OFFICE FOR COMMUNICATIONS
PRINCIPALITY OF LIECHTENSTEIN

Analysis of the leased line markets

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Market for terminating segments of leased lines (wholesale market; M6)

Market for trunk segments of leased lines (wholesale market)

Final version

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TABLE OF CONTENTS

1 Introduction

1.1 Legal basis

By virtue of Art. 20 of the Law concerning Electronic Communication (KomG)[1] the Office for Communications (hereunder the "AK") is required to examine whether effective competition prevails on the electronic communication markets in Liechtenstein. If effective competition does not exist, that is, one or more providers possesses significant market power, the AK is to apply such measures of special regulation (under Art. 23 et seq. KomG) as are needed in order to remove or mitigate the competition problems that have been determined to exist. This procedure is termed market analysis.

The AK has defined the scope of the service and/or product markets that are to be investigated in the context of the market analysis in accordance with Art. 21(1) KomG. This was done taking into consideration the Recommendation on Relevant Markets by the EFTA Surveillance Authority.

The existence of significant market power – corresponding to a position of dominance in a market under general EEA competition law – has to be determined by taking into account in particular the criteria laid down in Art. 31 VKND.[2]

If the AK determines that one or more providers have significant market power in a defined market, it has the power to impose such measures of special regulation under Art. 34 to 43 VKND as are necessary and proportionate and suited to the removal or mitigation of the problems for competition obtaining on the market in question.

The following market analysis investigates in the first place the question of whether self-sustaining competition exists in an economic sense on the leased line markets in Liechtenstein or, as the case may be, whether self-sustaining competition would prevail in an economic sense without regulation. Such factors and competition problems as may stand in the way of such self-sustaining competition are identified. The presence of economic market power is investigated in this connection; in particular the criteria of Art. 31(1) to (3) VKND are considered according to their relevance for the market in question. Proceeding from the determination of providers having significant market power and the identification of relevant problems for competition on the leased line markets, the necessary measures of special regulation are assessed that are suited to redressing the problems for competition that have been determined.

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1 Law of 17 March 2006 concerning electronic communication (Kommunikationsgesetz; KomG), LGBl. 2006 No. 91.

2 Ordinance of 3 April 2007 on electronic communication networks and services (VKND), LGBl. 2007 No. 67.

1.2 Market analysis process

The procedure for the market analysis and the imposition of measures of special regulation consists of the following steps:

Complete process of special regulation	Market analysis in its broad sense	Step	
Complete process of special regulation		1	Collection and analysis of the necessary data on the market and from undertakings.
	Market analysis in its broad sense	2	Definition of the relevant markets in a national context from a material and geographical point of view.
		3	Determination of (any) SMP undertakings.
		4	Identification of any current and potential problems for competition.
		5	Structure and design of any measures of special regulation that are to be imposed.
		6	Consultation of interested groups nationally, i.e. undertakings which will be affected by planned measures.
		7	Submission of the market analysis and the planned measures for review by the EFTA Surveillance Authority and the regulatory authorities in the EEA.
		8	Imposition of any necessary measures by means of an administrative decision.
		9	Control of the implementation and compliance with the measures which have been imposed.

Figure 1: Overview of the overall process of special regulation

The above overview presents the process of special regulation as a whole. Market analysis in its broad sense here[3] is understood to include the adoption of any necessary regulatory measures if need be, and so extends across steps 2 to 8 in the above overview.

The present market analysis prepared by way of public consultation as per Art. 24(1) in conjunction with Art. 46(1) KomG and Art. 24(1)a RKV[4] is a pure transparency procedure. It serves to facilitate the public discussion regarding the intended measures of special regulation, which are currently only in a draft form, or the procedural steps which lead to same and named individually above. The official setting of these measures or the determi-

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[3] One can define market analysis in its narrow sense as relating to steps 2 to 4.

[4] Ordinance of 3 April 2007 on the tasks and powers of the regulatory authorities in the area of electronic communications (RKV), LGBL. 2007 No. 68.

nation of the preconditions required for same occurs in the special regulation procedure following same, in which the individual undertakings concerned have individual, concrete measures in accordance with Art. 23 KomG imposed on them by means of an administrative decision.

1.3 National consultation

To the extent that the AK foresees the adoption of measures of special regulation that are likely to have significant effects on the market concerned, it is obliged to announce this to interested parties in conformity with Art. 24(1) KomG and to give such parties the opportunity to make their position known within a reasonable period. The AK is for this purpose empowered to hold public consultations (Art. 46 KomG in conjunction with Art. 24(1)a RKV).

The consultation procedure in accordance with Art. 24(1) and Art. 46(1) KomG for the purpose of the market analysis is a non-adversarial administrative procedure *sui generis*. It serves to assess the conditions for competition and the promotion of transparency by means of early and public discussion of the measures planned by the AK. A differentiation is to be drawn between the consultation procedure of the subject matter and the adversarial special regulation procedure subsequent to same in accordance with Art. 23(1) KomG, in the context of which the AK imposes individual concrete *"obligations by imposition (measures of special regulation)"* on an undertaking with significant market power.

On 31 May 2012, AK has published the present *ex officio* analysis of the leased line markets in Liechtenstein pursuant to Art. 24(1) in conjunction with Art. 46(1) KomG and Art. 24(1) RKV and invited interested parties to submit comments on the analysis and the measures of special regulation proposed in it in the context of a public consultation.

The following undertakings submitted comments by the end of the consultation period on 31 July 2012: upc cablecom GmbH, Telecom Liechtenstein AG, Swisscom (Schweiz) AG, Orange (Liechtenstein) AG and Liechtensteinische Kraftwerke. None of the respondents disagreed with the market definition or the lack of designation of undertakings with significant market power.

All comments are, in so far as they are not subject to confidentiality, published on the AK's website.[5] In addition AK evaluated the submitted comments in the separate document "Evaluation of comments related to the national consultation on the analysis of the leased line markets" dated 9 August 2012, which was also published on the website of the AK.

The comments were taken into consideration when preparing the final version of the market analysis in so far as they are in the AK's view of importance and/or entail conse-

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[5] Accessible at: http://www.llv.li/amtsstellen/llv-ak-marktanalysen/llv-ak-marktanalysen-aktueller_stand.htm.

quences. In accordance with Art. 47(1) KomG the *"participation in a public consultation [...] does not constitute any legal rights above and beyond it"*.

1.4 EEA-wide consultation

If the AK intends to adopt measures of special regulation which are likely to have effects on trade between EEA States, the AK thus has in addition to the national consultation exercise to consult the EFTA Surveillance Authority and the other NRAs in the EEA beforehand in conformity with Art. 7 of the Framework Directive 2002/21/EC[6,7] (Art. 24(2) KomG). This EEA-wide consultation of the draft measures serves to establish transparency and the consolidation of the single market.

During a first phase, the EFTA Surveillance Authority is given a period of one month to review the present draft analysis and the planned measures. If the Authority expresses a reasoned doubt as to the compatibility with the applicable EEA law of measures that have been submitted, it can extend this period by two months in order to allow further investigation of the matter. If no such doubts exist, the AK can adopt the measures that were submitted. On the other hand, if the EFTA Surveillance Authority comes to the conclusion within the extended period that the market definition submitted or the analysis of significant market power is contrary to applicable EEA law, it can forbid the AK from bringing the planned measures into force.

With regard to the structure and design of the concrete measures of special regulation *per se*, i.e. the obligations which are imposed on providers, the EFTA Surveillance Authority has solely the competence to comment on them, not to reject them. If the EFTA Surveillance Authority does comment on a draft measure submitted, then the AK has to take its comments into utmost account.

All relevant documents and published information related to the submission of planned measures of special regulation by the AK are accessible via the electronic portal[8] of the EFTA Surveillance Authority. All public documents related to the national consultations are viewable on the AK's website.[9]

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6 Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services ("Framework Directive"; Liechtenstein Compendium of EEA Law ("EWR-Rechtssammlung"): Annex XI – 5cl.01).

7 For the details of the notification procedure according to Art. 7 of the Framework Directive see also: EFTA Surveillance Authority Recommendation of 2 December 2009 on notifications, time limits and consultations provided for in Article 7 of the Act referred to at point 5cl of Annex XI to the Agreement on the European Economic Area (Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services), as adapted by Protocol I thereto (Case No: 65615, Event No: 514868). Currently not available in German. Published in English at: http://www.eftasurv.int/media/internal-market/recommendation.pdf.)

8 https://eea.eftasurv.int/portal/

9 http://www.ak.llv.li/

1.5 Basic aspects of the market analysis

From an economic viewpoint, the position of significant market power is related to an undertaking's power to increase prices without having to suffer significant sales losses. In accordance with the thesis of equivalence from the EFTA Surveillance Authority and the European Commission, effective competition prevails on a market when no undertaking on the market possesses a position of significant market power.[10]

In the following market analysis, the terms "effective competition", "functioning competition", "competition that is effective" are used synonymously. Effective competition presupposes that the competition also exists without any *ex ante* regulation (anticipatory regulation) on this market, but taking into consideration *ex ante* regulations on other markets of relevance for this market. If the competition on one market is also not dependant on regulations on other markets, not only is the competition effective, but also self-sustaining. Accordingly in the market analysis, the conditions for competition are to be assessed as if no *ex ante* regulations affecting this market exist (this is also termed the *"greenfield approach"*). Otherwise the danger exists that effective competition is ascertained for a market although the market outcome is primarily determined by existing regulation and not by competitive forces. The consequence of this would be that (at least over the medium term) structurally driven competition deficits arise and dominant market operators abuse their position to the detriment of the consumers.

1.6 Composition of the market analysis

The market analysis is composed as follows: After the general section in the present Chapter 1, an introduction to the subject matter under investigation is provided in Chapter 2. Initially, the essential developments in the markets under investigation are described before, commencing with the definition of the relevant markets from a material and geographical point of view, the products and services contained in them as well as the regulatory situation to date are presented. The analysis of competition itself occurs in Chapter 3, in which the question of the effectiveness of the competition as well as the presence of market power is answered. Doing so, all aspects for the assessment of relevant market power indicators are examined. In section 3.6, the overall evaluation is conducted as to whether effective competition prevails on the markets under investigation, self-sustaining competition exists from an economic viewpoint without regulation, or which competition problems and factors are in conflict with this as the case may be. In the event that no effective competition prevails, the most fundamental market power abuse potentials and competition problems are then analysed and the regulatory measures that are required

[10] Cf. section 3.1.1.

for redressing the competition problems that have been ascertained as the case may be are discussed.

1.7 Time frame

Art. 21(2) KomG lays down that the conditions for competition in the defined markets are to be reviewed regularly by the AK. The time frame for the present market analysis amounts to two to three years. The AK will continue to keep the markets concerned under further observation during this period and, if necessary, initiate a fresh market analysis.

1.8 Sources of data

The essential data that provide the basis for the following market analysis were collected by the AK by means of an annual questionnaire to operators. The collection of market data takes place each year in the spring/summer in relation to the preceding calendar year. For reasons of proportionality, any collection of the requested data between these intervals is normally only conducted additionally if this seems to be indicated due to a rapid change in market conditions or by other special reasons.

To supplement the data gathered in the context of the annual questionnaires to operators, data obtained under the previous legal framework is used as necessary. No further reference is made in the following market analysis to these data or to the data collected during the survey of operators; all other external sources of data are only referred to specifically as necessary. Additionally, the AK keeps the markets in question, like other relevant markets, under constant observation. Hence the present analysis also relies on the AK's further current information and data.

1.9 Competition authority

Liechtenstein has no national competition law beyond the rules of competition applicable under the EEA Agreement. Nor does Liechtenstein have an independent competition authority at present. Legal recourse in competition cases is therefore to be sought in accordance with the applicable EEA law before the ordinary national courts or by referring the matter to the EFTA Surveillance Authority or the European Commission respectively. The exception to this is the Office for Trade and Transport by virtue of Art. 2(1) of the *Law of 23 May 1996 on the Implementation of the Rules of Competition in the European Economic Area, LGBl. 1996 No. 113*, under which that Office has responsibility for the implementation of competition rules to the extent that the courts do not have jurisdiction. This responsibility is however essentially directed towards supporting the EFTA Surveillance Authority and the undertaking of actions by the State, and not towards the material application and enforcement of EEA competition rules.

For these reasons, cooperation with and consultation of a competition authority in the sense of the second sentence of Art. 16(1) of the Framework Directive 2002/21/EC[11] is not possible in the case of the present market analysis in Liechtenstein.

[11] Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services ("Framework Directive"; Liechtenstein Compendium of EEA Law ("EWR-Rechtssammlung"): Annex XI – 5cl.01).

2 The markets to be investigated

2.1 The Liechtenstein fixed network sector in general

The fixed network sector in Liechtenstein was characterised until the end of 2007 by three separate undertakings: LTN Liechtenstein TeleNet AG (LTN; for wholesale services), Telecom FL AG (TFL; for retail services) and LIE-COMTEL AG (for CATV services).[12] On 1 January 2008, all three undertakings were merged into Telecom Liechtenstein AG (hereunder called "TLI") and now exist only under this name.

Before then, the provision of telecommunications in Liechtenstein took place up to 1998 under the PTT Treaty of 1978 between Liechtenstein and Switzerland. The network in Liechtenstein was an integral part of the Swiss telephone network (Schweizerische Post-, Telefon- und Telegrafenbetriebe or the subsequent Swisscom AG). The network components situated in Liechtenstein, and especially the copper pair based access network as well, were provided, maintained and operated by Swisscom in the name and on the account of the Liechtenstein State. Their owner was the Liechtenstein State. In 1998, separation from the Swiss telephone network took place upon the liberalisation of the telecommunications sector and with the founding of the former LTN.

LTN was only entrusted with the operation of the network. The retail customer relationship was transferred to the former Telecom FL AG, which belonged to Swisscom, following an invitation for tenders in relation to the provision of basic services. Telecom FL was then taken over 100% by LTN in 2003 following an increase in LTN's capital. The full merger of the two undertakings as "Telecom Liechtenstein AG" took place on 1 January 2008. TLI remains under complete State ownership.

