parallel set of copper/cable TV access networks.

Dansk Energi looks forward to taking part in the coming process.

DBA take notes of the comments from Dansk Energi.