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Appendix 6 of ComReg Document 16/69



Leased lines data analysis
in the context of ComReg's
market analysis review

Final report Non-confidential

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1 Introduction

ComReg has selected TERA Consultants to assist in the analysis of leased lines in the context of ComReg's market analysis review.

In February 2015, ComReg presented to TERA Consultants the data it collected until now as well as preliminary analyses it conducted¹. ComReg highlighted the numerous difficulties in faced in getting robust and comparable data from operators in Ireland.

In order to help ComReg in identifying potential further analyses which could be conducted and then used for the market analysis, TERA Consultants reviewed the approaches followed by other regulatory authorities in Europe for leased lines.

TERA Consultants focused on the French regulatory authority (ARCEP) and the UK regulatory authority (OFCOM) as they have conducted recent market analyses (in the year 2014, and 2013 respectively).

As a consequence, this report describes the analysis performed by ARCEP and OFCOM to their leased lines data and to identify their practices as regards quantitative market power assessment. From this, TERA Consultants provides observations ComReg may consider in its approach to leased lines data analysis.

The most recent market analyses performed by these NRAs are:

- ARCEP: Decision 2014-0735 dated 26 June 2014;
- OFCOM: Business Connectivity Market Review dated 28 March 2013.

This report analyses the different types of quantitative assessments that regulatory authorities typically conduct during a market analysis process:

1. The assessment of market shares (see §2);
2. The types of leased lines included in the analysis (see §3);
3. The evolution of market shares over time (see §4);
4. The geographic analysis (see §5);
5. Additional aspects (see §6).

¹ It is to be noted that TERA Consultants could not proceed until now to an in depth review of ComReg's preliminary market shares assessment as many calculations are performed offline due to the quantity of data at stake.

2 Market share in volume and in revenue

Two options can be envisaged to calculate market shares in a market analysis process:

- Volume market shares (i.e. based on the number of customers);
- Revenue market shares.

Both OFCOM and ARCEP **are using volume market shares** to conduct their assessment.

2.1 OFCOM approach

The metric chosen by the OFCOM to assess market shares is volume. This is due to the unavailability of the detailed data required to perform revenue market shares calculations:

“We did seek to measure market shares based on leased lines revenues but this was not possible because many CPs were unable to present their revenue data at the required level of granularity. Consequently, and in response to the observation made in the SMP Guidelines, this measurement exercise was more complicated to carry out than measuring market shares using the volume of leased line termination points.” (§7.57)

It is to be noted that OFCOM has defined a number of market segmented by speeds and by technologies. As a consequence, products within a given market are less heterogeneous (and therefore have similar revenues per line) as compared to the Irish case (if we consider the existing market definition). As a consequence, volume market shares are more likely to be representative of the market power.

OFCOM assesses market shares on a “per customer circuits ends” basis rather than on a “per circuit” basis. This is because the two ends of a circuit are not always supplied by the same provider (Footnote #736).

2.2 ARCEP approach

ARCEP assesses market power by calculating volume market shares based on the number of accesses².

The option to assess value market shares is not discussed by ARCEP.

When assessing the market shares, ARCEP only splits the calculation by 3 access types, without any further speed disaggregation:

- Copper with traditional interface (PDH, SDH);

² This is equivalent to OFCOM's “circuit ends” concept.

- Copper with alternative interface (ATM, Ethernet);
- Fibre.

2.3 Implementation in the case of Ireland

Irish operators had to make assumptions on the revenue data to enable revenue market share analysis (e.g. the allocation of revenues to international parts of leased lines has been based on sales forces estimates).

As a consequence, volumes market shares based on circuit ends seem more robust than volume market shares in Ireland (as in UK according to OFCOM analysis).

However, it should be noted that there is also potential for bias in the volume market share assessment due to the way circuits are recorded in the operators' systems (see section 3.1.1 for example). As a consequence, the option chosen by ComReg in its preliminary calculation to assess both volumes and revenue market shares seems safer as it could enable to identify bias.

Potential actions:

- Investigate areas where volume market shares and revenue market shares are significantly different.

This can enable one to identify potential bias if no clear reason can be identified.

3 Type of lines to be considered

This section aims to identify how the NRAs have managed to identify and mitigate systematic bias in their data.