Before integration into TLI at the beginning of 2008 under the name LIE-COMTEL, the cable television (and internet) provider for the majority of Liechtenstein[13] belonged to Liechtensteinische Kraftwerke (LKW) until the end of 2006. LKW, which is also 100% State-owned, is also responsible for the development and maintenance of the copper, optical fibre and cable TV infrastructure in Liechtenstein.

In 2006, LTN and LKW signed a so-called "consolidation agreement". The agreement's purpose is to concentrate all retail customer relationships and "intelligent" network components in the hands of LTN (now TLI) and to combine all passive network components, including in particular the access network, transmission lines, cable ducts, etc., in LKW's

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12 Lie-COMTEL AG was originally founded by Liechtensteinische Kraftwerke (LKW) as a stand-alone undertaking but existed at the time of the transfer to LTN only as a brand name and business that was part of LKW. The CATV network remained with LKW also after the transfer of the services platform and customers to TLI.

13 LKW operates a cable TV network (CATV) in nine of the eleven Liechtenstein municipalities: Balzers, Triesen, Triesenberg, Vaduz, Schaan, Planken, Gamprin-Bendern, Ruggell and Schellenberg. The CATV network in Schellenberg belongs to the municipality but is operated by LKW. Hereunder, LKW is always regarded as being inclusive of the municipality of Schellenberg's CATV network.

hands. LKW should henceforth no longer be active on the retail customer market, but rather only on the wholesale market. The agreement was put into effect on 1 January 2007 through the transfer of LTN's passive network infrastructure to LKW. At the same point in time LIE-COMTEL was integrated into the former LTN by transferring the customer relationships and taking over the services platform as well as the active network components; the passive (and a few active) CATV network components remained in LKW's hands.

LKW has thus been the owner of the above named fixed access networks in Liechtenstein since 1 January 2007. In addition to copper pair (TPCW) based subscriber connections, these also consist of optical fibre (fibre access) and CATV (coaxial access). Furthermore, LKW also operates copper and fibre optic based infrastructure for the core network and leased lines (dark copper and dark fibre). LKW uses this infrastructure to provide wholesale services to carriers and providers. By contrast, only TLI is active on the retail customer market.[14]

In addition to LKW, TV-COM AG (formerly Matt Antennentechnik AG[15]) is active in Liechtenstein as a further cable network operator in the municipalities of Mauren/Schaanwald and Eschen/Nendeln). There is no overlap between the area supplied by TV-COM AG and that of LKW's CATV network. Both firms taken together cover practically 100% of the households in Liechtenstein.

2.2 Preliminary remarks on the market definition

In accordance with the Guidelines (hereunder called the "SMP Guidelines") of the EFTA Surveillance Authority on market definition and the assessment of significant market power,[16] the basis for the definition of the materially relevant market is a test of substitutability on the demand and supply sides of the product or service in question. Those products all belong to the same market when both consumers and providers see them as sufficiently interchangeable. A generally acknowledged procedure for determining this is provided by the so-called SSNIP test (small but significant non-transitory increase in price – SSNIP) or the test of the hypothetical monopolist.[17]

The EFTA Surveillance Authority in its 2008 Recommendation on Relevant Markets[18] has identified in accordance with Art. 15 of the Framework Directive 2002/21/EC those mate-

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14 As per the implementing arrangement to the merger agreement of 05.10.2007 (not public) and actual range of services.

15 The former Matt Antennentechnik AG changed its name on 09.03.2011 to TV-COM AG with its registered office in Eschen.

16 Guidelines of the EFTA Surveillance Authority of 14 July 2004 on market analysis and the assessment of significant market power under the common regulatory framework for electronic communications networks and services referred to in Annex XI of the Agreement on the European Economic Area, OJ C 101, 27.04.2006, page 1.

17 The SSNIP test examines whether the consumer as a reaction to a 5 to 10% increase in the price of a good by a hypothetical monopolist (HM) increasingly demands a substitute product instead so that the price increase is no longer profitable for the HM due to the induced reduction in the volume caused by the elasticity of the demand.

18 EFTA Surveillance Authority Recommendation of 5 November 2008 on relevant product and service markets within the electronic communications sector to be considered for ex ante regulation in accordance with the Act referred to at point 5cl of Annex XI to

rially relevant product and service markets which can be considered for *ex ante* (anticipatory) regulation. It is to be assumed that for these markets – because the EFTA Surveillance Authority has already examined whether the applicable criteria are fulfilled – *ex ante* regulation will also be considered in Liechtenstein. Hence, the AK does not have to repeat this examination as the competent regulatory authority, unless it has reasonable doubt as to the criteria's specific concordance with the national context or the definition of the relevant national product market deviates from that which has been recommended.[19]

The AK is to define, to a material and geographical extent, the service or product markets respectively that are to be investigated in accordance with Art. 21(1) KomG in the context of the AK market analysis, while taking into consideration to the greatest degree possible the Recommendation on Relevant Markets by the EFTA Surveillance Authority. If and to the extent that the AK defines markets which deviate from the Recommendation on Relevant Markets by the EFTA Surveillance Authority, it has to ensure in advance in accordance with the same stipulation that the following three criteria are cumulatively fulfilled (hereunder called the "three-criteria test"):

a) Significant entry barriers of a structural, legal or regulatory nature persist.
b) The market does not tend towards effective competition within the relevant timeframe. When assessing this criterion, the level of competition behind the barriers to entry is to be examined.
c) Competition law by itself is insufficient to adequately address the market failure concerned.

2.3 The leased line markets

2.3.1 Definition of a leased line

Commencing with the legal definition of Art. 3(1)(24) KomG, leased lines are understood hereunder to be facilities which provide a precisely defined transparent transmission capacity between two network termination points[20] (symmetric bi-directional) located in Liechtenstein. A further characteristic of leased lines is the lack of switching functionality, i.e. the user does not have any controlling options available to them (lack of an on-demand switching function). This definition is applicable for both leased lines on the retail level, as well as for those on the wholesale level.

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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), as adapted by Protocol 1 thereto and by the sectional adaptations contained in Annex XI to that Agreement, OJ C 156, 09.07.2009, page 18.

19 Cf. comments of the EFTA Surveillance Authority of 6 September 2005 on the submission of the first Norwegian decision on mobile termination markets, section 3.2.

20 With leased lines on the wholesale level, the network termination point is also understood to mean the point of interconnection (POI) between the contractual partners.

In line with this definition, there are three characteristics which have to exist cumulatively in order to classify a leased line as a transmission facility:

- A leased line is a symmetric bi-directional point-to-point connection with a fixed capacity capable of data and voice traffic.
- A leased line is a transparent transmission facility: Transparency describes the property whereby payload data bits are transmitted unchanged from a transmission facility.
- A leased line is a transmission facility without switching functionality: This means that the user has no option for controlling the connection.[21]

It is fundamentally irrelevant for the classification of a transmission facility as a leased line via which technology its establishment occurs. The decisive factor is the function for the user and not the kind of technical establishment between the two customer interfaces or the product description on the market respectively. As a rule, internet access types provide on-demand switching functionality – regardless of the kind of connection technology utilised e.g. xDSL, coaxial cable (CATV), WLAN – and are thus not to be classified as a leased line.

Leased lines are used by both retail customers for a connection from locations or to establish private networks, as well as by operators as a wholesale service product to provide communication services to retail customers. Thus, retail and wholesale markets may fundamentally be defined in parallel.

On the wholesale level, a differentiation can be drawn between markets for trunk (long distance) line segments on the one hand and terminating segments of leased lines on the other hand. The exact extent to which the differentiation is to be undertaken between these two markets in a national context depends on the given network topography and is at the discretion of the regulatory authority.[22] The differentiation of these two markets in accordance with the circumstances in Liechtenstein occurs in the next section.

2.3.2 The material definition of the leased line markets

At the wholesale level leased lines are provided for use by other communication network operators or service providers. A differentiation may be drawn between two relevant wholesale markets: The market for trunk segments on the one hand and the market for

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21 The lack of switching functionality results from the fact that no connection control information is analysed from the bitstream at the user interface within the transmission facility.

22 Cf. Commission Staff Working Document (Explanatory Note) accompanying the Commission Recommendation on Relevant Product and Service Markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (Second edition) – SEC (2007) 1483, hereunder called "Commission Explanatory Note", page 38.

terminating segments on the other hand. Both markets fundamentally cover leased lines without any bandwidth restrictions.

The differentiation between a trunk and a terminating segment occurs on the basis of the physical line routing: With trunk segments it concerns leased lines or leased line sections[23] on the wholesale level which connect two points of interconnection (POI) – as a rule at the main distribution frame (MDF) or at the intermediate distribution frame (IDF) of two access network areas – of the operator providing same. It is characteristic of trunk segments that as a rule they do not reach the network termination point of the retail customer.

Terminating segments are regarded as all leased lines or leased line segments at wholesale level, which are not classified as trunk segments. As a rule, these are (at least for bandwidths of < 8 Mbit/sec)[24] twisted pair copper wires (TPCW) or a multiple of them that extend from the main distribution frame (MDF) to the network termination point of the retail user.

Thus, trunk segments of leased lines are as a rule assigned to the core network, while terminating segments are assigned to the access network. While the user receives exclusive access to the complete connection line available with the terminating segment of a leased line, as a rule trunk leased lines transmit the data streams of several users together (with a fixed capacity provided permanently for each user) and transport larger volumes of information.

The LKW's twisted pair copper based access network in Liechtenstein currently consist of a total of 30 access domains and thus trunk segment points of interconnection.[25]

The differentiation between trunk segments and terminating segments may also be undertaken in the same way for leased lines established via optical fibre (fibre optic cable – FOC). Terminating segments of FOC leased lines as a rule also converge in the same TPCW access domains in optical distribution frames (ODF),[26] which can be found as a rule in the same places as the main distribution frame (MDF) or intermediate distribution frame for TPCW lines. The number of optical distribution frames (ODF) will increase further over the coming years with the progressive expansion of the FOC access network (fibre to the home – FTTH).[27] Thus, there are trunk segment points of interconnection at the points named for leased lines provided via optical fibre. Consequently, trunk segments of leased lines run between these points.

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23 For the purpose of defining the market at the wholesale level, it is necessary to introduce the term "leased line section". A wholesale leased line which falls in both the market for trunk segments as well as in that for terminating segments due to its line routing is separated into sections which are assigned to the respective markets.

24 TLI establishes customer connections up to a capacity of 2,048 kbit/sec (E1 lines) via TPCW lines or optical fibre (FOC) and higher bandwidths fundamentally via an STM-1 FOC connection.

25 Source: LKW "Approved Reference Offer and Cost Accounting Model" dated 20.04.2012.

26 Also called "E2000 optical distribution frame" or splice box.

27 Cf. the Government press release dated 29.06.2010: "Ambitious broadband supply aim for Liechtenstein / supply planned across the complete country by 2020".

Moreover, the line sections located in Liechtenstein of cross-border leased lines, i.e. so-called international half circuits, are to be assigned to the trunk segments.

The network topography and thus the differentiation between trunk segments and terminating segments of leased lines is illustrated in the following figure:

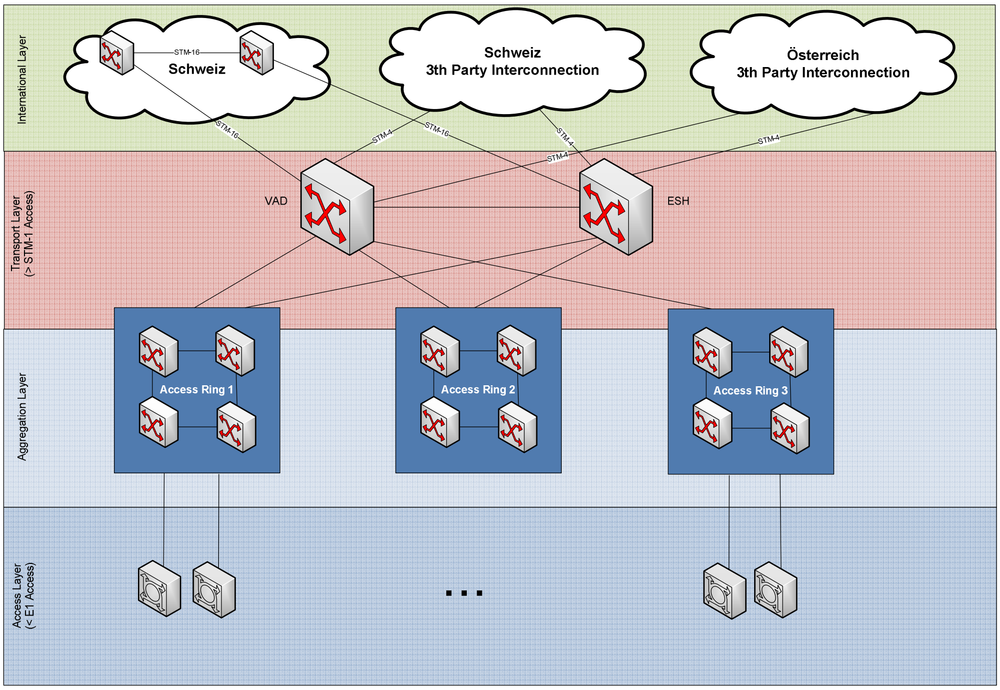

Figure 2: TLI's leased line network scheme (source: TLI; 19.02.2009)

Trunk leased lines are those leased lines which run between the distribution frames in a transport layer, between the distribution frames in a transport layer and those in an aggregation layer, as well as among the distribution frames in an aggregation layer. These also include those sections of leased lines located domestically between the distribution frames in a transport layer and those abroad (international layer), as well as to potential distribution frames of other domestic operators (not included in the chart).

Terminating segments of leased lines are those leased lines which run between a distribution frame in an aggregation layer and a network termination point on the retail customer side in an access layer.

Thus, end-to-end leased lines between two network termination points consist as a rule either of two terminating and one trunk segment or else only of two terminating segments when both network termination points are located in the same access domain.

Products with Ethernet interfaces on the user side, which offer the option of controlling the destination of the connection depending on the VLAN identifier values which can be selected by the user, are not part of the leased line markets under investigation here as they provide an on-demand switching function for the user. Furthermore, they also do not include products with user-side X.25, Frame Relay, ATM and IP interfaces at the network termination points which offer the option to control the destination of the connection depending on the values of a connection control parameter (examples of connection control parameters are: Logical channel number, data link connection identifier (DLCI), virtual connection identifier (VCI), virtual path identifier (VPI) or destination IP address), as well as products with user-side Ethernet interfaces to more than two network termination points, which terminate an Ethernet frame sent at one customer interface to several or all other customer interfaces of this product.

Unlit optical fibre as well as twisted pair copper lines not in service are not part of the relevant leased line markets because they provide ***no specific*** transparent transmission capacity. To the extent that these unlit cables or not switched on lines are located in the access network domain, they are to be assigned instead to the already defined market for physical access to network infrastructures at fixed locations (M4). With regard to unlit optic fibre in core networks (dark fibre/fibre channels), these are to be assigned to an separate wholesale market still to be defined as the case may be for the physical access to network infrastructures for high capacity transmission routes in a core network. The AK is currently assessing the conditions for the definition and regulation of such a market and will conduct an independent consultation process in this respect as required.

In addition to those services which are provided to third parties, self provided services (self supply) which are used for the internal provision of retail customer leased lines or for own use are also taken into consideration in the present leased line markets on the wholesale level. Thus, self supply is part of the market, as the market power of a hypothetical monopolist on the wholesale level is also restricted by such undertakings which also or solely provide the wholesale service concerned internally. As a 5 to 10% increase in the prices on the wholesale market also in general leads to an increase in the prices on the retail market,[28] it is always then unprofitable when sufficiently large numbers of customers switch to vertically integrated providers as a reaction to the price increase. Moreover, self supply is also relevant to the extent that an undertaking which provides leased lines internally can also offer these externally (or actually does this) and thus the internally provided capacities of this undertaking potentially restrict the external provider of leased lines competitively.

[28] For providers of leased lines to retail customer markets, which purchase the leased lines on a wholesale market, wholesale leased lines represent a very high share of the complete costs.

2.4 Definition of the relevant product markets

2.4.1 The Recommendation on Relevant Markets and the three-criteria test for *ex ante* regulation

The 2004 Recommendation on Relevant Markets[29] by the EFTA Surveillance Authority, which has been amended in the meantime, still defined three relevant leased line markets:

- The market for the minimum set of leased lines with specific types of leased lines up to and including 2 Mbit/sec (retail market)
- The market for trunk segments (wholesale market)
- The market for terminating segments (wholesale market).

In its revised and currently applicable 2008 Recommendation on Relevant Markets,[30] the EFTA Surveillance Authority removed the retail market for the minimum set of leased lines as well as the wholesale market for trunk segments of leased lines from the list of markets to be considered for *ex ante* regulation. The wholesale market for terminating segments was the sole leased line market (as Market No. 6 of the applicable Recommendation) to be retained. Thus, after a separate EEA/EFTA-wide consultation, the Authority for its part followed without exceptions the revised 2007 market recommendation[31] of the European Commission, which is applicable in the EU. With respect to the revision of its Recommendation, by its own admission the EFTA Surveillance Authority did not align itself to the level of the market development in the EEA/EFTA states, but rather to that in the complete EEA, and thus predominantly to the level of the market development in the EU Member States.[32]

The AK presented, in its statement dated 27 June 2008 as well as on the occasion of the workshop dated 16 September 2008 held in this respect in the context of the consultations conducted by the EFTA Surveillance Authority on the revision of the Market Recommendations, the special national (market) circumstances worthy of consideration which, in the opinion of the AK, spoke for the retention of the wholesale market for trunk segments of leased lines in the revised Recommendation.

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[29] EFTA Surveillance Authority Recommendation No. 194/04/KOL of 14 July 2004 on relevant product and service markets within the electronic communications sector to be considered for ex ante regulation in accordance with the common regulatory framework for electronic communication networks and services in the Agreement on the European Economic Area Directive 2002/21/EC of the European Parliament and of the Council), OJ L 113, 27.04.2006, page 18.

[30] Cf. footnote 17.

[31] Commission Recommendation 2007/879/EC of 17 December 2007 on relevant product and service markets within the electronic communications sector to be considered for ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services, OJ L 344, 28.12.2007, page 65.

[32] Cf. Recital 18, second sentence, 2008 Recommendation on Relevant Markets by the EFTA Surveillance Authority.

The EFTA Surveillance Authority explicitly clarified in Recital 21 of its 2008 Market Recommendations that the removal of a market from the Recommendation does not necessarily mean that effective competition prevails on the market in question in each EEA/EFTA state and that *ex ante* regulation is no longer justified for this market. In this connection, it referred especially to the comments received in the context of the consultations.

The EFTA Surveillance Authority further stated that: *"For markets not listed in this Recommendation national regulatory authorities should apply the three-criteria test to the market concerned. For the markets in the Annex to Recommendation No 194/04/COL of 14 July 2004, which are not listed in the Annex to this Recommendation, national regulatory authorities should have the power to apply the three-criteria test in order to assess whether, on the basis of national circumstances, a market is still susceptible to ex ante regulation."*[33]

Commencing with the recommendatory character of the Recommendation on Relevant Markets by the EFTA Surveillance Authority, a regulatory authority thus continues to be free to consider as required markets as relevant for the *ex ante* regulation which are not listed (anymore) in the Recommendation on Relevant Markets by the EFTA Surveillance Authority, provided it demonstrates the cumulative fulfilment of the three-criteria test under the specific national circumstances: The existence of significant persistent barriers to entry, the lack of a tendency towards effective competition and the insufficiency of the means under general competition law to redress the market failure ascertained. This three-criteria test can also be found in Art 21(1) second sentence KomG.

2.4.2 The application of the three-criteria test to the trunk leased line market

The AK continues to regard the three criteria stipulated in Art 21(1) second sentence KomG to be fulfilled with respect to the wholesale market for trunk segments of leased lines in Liechtenstein for the following reasons:

Unlike numerous other EEA states, Liechtenstein has to date not been able to ascertain any duplication[34] of trunk segments of leased lines by alternative operators. While it is true that the mobile network operators have partly established radio link connections in order to connect parts of their network to their gateway-MSCs, however this is often only for redundancy purposes and geographically limited to their own antenna sites. A cable connection alternative trunk infrastructure also only exists to an isolated extent, as well as in the form of short and customer-specific line sections with only a sporadic geographic

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[33] Recital 22, second and third sentence, 2008 Recommendation on Relevant Markets by the EFTA Surveillance Authority.

[34] The determination of the progressive duplication of trunk leased line connections in numerous EEA states moved the European Commission, and consequently the EFTA Surveillance Authority, to remove the market for trunk leased lines designated as relevant previously for *ex ante* regulation from the revised 2008 Market Recommendations (cf. Commission Explanatory Note, page 38).

presence as a rule. Likewise, the network of the sole alternative CATV network operator, TV-COM AG, is limited to the area of the two Eschen and Mauren municipalities.

Thus, apart from these exceptions, no general duplication of the national trunk leased line routes can be observed in Liechtenstein. In other words, alternative operators have not established their own leased line capacities in a core network, and especially between the main distribution frames (MDF), intermediate distribution frames (IDF) and optical distribution frames (ODF), which represent the points of interconnection (POI) to the access network or to the terminating segments respectively.

This lack of alternative capacities can be traced back to the low traffic volume and income on these routes and the high line construction sunk costs linked to such a duplication, which represent persistent barriers to entry onto this market. For these reasons, the AK also does not expect any duplication of trunk leased line routes in the foreseeable future. Consequently, it can be ascertained that on the wholesale market for trunk leased lines, no tendency to develop (self-sustaining) competition will occur in the anticipated period under consideration of this market analysis and that high and persistent market entry barriers will continue to exist.

Following the sale of the passive network infrastructure from TLI (previously LTN) to LKW, there were initially two undertakings, TLI and LKW, which offered leased line products externally on the wholesale level. However since 2010, LKW has not offered leased lines on the wholesale level anymore, but rather only dark fibre or dark copper respectively. Thus, TLI is currently the *de facto* sole provider of leased lines to external wholesale service buyers. All other operators only provide leased line services for self supply or for their own retail customers. However, as TLI is also dependent for the provision of leased lines in the access network and the core network on the wholesale inputs of LKW in the form of unlit optical fibre and copper lines (dark fibre and dark copper), ultimately only LKW can or could respectively provide by its own means cable based leased lines across the complete country.[35]

LKW does not itself offer leased lines on the retail market. Even though LKW on the one hand currently does not *de facto* provide leased lines on the wholesale level and on the other side guarantees access to its infrastructure under non-discriminatory conditions, it is still correct that LKW itself also could be active on the wholesale market for trunk leased lines as a provider and thus a competitor, and consequently incentives fundamentally exist for anti-competitive behaviour, and especially to charge excessive (or allocation inefficient) prices or to practice margin squeezes. The access conditions and prices for trunk

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[35] The access to not switched on/unlit TPCW or FOC is currently not subject to special regulation. The LKW has unilaterally guaranteed non-discriminatory access to these wholesale service inputs. The obligation to provide access to not switched on/unlit cables by means of measures of special regulation in other markets than the present one, and especially the wholesale market for the (physical) access to network infrastructures (Market No. 4 of the market definitions announced) and a wholesale market still to be defined as the case may be for physical access to the core network, remains reserved.

leased lines are not currently subject to regulation. There is no relevant wholesale regulation for the trunk leased line market at present – unlike the wholesale regulation for access to the physical infrastructure in the access network (M4 Market). In accordance with the greenfield approach, in any case the competitive conditions are to be assessed by the AK in such a way as though there is no relevant regulation for the present market on the market itself or on upstream markets.

Consequently, it must be concluded that high and insurmountable market entry barriers continue to exist on the wholesale market for trunk leased lines. No tendency towards effective competition can be observed. The lack of an independent competition authority in Liechtenstein and the fact that any legal action in accordance with general EEA competition law has to be brought before the ordinary national courts or the EFTA Surveillance Authority – should it have jurisdiction – coupled with the probable requirement of an ongoing and detailed intervention in cases of competition problems on this market (and especially to fight the problem of excessive prices) make it obvious that general competition law is inadequate for successfully countering potential competition problems on the trunk leased line market.[36]

For these reasons, the AK has ascertained that the three-criteria test as per Art. 21(1) sentence two KomG is (still) fulfilled with respect to the wholesale market for trunk segments in Liechtenstein and *ex ante* regulation of this market is still to be considered.

2.4.3 The market for terminating segments of leased lines

With respect to terminating segments of leased lines, there are also clearly high and insurmountable barriers to market entry. A tendency towards effective competition cannot be observed, nor is it to be expected in the foreseeable future. This is the case for the reason that the provision of terminating segments of leased lines continues to be dependent in one form or another on access to the fixed access network across the complete country. While it is true that simplified access options to the infrastructure in the access domain are available due to the measures of special regulation imposed on the market for physical access (M4), however the circumstances on the market for terminating segments of leased lines are to be assessed, in the sense of the greenfield approach to be applied, in such a way as though there were no relevant regulation for same on the market itself or on upstream markets.

Also with respect to terminating leased lines, general competition law is to be categorised as insufficient, for the reasons described already in section 2.4.3 concerning trunk leased lines, in order to redress the competition problems arising on this market. Hence, *ex ante*

[36] Even if a competition authority was able to successfully deal with the competition infringements, general competition law would not be suitable for handling the persistent access and price setting or cost accounting problems respectively, as well as the continuous monitoring of the access conditions, including the technical parameters.

regulation is to still be considered for this market, also in Liechtenstein, as provided for by the 2008 Recommendation on Relevant Markets by the EFTA Surveillance Authority.

2.4.4 The market for the minimum set of specific retail customer leased lines

The demand for retail customer leased lines with a bandwidth of less than 2 Mbit/sec, and thus those leased lines subject to date to a minimum provision obligation, has decreased significantly over the last few years due to the fact that other substitution technology (and especially xDSL) can be utilised for this and the general requirement for bandwidth has grown drastically.

Apart from that, effective special regulation can secure functioning competition on the upstream wholesale level and protect the consumers on the retail customer markets. This is also true for retail customer leased lines with a bandwidth of more than 2 Mbit/sec, which were not subject to any minimum provision obligation up to then.

Thus, if the required measures of special regulation are taken on the leased line wholesale markets, there only remain low barriers to the market entry of alternative providers on the leased line retail market. For these reasons, it is no longer appropriate to envisage the provision of a minimum set of retail leased lines and the obligations which exist in this respect should be rescinded accordingly. Apart from that, the European Commission has deleted the list of the minimum set of retail leased lines to be provided without any replacement, and thus there is also no need for regulation anymore for the same reason.[37] Ultimately, this approach corresponds to the "wholesale service regulation before regulation on the retail markets" premise.

2.4.5 The materially relevant leased line markets – conclusion

On the basis of the explanations provided above and under consideration of the circumstances in Liechtenstein, two material markets in the leased line area are to be defined for *ex ante* regulation consideration:

a) The wholesale market for terminating segments of leased lines
b) The wholesale market for trunk segments of leased lines.

The market for terminating segments of leased lines under a) corresponds to Market No. 6 of the Recommendation on Relevant Markets by the EFTA Surveillance Authority:

> *"Wholesale terminating segments of leased lines, irrespective of the technology used to provide leased or dedicated capacity"* (wholesale market).[38]

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[37] Decision 2008/60/EC of the Commission dated 21 December 2007 on the amendment to Decision 2003/548/EC concerning the deleting of certain kinds of leased lines from the minimum set of leased lines, OJ L 15, 18.1.2001, page 32.

[38] The European Commission has described the underlying material product markets in its explanatory remarks to the market recommendation, Explanatory Note (Commission staff working document SEC2007/1483) to Commission Recommendation

Due to the fulfilment of the three-criteria test as per Art. 21(1) second sentence KomG, the AK has additionally defined the following wholesale market for trunk leased lines as a material market for *ex ante* regulation consideration and assumes this in the market analysis hereunder:

> *Wholesale trunk segments of leased lines, irrespective of the technology used to provide leased or dedicated capacity (wholesale market).*

2.5 The development of the leased line markets

The undertakings active on the materially relevant leased line markets and their products as well as the market shares and their development are presented and investigated hereunder.

2.5.1 Providers

Initially, the providers active on the two relevant leased line wholesale markets are identified. In this connection, a differential is also to be drawn between the (pure) provision of own services (self supply) and the external provision of leased line capacities to third parties.

The providers of retail leased line products are not relevant for the present market analysis, as this market is not under consideration (anymore) for *ex ante* regulation. However it is also included hereunder for the sake of completeness and to allow for a better differentiation.

2007/879/EC of 17 December 2007 on Relevant Product and Service Markets within the electronic communications sector to be considered for ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services, OJ L 344, 28.12.2007, page 65.

Provider	Terminating segments (WM)		Trunk segments (WM)		Endkunden-ML
	Self supply	External	Self supply	External	
A1 Telekom Austria AG	✓		✓		✓
Mobilkom (Liechtenstein) AG	✓		✓		
Orange (Liechtenstein) AG	✓		✓		
Alpcom AG (eh. Tele2 AG)[39]	✓		✓		
UPC Cablecom GmbH			✓		✓
Swisscom (Schweiz) AG			✓		
Telecom Liechtenstein AG	✓	✓	✓	✓	✓
Liechtensteinische Kraftwerke					
ICT-Center AG	✓		✓		✓
Green.ch AG	✓		✓		✓
Newsnet AG / NIS AG[40]	✓		✓		✓
Total Optical Networks AG	✓		✓		✓
Quality Net AG			✓		✓
BT Limited	✓				✓
SpeedCom AG	✓				✓
Kyberna AG			✓		✓

Table 1: Providers active on the leased line markets

On the wholesale level, TLI is currently the only provider which not only provides leased line services as an own service (self supply), but also externally to third parties. TLI offers leased line services to both wholesale service buyers as well as to retail customers.

LKW, which still offered a few trunk leased lines on the wholesale level up to 2009, has no longer offered leased lines either externally on a wholesale level or to retail customers since 2010. The LKW transmission capacities provided to itself to control its energy supply network are only supplied internally by the energy supply department.

In the context of self supply – either as a wholesale service to provide other own electronic communications services or else for the provision of leased line services to retail customers – the following undertakings also provide leased line services as own services in

39 By decision of the Princely Court of Justice dated 15.02.2012, bankruptcy proceedings were commenced over the assets of Alpcom AG with effect from 16.2.2012.

40 Newsnet Internet Services AG (which traded under the name ABILA AG prior to 21.12.2010) and Newsnet AG each responded separately in the past in the context of the questionnaire to operators. However as this is to be considered a uniform presence economically, only Newsnet AG is named hereunder and the data is aggregated as required.

Liechtenstein as per the 2010 questionnaire to the operators: A1 Telekom Austria AG (Austria), UPC Cablecom GmbH (Switzerland), ICT-Center AG, Green.ch AG (Switzerland), Newsnet AG, Total Optical Networks AG (Switzerland), Quality Net AG, BT Switzerland Ltd. (Switzerland), SpeedCom AG and Kyberna AG.[41] With the exception of A1 Telekom Austria AG and UPC Cablecom GmbH – which utilise either solely or predominantly their own infrastructure (i.e. cable-based or radio transmission systems) to provide their leased line services – the provision of leased line capacities by the other providers named is based in the overwhelming number of cases on infrastructure wholesale inputs provided by LKW.[42] Although these providers are thus dependent on wholesale inputs from other providers in order to provide leased line services, their leased line capacities are to be taken into consideration on the supply side – due to their provision by themselves.

In addition to the providers named above, the licensed mobile communications providers in Liechtenstein, Mobilkom (Liechtenstein) AG, Orange (Liechtenstein) AG, Alpcom AG and Swisscom (Schweiz) AG, provide leased line services as self supply on the wholesale level in the context of operating their mobile communication networks. As a rule, they utilise their own radio transmission systems (radio links) for this, which serve on the one hand for connecting the mobile communication base stations (BTS/Node B) to the core network and on the other hand for interconnection with other domestic and foreign operators. These capacities are to be taken into consideration on the supply side as self supply.

2.5.2 Buyers

Buyers of leased line wholesale products are other domestic and foreign communications network operators and providers of communications services (incl. internet service providers – ISP) for their own requirements or as wholesale input for the provision of retail leased lines.

In addition to the leased lines which are provided for external parties ("external services"), those leased lines on the market which are used for the internal provision of retail leased lines or for other internal purposes ("self supply") are also included.

2.5.3 Leased line products offered

The following published leased line products are currently offered externally on the market on a wholesale level, i.e. not as pure self supply:

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41 TV-COM AG provides infrastructure wholesale services for the provision of leased lines, however it does not provide leased lines itself at present.

42 And only to a limited extent on the infrastructure of other operators (where available).

Provider	Product[43]	Relevant leased line market
TLI	Virtual leased lines (VLL) based on MPLS[44] standard (with Ethernet interface) for bandwidths of 2 Mbit/sec to 1,000 Mbit/sec.[45]	- *Trunk leased lines;* - *Terminating segments.*
TLI	Private line national (PLN) with bandwidths of 64 kbit/sec to 622 Mbit/sec (higher bandwidths on request).[46]	- *Trunk leased lines;* - *Terminating segments.*
TLI	Private line international (PLI) with bandwidths of 2 Mbit/sec to 155 Mbit/sec.[47]	- *Trunk leased lines;* - *Terminating segments;* *(Each in domestically located section).*

Table 2: Overview of leased line products offered on the wholesale level

2.5.4 Market sizes and development

The leased line wholesale markets of relevance for the investigation are presented in Figure 3, measured on the one hand in the number of trunk as well as terminating leased line routes and on the other hand in capacities provided (in 64 kbit/sec equivalents[48]).

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43 For the TLI products, see the wholesale product descriptions on its website, as well as the *"Product Description - Virtual Leased Line VLL"* dated 23.05.2006 (http://www.telecom.li/CFDOCS/cms3/admin/cms/download.cfm?FileID=2490&GroupID=171), last accessed on 16.02.2012.

44 Multi protocol label switching.

45 Distance dependent pricing per line type and bandwidth, whereby all of Liechtenstein (incl. half-circuits to Feldkirch/AUT and Buchs SG/CH) is priced as a uniform national zone.

46 TLI provides the customer-side modem (CPE) to the wholesale service buyer (service provider).

47 PLI extends to the point of presence (POP) abroad; from there, the terminating segment has to be provided by the wholesale service buyer.

48 For comparison purposes, the leased lines of the most varied capacities shown were provided at the largest common factor of 64 kbit/sec (also termed hereunder "64 kbit/sec equivalents" or "64 kbit/sec EQ"). For reasons of practicability (the respective line lengths could not be surveyed at a reasonable effort by the providers), the line lengths were not independently considered.

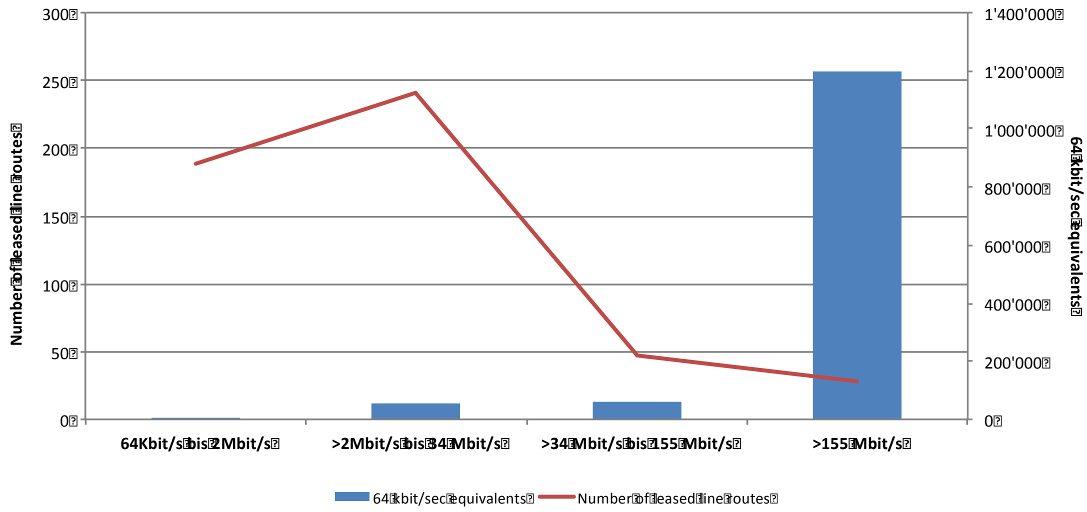

Figure 3: Overall view of leased lines on wholesale levels as of 01.01.2011

The unequal distribution of the number of leased lines across the differing capacities can already be recognised here. The presentation hereunder provides a more precise overview of the distribution of the capacities and the number of leased lines across the different leased line capacities.

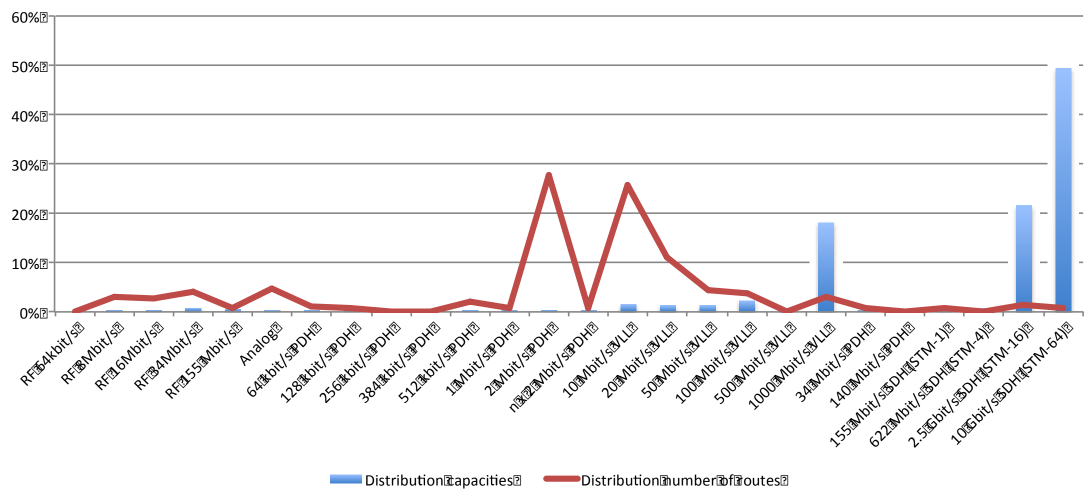

Figure 4: Distribution of capacities and number of leased lines as of 01.01.2011

As of 01.01.2011, leased line capacities of 81 Gbit/sec[49] were provided overall in Liechtenstein, distributed across 504 individual leased line routes on the wholesale level.

[49] This corresponds to 1,324,605 64 kbit/sec equivalents.

Capacities	64 kbit/sec to 2 Mbit/sec	>2Mbit/sec to 34 Mbit/sec	>34 Mbit/sec to 155 Mbit/sec	>155 Mbit/sec	Total
Number of leased lines	188	241	47	28	**504**
64 kbit/sec equivalents	4,669	57,024	62,880	1,200,032	**1,324,605**

Table 3: Number of leased lines and capacities on wholesale level as of 01.01.2011

Figure 5 presents the development of the number of leased lines and their capacities over the course of the last three available reporting periods. In general, continuous growth in both the number of leased line routes as well as in the leased line capacities can be observed, which is marked especially in the capacity growth of high capacity leased lines, as well as with respect to the number of leased lines in the 2 Mbit/sec area and multiples thereof.

A distinct decrease has only been observed in terms of the numbers with the low capacity leased lines under 2 Mbit/sec, which may be explained on the one hand by the fact that such low capacities no longer correspond to today's requirements and on the other hand that there are alternative products (e.g. xDSL or UMTS) which may satisfy the customers' need more cost effectively. A corresponding consolidation or migration respectively was observed especially at TLI in the 2010 reporting year.

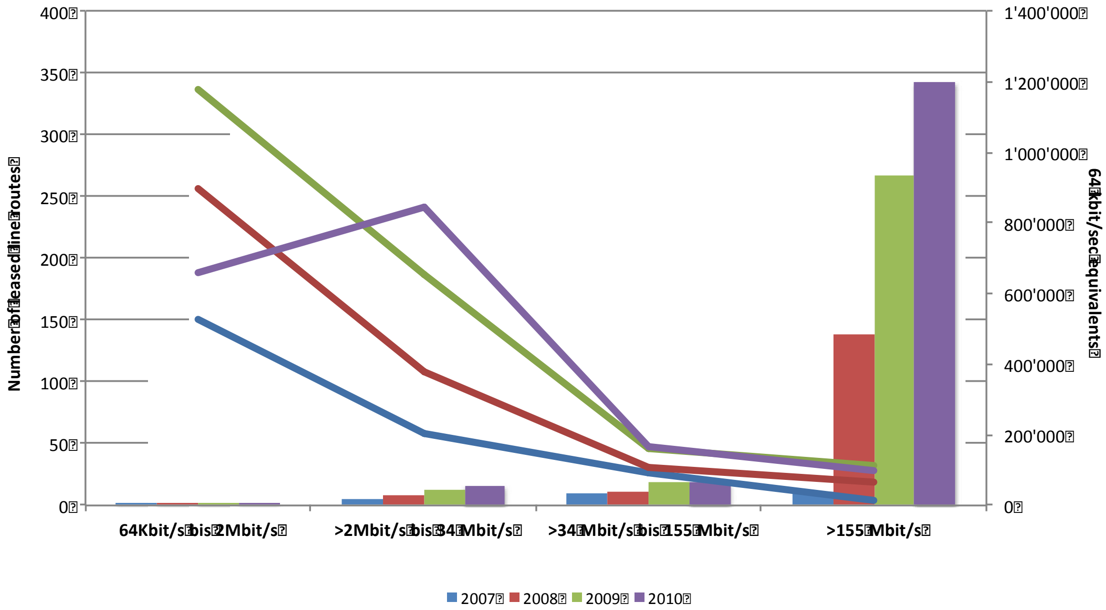

Figure 5: Development of the leased line capacities on the wholesale level

Although, in the context of the market power analysis conducted in the next chapter, the intention is to break down the market shares in accordance with the two defined product markets, Figure 6 hereunder is still intended to illustrate the aggregated market conditions on the wholesale level as of 01.01.2011.

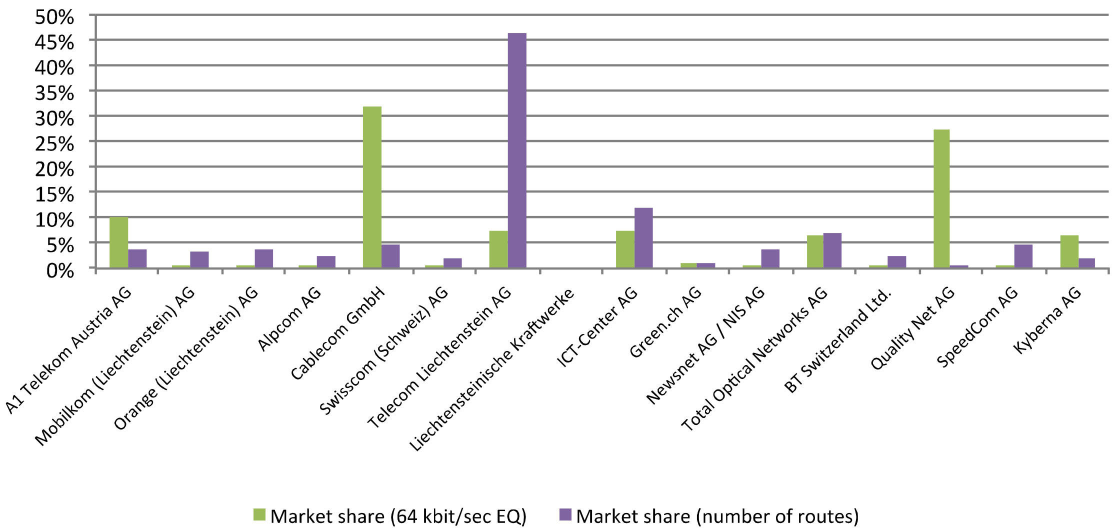

Figure 6: Distribution of the market shares across the complete leased line market on the wholesale level

2.5.5 The sizes of the trunk segment market and the market for terminating segments

The two wholesale markets for trunk segments of leased lines and terminating segments of leased lines were defined and delineated from each other in section 2.3.2. Trunk leased lines run between two trunk segment points of interconnection (POI) and are characterised by the fact that they, unlike the terminating segments, do not extend to the network termination point of the retail customer. Terminating segments are regarded as all leased lines or leased line sections on a wholesale level which are not classified as trunk segments.

As the providers of leased lines do not, in the context of the annual operator survey conducted by the AK, survey or report on these two markets separately on the basis of the above differentiation, an allocation to the respective product market cannot be undertaken without utilising further auxiliary criteria. Since as a rule for capacities smaller than 8 Mbit/sec twisted pair copper lines (TPCW) are used from the main distribution frame to the network termination point, this capacity threshold can form the basis for a differentiation between the two product markets.[50,51] Thus, all leased lines under 8 Mbit/sec are allocated hereunder to the market for terminating segments and all those with higher capacities to the market for trunk segments.

The size of the market for terminating segments is presented in Table 4.

	Number of providers	Number of terminating segments	Capacity (in 64 kbit/sec EQ)
2010	13	207	6,813

Table 4: The market for terminating segments

While TLI alone still continues to offer terminating segments of leased lines externally as well, at least the number of providers which supply such leased lines to themselves (internally) has grown to 13.

The size of the market for trunk segments is shown in Table 5.

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[50] LKW's planned provision of network termination points by means of optical fibre connections in the future does not in any way change these conclusions over the relevant analysis period of the next 2 to 3 years.

[51] The same approach with the utilisation of a capacity threshold of 8 Mbit/sec was accepted by the EFTA Surveillance Authority in the case in question from the Norwegian Regulatory Authority on M13old and M14old (comments letter of the EFTA Regulatory Authority dated 20 March 2007, Case no. 59756, Event no. 412652, page 3).

	Number of providers	Number of trunk segments	Capacity (in 64 kbit/sec EQ)
2010	13	297	1,317,792

Table 5: The market for trunk segments

The number of providers of trunk leased lines for self supply amounts to 13, whereby here too – as with the terminating segments – only TLI currently offers such leased lines as external wholesale products to third parties as well.

2.6 Definition of the relevant geographic market

The geographic scope of the relevant market is in accordance with Art. 21(1) KomG that geographic area in which the relevant product is supplied and demanded under sufficiently similar or homogeneous conditions of competition respectively. Areas in which the conditions of competition are heterogeneous, i.e. in which there are significantly different conditions, are not regarded as a uniform market.

Due to the geographic extent of the trunk and terminating leased lines across the sovereign territory of Liechtenstein[52] as well as the small size of the national territory and the country-wide homogeneous conditions for supply and demand resulting from same, the AK has defined the relevant geographic market for both relevant material markets as the whole national territory of Liechtenstein.

2.7 Regulation relevant to date for leased line services

The leased line markets were completely liberalised in Liechtenstein formally as of 1 January 1998. As part of the liberalisation and restructuring of the Liechtenstein telecommunications sector, Art. 23 in conjunction with Art. 8(2)f of the licence for basic service provision[53] granted on 30 June 1998 to the former Telecom FL AG (and now TLI) imposed a price cap for local basic services (including leased line services). This licence for basic service provision was rescinded in the context of designating TLI as a universal service provider by Government decision dated 3 February 2009 to RA 2009/296-3810 as of 28 February 2009. With respect to determining the minimum set of universal services, the Government decision referred to the relevant provisions in the KomG and the VKND. However

52 With international half circuits and international leased lines, the respective leased line section located domestically is part of the market.

53 Licence for the provision of basic local and international services over the public telecommunications infrastructure in the Principality of Liechtenstein (combined basic service licence – ITT/GVD/ISP/1&ITT/GVD/LSP1), 30 June 1998.

no special obligations arise from the latter acts named with respect to the provision of leased lines by TLI as the designated universal service provider.

Furthermore, no measures of special regulation in accordance with Art. 23(1)b KomG in conjunction with Art. 40(1) VKND are currently applicable with respect to leased lines.[54] Consequently, it can be ascertained that there are no special regulatory measures which currently concern the leased lines on a wholesale level (and on a retail level) actually provided by TLI as a designated universal service provider.

Furthermore, the former Liechtenstein TeleNet AG (now TLI) was obliged in Art. 26(3) of its infrastructure licence[55] dated 23 December 1998 to provide leased lines on the wholesale level on a cost-orientated basis[56]. In addition, as per Art. 26(2) and 30(3) of the Licence, there is an obligation to have accounting separation and to maintain a cost accounting model. The obligation to provide leased lines on a wholesale level results from Art. 30a(b) of the Licence. Art. 18 of the Licence stipulates a non-discrimination rule. As per Art. 73(3) KomG, the obligations named remain *"in being up to publication of the market analysis' final outcomes"*.

As the legal successor in all respects to LTN Liechtenstein TeleNet AG and Telecom FL AG, the licence obligations as named were in principle transferred to TLI. However, TLI has sold all passive network components to LKW in the meantime, for which reason the question of the validity with respect to these obligations must also be posed to LKW. As LKW did not acquire the passive network components in the context of a legal (universal) succession but rather by means of a purchase, the AK has to assume that the pre-existing legacy licensing obligations were not transferred to LKW during this transaction, and instead continue to be valid with respect to TLI.[57]

Due to the fact that since the sale of the passive network infrastructure to LKW, TLI has lost control over fundamental components of the infrastructure required for the provision of leased lines, there is reasonable doubt with respect to the continued validity of the above named legacy licensing obligations. Thus in the case of doubt, the AK is obliged to assume that the obligations as named no longer exert a binding influence on TLI.

Furthermore in the case of doubt, it may consequently be assumed that the leased line markets in Liechtenstein are – due to the lack of any other special regulation with respect

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54 Also in accordance with Decision 2003/548/EC of the Commission dated 24 July 2003 on the minimum set of leased lines with harmonised characteristics and associated standards referred to in Article 18 of the Universal Service Directive, in the version of Decision 2008/60/EC (Liechtenstein Compendium of EEA Law ("EWR-Rechtssammlung"): Annex XI - 5cn.01), there are no pertinent obligations anymore with respect to retail leased lines, at least to the extent that the minimum set of retail leased lines to be provided was deleted.

55 Licence for the provision of a public telecommunications infrastructure in the Principality of Liechtenstein (infrastructure licence – Licence for the support and realisation of functions for the basic international service), 1 December 1998, in its currently valid version.

56 Cf. Art. 8a of the Licence as well.

57 In addition LKW received by Government decision dated 11.09.2001 to RA 2001/865 an independent "infrastructure licence".

to the undertakings named or any further ones active on these markets – currently unregulated.

3 Market power

3.1 Undertakings with significant market power

3.1.1 Single dominance

Under Art. 3(1)(3) KomG an *"undertaking having significant market power"* is regarded as *"an undertaking that either individually or jointly with others enjoys a position equivalent to dominance, i.e. a position of economic strength affording it the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers."* Art. 3(1)(3) KomG is coextensive with the applicable requirements of EEA law under Art. 14(2) of the Framework Directive.

In connection with the assessment of whether an undertaking individually enjoys a position of significant market power (single dominance), the AK is required to consider *"in particular"* the following criteria in accordance with Art. 31(1) VKND:

a) The size of the undertaking, its size in relation to the relevant market, as well as the changes in the relevant positions of market players over the course of time;

b) The magnitude of barriers to market entry as well as the degree of potential competition resulting from this;

c) The degree of countervailing buying power;

d) The degree of demand and supply elasticity;

e) The respective maturity of the market;

f) Technological advantages or superiority;

g) Any advantages in the sales and distribution organisation;

h) The existence of advantages resulting from economies of scale, scope and concentration;

i) The degree of vertical integration;

j) The degree of product diversification;

k) Access to capital;

l) Control over infrastructure not easily duplicated;

m) Market behaviour in general, such as pricing policy, marketing approach, bundling of products and services or the establishment of barriers.

The national as well as the EEA legal framework have resolved the connection between *"significant market power"* in the meaning of Art. 3 (1)(3) KomG and *"effective competition"* in the meaning of Art. 20(1) KomG by means of the so-called *"thesis of equivalence"*, whereby no effective competition prevails if at least one undertaking having significant market power is found to be present. Thus the EFTA Surveillance Authority in its SMP Guidelines[58] states that the conclusion that genuine competition exists on a relevant market is equivalent to the finding that on this market there is no operator that has a dominant position individually or jointly with others. *"Effective competition"* is defined to the effect that on the relevant market there is no undertaking that enjoys a position equivalent to dominance individually or jointly with others (cf. Recital 27 of the Framework Directive).

The above-mentioned Guidelines on Market Analysis and the Assessment of Significant Market Power are decisive in rendering the market analysis operative: In contrast to general competition law, sector-specific regulation pursues an *ex ante* approach – the assessment of competitive relationships proceeds from the premise that no regulation exists (the "greenfield approach"). Hence the EFTA Surveillance Authority also states the following in its Guidelines: *"[W]hen assessing ex ante whether one or more undertakings are in a dominant position in the relevant market, NRAs are, in principle, relying on different sets of assumptions and expectations than those relied upon by a competition authority applying Article 82 of the Treaty and Article 54 of the EEA Agreement ex post, within a context of an alleged committed abuse. Often, the lack of evidence or of records of past behaviour or conduct will mean that the market analysis will have to be based mainly on a prospective assessment. […] The fact that an NRA's initial market predictions do not finally materialise in a given case does not necessarily mean that its decision at the time of its adoption was inconsistent with the Framework Directive."*[59] Footnote 74 in the Guidelines states in addition that *"NRAs do not have to find an abuse of a dominant position in order to designate an undertaking as having SMP."*

If an undertaking enjoys significant market power on a particular market, it can then also be considered as an undertaking having significant market power on closely related markets horizontally and vertically and/or geographically, when the links between the two markets are such as to allow the market power held in one market to be leveraged onto the other market, thereby strengthening the overall market power of the undertaking (on "leveraging", see Art. 22 (2) KomG).

3.1.2 Collective market power (joint dominance)

Two or more undertakings can be assumed to have significant market power jointly if they – even in the absence of structural or other links between them – are active in a market whose character displays incentives for coordinated behaviour (Art. 31(2) VKND).

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[58] Cf. SMP Guidelines, paras. 19 and 113.

[59] Cf. SMP Guidelines, paras. 71 and 72.

To assess whether two or more undertakings together enjoy significant market power (joint dominance or collective dominance), the AK has to consider *"in particular"* the following criteria:

- The extent of market concentration, the distribution of market shares and their change over time;
- The level of market entry barriers and the resulting degree of potential competition;
- The degree of countervailing buying power;
- The market transparency that exists;
- The maturity of the market;
- The homogeneity of products;
- The basic cost structures;
- The degree of demand and supply elasticity;
- The degree of technological innovation and the level of maturity of the technology;
- The presence of unused capacity;
- The existence of informal or other links between market players;
- The mechanisms for countermeasures;
- The degree of the incentive for price competition.

The formulation *"in particular"* clearly indicates that the list of criteria in Art. 31(1) VKND is not exhaustive; Annex II of the Framework Directive states explicitly that its list of *"criteria to be used by national regulatory authorities in making an assessment of joint dominance in accordance with Article 14(2)(2)"* is *"not an exhaustive list, nor are the criteria cumulative*".

In assessing whether two or more undertakings have joint dominance on a market, the national regulatory authorities have in particular to act in accordance with EEA law and in this connection are to take utmost account of the EFTA Surveillance Authority's Guidelines on Market Analysis and the Assessment of Significant Market Power that have been published under Article 15 of the Framework Directive.

The legal character of collective market power is – at any rate according to present case law – to be equated with the economic concept of "tacit collusion". Under this, it is understood that undertakings' "parallelism" – without an explicit accord, but in awareness of their mutually responsive behaviour and at the cost of the other side of the market (the consumers) – aims at pursuing an offensive competition strategy by sacrificing short-term individual increases in turnover because this will be profitable over the longer term for all the providers involved.

The ECJ Court of First Instance in its decision in the *Airtours* Case[60] formulated or confirmed respectively in the context of a merger review the following three criteria as a test for determining collective market power:

1) The existence of sufficient market transparency to determine deviations from co-ordinated behaviour;
2) The presence of a credible retaliatory mechanism in case of such deviations;
3) The ability of current or potential competitors or customers to undermine the co-ordinated behaviour.

The core element of collusion resides in the tension between the collective rationality of undertakings (raising common gains through parallelism) and individual rationality (short-term gains through deviation from a collusive arrangement). The strategy of deviating from the collusive arrangement or of veering away from parallelism is termed cheating. Collusion is only possible on markets having sufficiently narrow market structures (oligopoly markets) and witnessing accompanying correspondingly strong responsive behaviour. But the market outcome on such markets is also dependent on a series of other market factors which tend to promote collusion (e.g. by creating an "incentive to collude" for undertakings) or to impede it (e.g. by creating an "incentive to cheat" for undertakings).

3.2 Market shares

3.2.1 The indicator's significance

Market shares provide a natural point of departure for the investigation of competitive relations on a market and are regarded especially in case law as an essential indicator of market power.[61] The economic significance of this indicator flows above all from the theory of monopolies and oligopolies as well as from empirical evidence for the linkage between market shares and profitability (in the form of price-cost margins). Thus, there is both theoretically and empirically a positive correlation between an (undertaking's individual) market share and an (undertaking's individual) price-cost margin. Neither the empirical nor the theoretical literature however provide information as to from which level of market share onwards "significant market power" may be suspected (or even proven) to exist. In case law, the following thresholds have established themselves: With a market share below 25% it can be presumed that the undertaking in question does not enjoy a position of (individual) dominance. A market share of 40% will raise, according to the deci-

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[60] Case T-342/99 *Airtours/First Choice* [2002] ECR II-2585.

[61] Art. 31(3)a VKND as well as the SMP Guidelines, paras. 75 to 78.

sion-making practice by the European Commission and EFTA Surveillance Authority, suspicions about the existence of a dominant position, while in some cases market dominance could also exist below this threshold (because of other factors). The consistent case law of the Court of Justice of the European Communities has held that at a threshold of 50% – leaving extraordinary circumstances to one side – the existence of market power can be taken as proven.[62]

A high market share on its own does not however mean the existence of a dominant market position; in reaching a judgement an essential aspect is also the development of the market shares: Thus, it is important for example to observe the market share of an undertaking not only at a particular point in time, but also to look at the change in the market share over time. If the market share is high and stable (or even growing) over a long period of time, the existence of market power is more likely to be assumed than when the market share is sinking or subject to significant fluctuations. Furthermore, the market share has also to be placed in relation to the market shares of the competitors. If the undertaking in question has a significantly higher market share than even the largest of its rivals, the finding of a dominant market position is then more probable than in cases in which several undertakings have high market shares. It goes without saying that – in order to obtain a comprehensive picture – even in cases of very high market shares, further indicators must still be examined; in particular the causal factors underpinning the high market share must be investigated.[63]

The structure of the market and thus the number of market players as well as their market shares are dependent on economies of scale, sunk costs and the minimum efficient scale[64] of an undertaking. If for instance there are high economies of scale, then *ceteris paribus* a higher concentration is also to be expected. In extreme cases the industry is a natural monopoly, i.e. costs are (from a static perspective) optimal when only one single undertaking is in production. Since high economies of scale can thus lead both to a high concentration and to high market entry barriers, market power can fairly be assumed where significant economies of scale exist.

Ultimately, the market share – like all indicators – is only one of several criteria (although an important one) for assessing market power and thus only becomes meaningful in combination with other indicators. Market shares nevertheless remain a special indicator for the underlying market analysis inasmuch as they constitute a necessary but not sufficient condition for determining market power.

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62 Cf. para. 76 of the SMP Guidelines.

63 By way of example, a higher market share on an innovative market in a very early stage of the market would be assessed differently than in an already saturated market with switchover costs.

64 MES – minimum efficient scale.

3.2.2 Assessment of the indicator

Table 6 lists the undertakings active on leased line markets, as well as their market shares broken down into the two relevant wholesale markets. The market shares are measured on the one hand in 64 kbit/sec equivalents (capacity) and on the other hand in the number of leased lines (units) provided. The market share calculation takes into account self supply.

The market shares are measured in 64 kbit/sec equivalents and in the number of leased lines provided because on the one hand the providers' sales revenues generated from leased lines on the wholesale level and separated into trunk and terminating segments are not available as an alternative measurement category and, in addition, the own services (self supply) do not appear in the sales revenues.[65]

On the other hand, the value of a leased line fundamentally depends on bandwidths and line lengths. However, as the surveying of bandwidths and lengths for each individual leased line would represent a disproportionately high effort and expense and a presentation of the market shares in relation to bandwidths *and* lengths could barely be conducted in a sensible manner, the leased lines were weighted with their bandwidth or capacity respectively (in the form of the number of 64 kbit/sec equivalents) for the market share calculation.[66]

The comparison of the 64 kbit/sec equivalents permits, in combination with the number of leased line routes, meaningful conclusions to be drawn with respect to the market conditions and thus is utilised hereunder for the market power analysis. However it has also been taken into consideration in this connection that 64 kbit/sec equivalents do not adequately reflect the value of a leased line when lines with extremely varied bandwidths – and especially very high capacity – are compared with each other.[67]

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[65] The sales revenues were only collected in total for the complete leased line area in the context of the market survey. Furthermore, it should be noted with the sales market shares that they do not include internally provided services (self supply) as no sales are noted for self supply and an assessment by the AK of self supply with sales revenues would be arbitrary and was thus not conducted.

[66] The number of 64 kbit/sec equivalents is a computed amount resulting from the comparison of the bit rates provided by a concrete leased line with the data rate of a leased line with 64 kbit/sec.

[67] This is because leased lines with an x times bandwidth are not in general x times more expensive. This is explained by the fact that a part of the leased line costs is independent from the leased bandwidth, such as for instance excavation work or servicing the network infrastructure. However as these cost elements represent a significant share of the complete costs, a 64 kbit/sec equivalent of a higher bit rate leased line is *ceteris paribus* "worth less" than with a lower bit rate. This would be unproblematic with the market share calculation if the providers' market shares remained constant over the various bandwidths. However when providers concentrate on certain bandwidths, kinds of distortions occur whereby the market share (measured on the "value" of the leased line) of providers which mainly sell lower bit rate leased lines are underestimated (a 64 kbit/sec equivalent with a lower bandwidth is after all more valuable comparatively than a 64 kbit/sec equivalent with a higher bandwidth), while the market shares of operators which provide higher bit rate leased lines especially are overestimated.

Provider	Market share terminating segments (wholesale service)		Market share Trunk segments (wholesale service)	
	64 kbit/sec EQ	Number of leased lines	64 kbit/sec EQ	Number of leased lines
A1 Telekom Austria AG	3.29%	3.38%	9.98%	3.70%
Mobilkom (Liechtenstein) AG	6.11%	1.93%	0.47%	4.38%
Orange (Liechtenstein) AG	7.52%	1.93%	0.33%	5.05%
Alpcom AG (formerly Tele2 AG)	13.15%	3.38%	0.25%	2.02%
UPC Cablecom GmbH	3.29%	3.38%	32.10%	5.39%
Swisscom (Schweiz) AG	3.76%	0.97%	0.28%	3.03%
Telecom Liechtenstein AG	25.86%	27.54%	7.09%	59.60%
Liechtensteinische Kraftwerke	0.00%	0.00%	0.00%	0.00%
ICT-Center AG	16.59%	23.67%	7.51%	3.70%
Green.ch AG	2.35%	2.42%	1.21%	0.34%
Newsnet AG / NIS AG	2.70%	3.86%	0.35%	3.70%
Total Optical Networks AG	9.86%	10.14%	6.57%	4.71%
BT Limited	5.18%	5.80%	0.00%	0.00%
Quality Net AG	0.00%	0.00%	27.29%	1.35%
SpeedCom AG	0.35%	11.59%	0.00%	0.00%
Kyberna AG	0.00%	0.00%	6.56%	3.03%

Table 6: Market shares on wholesale level (separated into relevant markets; as of 01.01.2011)

It can initially be determined that LKW which owns, with a few exceptions, the complete domestic cable-based infrastructure required for the provision of leased lines is active on neither the wholesale market for terminating segments of leased lines, nor on the wholesale market for trunk leased lines. This is explained by the fact that instead of leased lines, LKW solely provides physical access to infrastructure wholesale services (in the form of dark fibre and dark copper). However, these infrastructure wholesale services are part of other markets and not of the sole subject matter here, the leased line markets.

3.2.2.1 Shares in the market for terminating segments

On the wholesale market for terminating segments of leased lines, no provider except for TLI has a market share over 25%, above which as per the prevailing case law and practice initial considerations can arise at all about the occurrence of any sole dominant market position. However with 25.9% of the capacities provided and 27.5% of the leased line routes provided, even TLI is only barely above this critical market dominance threshold. In addition, four further providers have a market share of more than 10%, with ICT-Center AG the second largest provider after TLI on this market with a market share of 16.6% measured in terms of its transmission capacities and 23.7% in leased line routes.

Due to the lower "range" of the capacities (64 kbit/sec to 8 Mbit/sec) in the terminating leased line segments, as well as the fact that TLI offers leased lines spread across the complete spectrum, it may not be assumed that the market share calculation in 64 kbit/sec equivalents significantly over- or underestimates TLI's market power. Furthermore, the market share calculation using the number of leased line routes also leads to a congruent estimation of the market share.

The same estimation is also fundamentally applicable to ICT-Center AG, whereas the deviation between the two market share indicators occurs at a somewhat higher level here.

Due to the extent of the market shares held by TLI and ICT-Center AG, the existence of a joint dominant market position cannot be excluded *per se*, however this must result from other market power criteria than from the market share.

3.2.2.2 Shares in the market for trunk segments

On the wholesale market for trunk leased lines, TLI has a market share of 59.6% measured in terms of the number of trunk leased lines provided, above which a dominant market position is to be presumed as per the relevant case law and practice. However this finding is not supported by the market share calculation in terms of transmission capacities, according to which TLI only has a market share of 7.1%, which is far below the critical market dominance threshold of 25% at which normally no considerations whatsoever arise with respect to a position of significant market power. In addition, UPC Cablecom GmbH with 32.1% of the trunk leased line market and Quality Net AG with 27.3% have capacity market shares which are significantly above that of TLI.

However, the market shares of UPC Cablecom GmbH and Quality Net AG are also characterised by the same discrepancy between the two market share calculations: i.e. Quality Net AG provides just 1.3% of the total number of trunk leased lines and UPC Cablecom

GmbH 5.4%. Thus, both market shares are clearly below the critical market dominance threshold of 25%.

All other providers have a market share of less than 10%.

When one examines more closely the underlying data for the market share calculation of UPC Cablecom GmbH and of Quality Net AG in the trunk leased line market, it can be seen that the calculated capacities are based overwhelmingly on a few and partly (very) short but high capacity leased line routes, with which UPC Cablecom GmbH selectively connects major customers cross-border to its network in Switzerland and with which Quality Net AG operates its backbone network.[68]

As already detailed above, the presentation of the market shares in 64 kbit/sec equivalents still tends to overestimate[69] the market power of a provider when it solely or overwhelmingly provides high capacity leased lines. In the view of the AK, this is the case with respect to UPC Cablecom GmbH and Quality Net AG, whose market shares calculated in 64 kbit/sec equivalents result in an exaggerated picture of these companies' activities on the trunk leased line market for the reasons provided above. By comparison, the total number of 5.4% leased lines provided by UPC Cablecom GmbH and 1.3% provided by Quality Net AG in Liechtenstein on the trunk leased line market gives a more realistic reflection of these undertakings' activities. For this reason and based on the significant market share of TLI on this market as presented below, the AK assumes that neither UPC Cablecom GmbH nor Quality Net AG alone has gained significant market power at present.

Due to other asymmetric market share distributions and the fact that UPC Cablecom GmbH and Quality Net AG concentrate (at least at present) on a very few mostly short and high capacity trunk leased lines (1, 2.5 and 10 Gbit/sec routes) at geographically limited locations, the existence of joint market power – and especially together with TLI – can be excluded.

TLI has a market share on the wholesale market for trunk segments of leased lines of just under 60% measured in the number of leased line routes, yet has only approximately 7% measured in leased line capacities provided. Thus, the two market share calculations are not congruent in terms of their meaningfulness with respect to the existence of any significant market power on the part of this undertaking: While the number of leased lines provided speaks for the existence of significant market power according to consistent case law, as per the market share in accordance with the capacities provided, the existence of a dominant market position is not to be assumed. Thus, this ambiguous market share finding calls for the investigation of further market power indicators.

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68 Cf. http://www.qualitynet.li/products/products.htm, last accessed on 17.02.2012.

69 For the reasoning, see details in footnote 67.

As already detailed above with respect to UPC Cablecom GmbH and Quality Net AG, the existence of joint market power by TLI together with one or both of these two undertakings can be excluded.

Ultimately, the market share indicator alone thus does not provide any compelling conclusions with respect to the sole market power of TLI on the market for trunk leased lines. For this reason, additional market power indicators are examined hereunder, and especially barriers to market entry and the control over infrastructure not easily duplicated.

3.3 Relevance of further SMP indicators

The analysis of market shares provides a natural point of departure for the investigation of market power, but is on its own not yet sufficient. The further indicators of market power named in section 3.1.1 can also be of relevance for investigation purposes. This list of criteria is however not exhaustive, and neither are all of its criteria always relevant for purposes of examination in a particular instance. It is far more the case that only those criteria are to be examined that are suitable for use in the concrete applicable case, so as to confirm or rebut a presumption of an undertaking's dominant market position resulting from the analysis of the market shares.

The AK considers it to be useful when examining TLI's potential market power on the two leased line markets which are the object of the investigation to assess the further indicators hereunder:

- The extent of market entry barriers and potential competition behind them;
- Control over infrastructure not easily duplicated;
- The existence of economies of scale and scope;
- The existence and degree of sunk costs;
- The degree of product diversification.

The presence of market barriers over the longer term as well as the absence of potential competition represent necessary conditions for the existence of a dominant market position.

The other indicators of significant market power in accordance with Art. 31(1) VKND cannot, in the opinion of the AK, be ascertained due to a lack of available data, or are not meaningful or of lesser importance with respect to the present market.

3.4 Market barriers

3.4.1 The indicator's significance

Barriers to market entry (Art. 31(1)(b) VKND and paras. 79 and 81 of the SMP Guidelines) can be defined as any factors that permit undertaking(s) active on a market to raise their prices above costs without thereby facing additional instances of market entry. From an economic point of view, the presence of long-term market entry barriers is a key criterion for the assessment of a dominant market position. The excess profits of a market dominant undertaking would, were the market entry free of barriers, induce entry by further undertakings and thereby erode the excess profits (or the dominant market position respectively). This mechanism is disabled when entry is denied to potential new market entrants. Thus, the higher the market entry barriers are (i.e. the more difficult market entry becomes), the higher – *ceteris paribus* – will potentially be the degree of market power the established undertaking has.

Against this background, the existence of long-term market entry barriers is to be interpreted as a necessary condition for the absence of effective competition. What is decisive for the assessment of market power is, however, not merely the existence of such barriers but also the degree of competition that occurs behind these barriers. Market power can be supposed to exist especially where the market concentration is high and at the same time high barriers to market entry prevail.

In its Recommendation on Relevant Markets, the EFTA Surveillance Authority differentiates between two kinds of barriers to market entry, namely structurally and legally determined barriers:

A structurally determined barrier to access is present if, at a given level of demand, the state of the technology and the corresponding cost structure are such that asymmetries between established operators and market entrants are produced which hinder market entry by the latter. High structurally determined barriers to market entry can arise especially in connection with significant economies of scale, scope and concentration (see Art. 31(1)(h) VKND and para. 78 of the SMP Guidelines) as well as with high sunk costs. Although economies of scale do not represent barriers to market entry *per se*, they do have the effect that operators must have a high production volume when they enter the market in order not to be at a cost disadvantage vis-à-vis the established undertaking.

Sunk costs are taken to mean such parts of fixed costs that an undertaking cannot, by reason of a lack of alternative uses or a significant loss of value in the case of reuse, recover in the event of its leaving the market. If uncertainty exists about the success of an undertaking on a market, the level of sunk costs thus affects the decision to enter the market as well. The higher the component of fixed costs that sunk costs represent, the higher becomes the risk with a market entry.

Legally determined barriers arise not from economic conditions, but from legislative, administrative or other institutional factors that have a direct impact on the conditions of access and/or the position of operators on the market in question.

All those aspects which influence the openness to additional market entries in relation to the leased line markets of relevance for the investigation are described below in general terms. Because an analytical distinction often cannot be made between the different kinds of market barriers, the question is dealt with in a relatively broad fashion.[70]

3.4.2 Control over infrastructure not easily duplicated

One can speak of control over infrastructure that is not easily duplicated (Art. 31(1) VKND and para. 78 of the SMP Guidelines) if certain infrastructure necessary for the provision of the service is in the hands, exclusively or to a large extent, of a single undertaking (for which the indicator is market share) and high barriers exist to the establishment of alternative infrastructure (for which the indicator is market entry barriers). Such control can permit the undertaking in question (in the absence of countervailing buying power) to exercise market power, because it is the only provider of the service and neither current nor potential competition exists. It may in addition be possible for the undertaking to leverage its market power onto downstream or neighbouring markets.

Prior to its transfer to LKW on 1 January 2007, the complete[71] cable-based network infrastructure in Liechtenstein was concentrated in the hands of the previously integrated provider LTN. Since the acquisition of this (passive) network infrastructure by LKW, these are the only undertakings which have a network infrastructure (access and core network) across the complete country at their disposal for the provision of leased line and other services at fixed locations in Liechtenstein, and thus have control over infrastructure not easily duplicated. However, LKW itself is not active on the downstream retail markets, i.e. it offers neither fixed network access nor leased lines on the retail level. But also on the wholesale markets for terminating and trunk segments of leased lines which are of relevance here, LKW is not active (anymore) at present: Since 2010 it has not provided any trunk leased lines and LKW has never provided terminating segments. Instead, LKW solely provides infrastructure wholesale service products (and especially dark copper and dark fibre, i.e. not switched on or unlit physical line/cable sections) in the access network (Market 4) and in the core network. Both products are not part of the leased line markets under investigation. The buyers of these infrastructure wholesale services – in particular TLI

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70 Due to the relevance criteria underlying the Recommendation on Relevant Markets by the EFTA Surveillance Authority (three-criteria test for *ex ante* regulation, which also assesses the market entry barriers, cf. section 2.2.), the presence of market barriers at a certain magnitude must be assumed. This applies at least to the market for terminating segments of leased lines, which has been identified in the current version of the Recommendation on Relevant Markets by the EFTA Surveillance Authority as being under consideration for *ex ante* regulation. Regarding the market for trunk leased lines, the AK has also confirmed in section 2.4.2 above the presence of market entry barriers in Liechtenstein. To that extent, the task of the present chapter is to elaborate the magnitude or the concrete extent respectively of these market entry barriers.

71 With the exception of LKW's CATV network.

as well – use these for their own part to provide their own terminating and trunk segments of leased lines. This provision is taken into consideration as an offer on the supply side of the present wholesale leased line markets.

The access to LKW's infrastructure in the access domain, which is required as a rule for the provision of terminating segments of leased lines, is currently subject to special regulation in the context of the market for the physical access to network infrastructures at fixed locations (M4).[72] The access to LKW's infrastructure in the core and trunk network area is not currently subject to special regulation. In any case however, when assessing the conditions for competition in the sense of the greenfield approach, the premise is to be assumed that no relevant regulation is a given for the markets under investigation.

Regarding TLI this continues to have at its disposal, as detailed in the context of the analysis of the M4 Market,[73] as the sole operator a fixed network across the complete country in Liechtenstein that is difficult to replicate, as it continues to be represented with its backhaul components country-wide in the collocation facilities and the gateway-MSCs, which are required in addition to the subscriber connections (which are now bought as a wholesale service from LKW) for the provision of access to voice telephony services at fixed locations. Similar considerations are applicable with respect to the provision across the complete country of terminating segments of leased lines. In addition to the line infrastructure in the access domain itself (twisted pair copper cable as a rule), which TLI leases from LKW, collocation facilities and backhaul components country-wide are required for this. This is because leased lines which do not begin and end in the same access network domain have to be routed by means of backhaul services from one access domain to the next one. As a rule, individual line routes are no longer physically connected end-to-end for this purpose, but instead are connected or combined respectively in a high capacity backbone line (virtually) under corresponding availability guarantees. As a rule, the separate physical cable routing would only pay off with high capacity leased lines. For this reason, in order to be able to offer leased lines across the complete country, it is still required that a provider is represented in all or most of the access domains named in section 2.3.2 by means of its own collocation installations and its own backhaul. This is the case with TLI, for which reason it has – although it is dependent on LKW's infrastructure wholesale inputs – a certain control over infrastructure not easily duplicated. This is even more so the case in relation to terminating segments of leased lines than with trunk leased lines.

However, other providers of leased lines can also buy unbundled access lines in the access domain or physical cable routes in the trunk domain from LKW as wholesale inputs and provide leased lines themselves on this basis. To the extent that availability across the complete country of the leased line services offered is to be considered, the investments

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72 Cf. administrative decision of the AK applied to LKW dated 16 December 2009.

73 *Ibid.* page 14 et seq.

in collocation installations and a backbone connection as described above also have to be effected for this purpose, with the corresponding impacts on costs.

Accordingly, it can be ascertained in conclusion that TLI is the sole undertaking with a network across the complete country for the provision of terminating segments of leased lines and thus has control over infrastructure not easily duplicated. This is true without prejudice to the fact that TLI has had to buy since 2007 – the point in time at which it sold the passive access network to LKW – the unbundled access line as a wholesale input. With respect to the trunk leased lines, this control does not exist or only in a weakened form to the extent that and as long as LKW actually provides the corresponding infrastructure wholesale inputs in a non-discriminatory manner to all providers of leased line services.

3.4.3 Existence of economies of scale and scope

If market shares show that an undertaking's services far outstrip that of potential competitors quantitatively, the question arises: Can this undertaking, because of its higher quantitative output, provide its services on the market at lower unit costs and so gain a competitive edge over its potential competitors, thus making their entry onto the market more difficult? This tends to be the case for any services that have a cost structure with a high proportion of fixed costs that are spread across the volume. Such economies of scale secure not only a competitive advantage vis-à-vis existing competitors, but make potential competitors' market entry more difficult, as they must first sell a minimum quantity in order to trade on the market profitably (minimum efficient scale). The dominant undertaking's higher margins additionally expose existing and potential competitors to the danger that they will not be able to match short-term price reductions made by the undertaking with significant market power and thus will no longer be competitive.

As already detailed in section 3.4.2 on the control over infrastructure which is not easily duplicated, providers of terminating segments of leased lines have to effect investments in country-wide collocation installations and backbone connections with the corresponding impacts on costs in order to have availability across the complete country, even if they are able to buy unbundled access lines from LKW as wholesale inputs in the access domain. Thus, this high fixed cost element would suggest that TLI can at least provide terminating segments of leased lines at cheaper prices than potential competitors and thus can gain or maintain a competitive edge due to its higher quantitative output and ubiquitous presence with collocation and backhaul facilities. In addition, TLI as a full service provider country-wide offers a range of further cable-based telecommunications services – and especially fixed network connections and broadband access – which permits it to gain economies of scope from the joint usage of the infrastructure in the core and access network domain. Thus in an unregulated environment, it can gain higher profits on this market through the economies of scale and of scope and abuse its market power as the case may be.

However the barriers to market entry decline in the direction of higher network levels, because more traffic tends to aggregate here and higher bandwidths are demanded. In this way, both the economies of scale as well as the sunk costs decrease. With respect to the trunk leased lines however, this does not occur to the same degree in any case because all providers of these (high capacity) leased lines can buy corresponding infrastructure wholesale services from LKW "as required" or on a customer-specific basis. However, certain economies of scale and of scope occur here too because TLI already operates numerous high bit rate transmission systems for leased lines and other purposes in the backbone area, which permit it to realise retail customer leased line routes via the existing systems in a simpler and more cost effective way than is the case for alternative providers which have to lease line routes from LKW in order to provide a leased line or have to utilise a transmission system, whose capacities cannot be exploited optimally or cost efficiently with only the leased line provided to the individual customers.

3.4.4 Sunk costs

Sunk costs are fixed costs of production which, once incurred, are irreversible, i.e. they cannot be recovered anymore. Network industries are characterised by high sunk costs. The network infrastructure in general and access networks specifically are to be assessed as sunk costs, in addition to the establishment of collocation facilities for instance. Major investments occur in the form of excavation work and the restoration of surfaces and they cannot be reused and thus not resold in the case of a shutdown. It also hardly seems sensible in the case of a shutdown or reduction in capacity to dig up cables that have already been laid or dismantle collocation facilities. At the most, entire networks or stand-alone sub-networks are re-saleable. However as this situation is so specific ("asset specificity", a "hold-up" problem), a market price cannot be ascertained for them, or it is set at a correspondingly low level. Only one competitor would come into question as a potential buyer and it would at most only be prepared to pay a price that corresponds to the equivalent of the discounted return. With respect to such an investment decision, the question has to be asked why it would not be possible for the owner to date of the network to continue business on a profitable basis. If it cannot, i.e. if it is shown that a shutdown is more advantageous, then no one else would be prepared to pay a price that would cover the sunk investments.

It is exactly this circumstance of high sunk costs in network industries (network infrastructure) that poses a major risk to the potential investor, which must be compensated for through higher returns. For an investor that has already made the investment, high sunk costs mean that it will wish to recover the highest possible marginal returns over the longest time possible, even if a more current decision to invest would be negative. This leads, in a situation of (buried) over capacity, to the operator also selling at prices that are below the (historical) full costs. Entry onto the market by new operators thus becomes unattractive or impossible, while established operators neglect investments to expand the network and apply stricter criteria for upgrade investments relative to what they can save. In this regard, network industries are substantially different to other industries where over capacity occurs due to the high sunk costs and the long (technical) life of such investments, which means that the process of consolidation lasts much longer (optimisation with respect to the reduction of exit costs).

The general assessment of the high sunk costs associated with network infrastructures described above and the problems for competition that they entail characterised the situation prevailing in Liechtenstein up to the end of 2006 with respect of LTN (now TLI). However since this sold its complete passive network infrastructure, these considerations are to be made with respect to LKW, even if it has to be taken into account for the present market analysis that LKW on the one hand is solely active on the wholesale level and on the other hand – as presented in section 2.5.1 – LKW is not present as a provider on the two leased line markets under investigation as it rather limits itself to the provision of infrastructure services on an upstream level (and especially dark copper/fibre or unbundled access lines respectively).

However the issue of sunk costs presented above and the competition problems resulting from same still fundamentally prevail in spite of this. Liechtenstein has – with the exception of a few routes (cf. UPC Cablecom GmbH with its own short duct and the radio links of the mobile communications operators for connection to its base stations) – not experienced any duplication of terminating or of trunk segments of leased lines (or of the underlying infrastructure respectively) by means of an alternative operator's own infrastructure, and this is also not expected in the foreseeable future in light of the very high sunk investment costs linked to this and the limited market potential. Likewise, there are no alternative network industries or network operators (such as for instance electricity suppliers[74] or railroads) in Liechtenstein, for which it would be easier due to their existing network infrastructure and economies of scope to erect their own telecommunications network infrastructure in light of the high sunk costs. Thus except for LKW, no other undertaking has – apart from the few exceptions which are also not across the complete country anyway – its own infrastructure available to it for the provision of leased lines.

Thus, it can be said in summary that both the country-wide infrastructure operated by LKW as well as the country-wide backhaul operated by TLI – even if it is based on the access to LKW's wholesale services – for the provision of leased line services are characterised by sunk costs.

3.4.5 Product diversification

The degree of product diversification (Art. 31(1)j VKND) is relevant for the assessment of market power to the extent that higher product diversification is fundamentally accompa-

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[74] LKW operates the electricity as well as the communications network.

nied by greater market power of the individual undertakings over their customers because switching to a different undertaking is only possible to a limited extent. If individual undertakings manage to differentiate their product sufficiently from other products and an imitation product is not possible for other undertakings, competitive advantages can arise from this.

Leased lines are fundamentally very homogeneous products as the established transmission technologies are standardised and available to each operator in the same way. However differentiation options result from the extent of the product range or by offering product bundling options, as well as in relation to the quality provided.

The extent of the product range covers the geographic availability and the selection of destinations or connections respectively, as well as the bandwidths and interfaces offered. TLI is quite clearly the undertaking with the largest network coverage and the largest capacities between the trunk access points here. Thus, it cannot be excluded that TLI has a certain degree of market power in relation to some customers or on certain routes respectively due to its network coverage.

As two terminating segments and a trunk segment are often required for the provision of end-to-end leased lines, a bundling issue exists between trunk segments and terminating segments. Thus, there are advantages for TLI in relation to the other undertakings active on the market due to TLI's powerful position on the market for terminating segments as well as for trunk segments.

Thus, it cannot be excluded that TLI has competitive advantages available to it in relation to its competitors due to its country-wide presence and its bundling options respectively.

3.5 Joint market power

3.5.1 On the market for terminating segments of leased lines

Of the 13 providers active on this wholesale market, only TLI has a market share between 25.9% (capacities) and 27.5% (number of leased lines) and thus of slightly above 25%. Except for ICT-Center AG which has a market share between 16.6% (capacities) and 23.7% (number of leased lines), all of the other providers have less than a 13% market share. The market concentration *(Herfindahl-Hirschman Index – HHI)* amounts to 1,335 in capacities and 1,638 in the number of routes and thus the market exhibits low concentration.

However the presence of joint market power by TLI together with other providers can already be excluded due to the asymmetric market share distribution.

Due to the availability of infrastructure wholesale service products on the part of LKW, the entry barriers to the market for terminating segments of leased lines are significantly reduced in comparison to the alternative construction of such an infrastructure, even if investments in country-wide collocation facilities and backhaul are still required for ubiquitous availability. This is also evidenced by the constantly growing competition at present, as well as the short-term option for further potential competitors to enter the market at all times on the basis of LKW's wholesale service products.

The threshold for customer switching is low, the market entry thresholds are also significantly reduced and LKW has sufficient unused wholesale capacities at its disposal, so that any coordinated behaviour could be quickly and easily undermined by current and potential competitors.

In the opinion of the AK, no undertaking has a credible retaliatory mechanism with which the undermining of any coordinated modes of behaviour could be punished. There is no alternative infrastructure across the complete country to that of LKW and every provider active on the market for terminating segments of leased lines, including TLI, buys the corresponding wholesale service products at the same conditions.

For all of these reasons, the presence of a joint dominant market position on the wholesale market for terminating segments of leased lines can be excluded.

3.5.2 On the market for trunk leased lines

There are currently 13 providers active on the wholesale market for trunk leased lines. Of these, only TLI, UPC Cablecom GmbH and Quality Net AG have market shares of more than 25%. All the other providers each have less than a 10% market share. The three undertakings named have approximately 66% of the market together, measured both in terms of transmission capacities provided as well as in the number of transmission routes provided. The market concentration *(Herfindahl-Hirschman Index – HHI)* amounts to 1,970 in capacities and 3,680 in the number of routes and thus is fundamentally high.

However, the presence of joint market power by TLI together with UPC Cablecom GmbH, Quality Net AG or any other provider is still not probable due to the asymmetric market share distribution and especially the limited products offered by Quality Net AG and by UPC Cablecom GmbH geographically in particular and also in terms of customers.

As already detailed, the market entry barriers for the trunk leased line market are already significantly decreased due to the private autonomous availability of infrastructure wholesale inputs on the part of LKW. Thus, not only the degree of the potential competition is large, growing competition can even be observed currently due to the increasing number of providers on this market – based to the greatest extent on LKW's wholesale infrastructure inputs – and their market share gains.

One clear sign of strengthened competition, which is thus contrary to the presence of joint market power, is the market entry of Quality Net AG especially which first occurred a few years ago and the growth in its market share, which is also to the detriment of TLI in particular.

Due to the small scale of the relations, which is a given, the market is fundamentally clear and manageable. However trunk leased lines are basically offered on a project-specific basis, for which reason low price transparency is a given.

Trunk leased lines are relatively homogenous and mature products, and there are low thresholds to switching on the customer side.

As per the AK's level of knowledge, there are no special informal or other connections between TLI, UPC Cablecom GmbH and Quality Net AG.

In the opinion of the AK, no undertaking has a credible retaliatory mechanism with which the undermining of any coordinated modes of behaviour could be punished. There is no alternative infrastructure across the complete country to that of LKW and every provider active on the market for trunk leased lines buys the corresponding wholesale service products at the same conditions.

The threshold for customer switching is low, the market entry thresholds are also significantly reduced and LKW has sufficient unused wholesale service capacities at its disposal, so that any coordinated behaviour could be quickly and easily undermined by current and potential competitors.

For all of these reasons, the presence of a joint dominant market position on the wholesale market for trunk leased lines can be excluded.

3.6 Market power – conclusion

3.6.1 On the market for terminating segments of leased lines

A position of significant market power for LKW can be excluded – despite its control over a ubiquitous access infrastructure which is not easily duplicated – due to the fact that this undertaking is not active at all on the market for terminating segments of leased lines.

Of the 13 providers active on the wholesale market for terminating segments of leased lines, only TLI has a market share of slightly over 25%, above which as per the prevailing case law and practice initial considerations can arise at all about the occurrence of any sole market dominant position. However the presence of further factors for significant market power is required for such a position. The result of the investigation of these factors is that overall they are contrary to the finding of a dominant market position by TLI on the market for terminating segments of leased lines.

On the one hand, four further providers have a market share of more than 10%, with ICT-Center AG being the second largest provider with a market share of 16.6% measured in transmission capacities and 23.7% in leased line routes.

TLI's control over infrastructure which is not easily duplicated in the form of country-wide collocation and backhaul facilities for the provision across the complete country of leased lines and the sunk costs linked to this – without prejudice to the requirement to purchase infrastructure access services from LKW – as well as the presence of economies of scale and of scope (country-wide provision of other cable-based telecommunications services, such as fixed network connections and broadband access especially) are of themselves an indication of a dominant market position.

However, other providers of terminating segments of leased lines can also buy physical network access in an access network from LKW as a wholesale service and provide leased lines on this basis. Even if availability across the complete country of the leased line services offered requires the (sunk) alternative investments described in country-wide collocation facilities and backbone connections, it has still been determined due to the actual market development that further providers have newly entered the market over the last few years and initially begun to sporadically add customers and expand their customer base step by step. Thus, it can be ascertained that competition is developing increasingly behind the barriers to market entry as named.

TLI also has an advantage to the extent that it can differentiate its products better than can its competitors, because it can bundle terminating and trunk segments to retail customer leased lines more easily. However in the opinion of the AK, this is not sufficient by itself for the assumption of a dominant market position in the present case.

Thus summarising the AK's analysis, TLI by itself does not have significant market power on the wholesale market for terminating segments of leased lines.

For the reasons named in section 3.5.1, and especially because of the asymmetric market share distribution, the presence of a joint dominant market position on the wholesale market for terminating segments of leased lines can also be excluded.

Thus no undertaking has a dominant market position either alone or together with others on the wholesale market for terminating segments of leased lines under investigation.

3.6.2 On the market for trunk segments of leased lines

A position of significant market power for LKW can be excluded – despite its control over a country-wide core network infrastructure which is not easily duplicated – due to the fact that this undertaking is not active at all on the market for trunk leased lines.

TLI has a market share of just under 59.6% on the wholesale market for trunk segments of leased lines, measured in the number of leased line routes, but only just 7.1% measured in leased line capacities provided. Although thus a dominant market position for this undertaking could be assumed – apart from extraordinary circumstances – in accordance with the market share measured in terms of the number of trunk leased lines provided as per the prevailing case law and practice, the market share of TLI measured in transmission capacities provided is, in accordance with the same settled case law and practice, so low that normally no considerations whatsoever would arise with respect to a sole dominant market position.

Furthermore UPC Cablecom GmbH and Quality Net AG have, with 32.1% and 27.3% respectively of the trunk leased line market, capacity market shares which are significantly above that of TLI's 7.1%.

However, the market shares of UPC Cablecom GmbH and Quality Net AG are also characterised by the same discrepancy between the two market share calculations: Thus, Quality Net AG provides just 1.3% of the total number of trunk leased lines and UPC Cablecom GmbH 5.4%. Thus, both market shares are clearly below the critical market dominance threshold of 25%. Furthermore, the presentation of market shares in 64 kbit/sec equivalents tends to overestimate[75] the market power of a provider when it solely or overwhelmingly provides high capacity leased lines, such as do UPC Cablecom GmbH and Quality Net AG. Thus, the number of leased lines provided by these undertakings on the trunk leased line market gives a more realistic reflection of their activities. For this reason and based on TLI's significant market share on this market presented below, the AK assumes that neither UPC Cablecom GmbH nor Quality Net AG alone has gained significant market power at present.

While consequently the sole market power of TLI would normally be assumed to be proven in accordance with established case law based on the number of leased lines provided, the market share calculation in accordance with the capacities provided excludes the presence of a dominant market position by this undertaking. Thus, the SMP market share indicator is not conclusive and by itself does not permit any clear conclusions concerning the position of TLI on the trunk leased line market. Thus, further market share indicators had to be investigated.

In addition to the magnitude of the market share, the existence of long-term barriers to market entry as well as the lack of potential competitors represent necessary conditions for the presence of a dominant market position.

In relation to trunk leased lines – under the assumption of the private autonomous availability of LKW's infrastructure wholesale services – sunk fixed costs are not a given to the same degree as with the terminating segments, because all providers of these (high capacity) leased lines can buy corresponding infrastructure wholesale inputs from LKW "as required" or on a customer-specific basis. However, certain economies of scale and of scope occur here too because TLI already operates numerous high bit rate transmission systems for leased lines and other purposes in the backbone area, which permit it to realise retail customer leased line routes in a more efficient way.

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[75] For the reasoning see the details in footnote 67.

Unlike with the market for terminating segments of leased lines, the control over infrastructure which is not easily duplicated (in the form of collocation and backhaul facilities) as well as the economies of scale and of scope prevailing there with respect to the trunk leased lines do not exist here or only in a weakened form respectively to the extent that and as long as LKW actually continues to provide the corresponding infrastructure wholesale services in a non-discriminatory manner to all providers of leased line services as it has done to date. The AK will define and regulate as required a separate market for physical infrastructure access services for high capacity transmission routes in core networks, provided the conditions are met.

The presence of joint market power by TLI together with UPC Cablecom GmbH, Quality Net AG or any other provider is to be excluded due to the asymmetric market share distribution and the limited products offered by the latter two providers geographically and in terms of customers.

Thus, in conclusion to the market power investigation it has been ascertained that the initial indication of the presence of significant market power on the part of TLI based on the market share calculated in accordance with the units cannot be confirmed by the examination of further indicators of market power. In consideration of the private autonomous and non-discriminatory access granted by LKW to corresponding infrastructure wholesale service products especially, the barriers to market entry have decreased clearly and this is supported by the fact that increasing competition by alternative providers is being observed here.

For these reasons, no provider has sole significant market power on the wholesale market for trunk segments at present. This assertion remains valid at least as long as LKW, which has the sole ubiquitous infrastructure for the provision of trunk leased lines at its disposal, does not itself enter this market as a provider and the required infrastructure wholesale services continue to be provided externally in a non-discriminatory manner. In the event that this changes in the future, the AK will initiate a fresh analysis of this market without delay.

For the reasons named, the presence of a joint dominant market position on the wholesale market for trunk leased lines can also be excluded.

Thus, no undertaking has a dominant market position either alone or together with others on the wholesale market for trunk leased lines under investigation.

4 No measures of special regulation

Art. 22 (1) KomG lays down that measures of special regulation may only be taken in cases where a lack of effective competition is ascertained on a specific market. Effective competition is present in the sense of the thesis of equivalence when no undertaking alone or in combination with others has a dominant market position on the market in question.

As no undertaking alone or in combination with others has been designated with a dominant market position on the wholesale market for terminating segments of leased lines or on the wholesale market for trunk segments of leased lines, effective competition prevails on both of the markets and no measures of special regulation in the sense of an *ex ante* regulation are required.

Thus the procedure officially initiated by the AK in accordance with Art. 21(2) KomG is to be ceased without recourse to any formal (administrative) procedure in conformity with Art. 32(3) VKND.

5 Annulment of the legacy licensing obligations

In accordance with Art. 32(3) second sentence VKND, any existing measures of special regulation are to be rescinded in the present markets under investigation in the event that the conditions for their regulation are not existent.

There are currently no measures of special regulation on the two wholesale markets for terminating segments of leased lines and of trunk leased lines which would have to be rescinded.

In accordance with Art. 73(3) KomG, the licences existing at the point in time of the coming into effect of the KomG are to remain valid until the publication of the market analysis' final outcomes.

Thus, any obligations in accordance with the infrastructure licence dated 23 December 1998 still in effect resulting from the assumption of the legal succession in all respects by TLI are to be annulled in conformity with Art. 73(3) KomG on *"publication of the market analysis' final outcomes"*. This is also applicable with respect to LKW in the event that such old licensing legislation duties were transferred at all in the context of the purchase of the passive network infrastructure.