3.1 OFCOM approach

OFCEM assesses volume market shares based on the number of "final access segments".

OFCEM assesses market shares both at wholesale level and at retail level.

3.1.1 Wholesale service share methodology

OFCEM aims at counting services which are supplied either using the alternative player's own network infrastructure (i.e. self-supplied), or on passive infrastructure from another supplier (§A5.10).

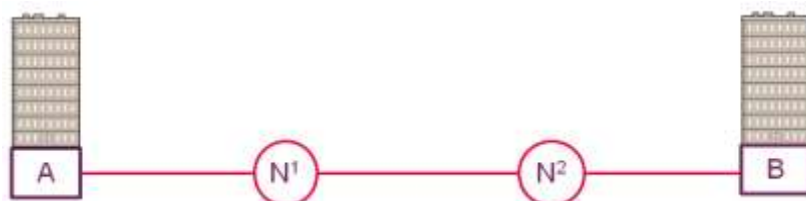
Market share is assessed by summing all wholesale and retail sales made by a operator to retail customers or other operators (external sales), which include resold services, and subtracting from this total the alternative player's wholesale purchases of leased lines from other:

$$\text{Wholesale Supply} = \left(\begin{array}{c} \textit{Wholesale circuit} \\ \textit{ends sold} \\ + \\ \textit{Retail circuit} \\ \textit{ends sold} \end{array} \right) - \left(\begin{array}{c} \textit{Wholesale circuit} \\ \textit{ends bought} \end{array} \right)$$

In the service share calculations, OFCEM only counts circuit ends at customer buildings in the UK and circuit ends at network sites. Any circuit ends outside the UK are not included (§A.5.17).

OFCEM provides an example diagram showing a leased line between two retail customer buildings at sites A and B. The leased line passes through two network sites at locations N1 and N2.

Figure 1 – Generic circuit diagram



Source: OFCEM, *Business Connectivity Market Review*, Fig. A5.1

In its raw data, an operator might describe this service as a single circuit AB, or at the other extreme it might describe the three (self-supplied) component circuits AN1, N1N2 and N2B, that is to say with 2 ends or with 6 ends.

This recording issue has to be tackled in order to avoid the different players' market shares being biased upward or downward depending on their recording option.

OFCOM has then mapped the services proposed by the market players to the products within the market definition:

Figure 2 – Mapping of interfaces with product markets

Service / Interface	Counted as wholesale supply	Product market
ADSL	No	
Analogue	Yes	TISBO
ATM	Yes	TISBO
Broadband	No	
Broadcast access	No	
Cablelink	No	
CCTV	No	
Dark Fibre	No	
Ethernet	Yes	AISBO (MISBO if >1Gbit/s)
Frame Relay	Yes	TISBO
ISDN and PSTN	No	
Radio / Microwave	No	
SDH and PDH	Yes	TISBO (MISBO if >1Gbit/s)
Street access	No	
WDM - Bearer	No	
WDM - Wavelength	Yes	MISBO
X25	Yes	TISBO

Source: OFCOM, *Business Connectivity Market Review*, Fig. A5.2

OFCOM has tried to assess the services in a consistent way and has chosen an approach that is “as much as possible” in line with sales records:

“WDM. We count wavelengths for WDM services rather than bearers. In addition, where higher bandwidth wavelengths are being used to carry multiplexed lower bandwidth circuits, we will count just the higher bandwidth wavelength.

Ethernet. Where a high bandwidth Ethernet circuit is being used to provide multiple lower bandwidth circuits, for example using VLANs, we will count just the higher bandwidth circuit. Similarly, where the bandwidth of an Ethernet service has been throttled, we will record the bandwidth of the underlying circuit.

SDH. *Where an SDH bearer is being used to carry multiplexed low bandwidth circuits, we will count each of the low bandwidth circuits and will not count the bearer.” (§A.5.32)*

It should be noted that OFCOM had to set a number of assumptions as raw data was not always detailed enough.

3.1.2 Retail service share methodology

The approach is the same except:

- Wholesale purchases are not subtracted from sales;
- Sales to other players from whom OFCOM collect circuit sales data are disregarded;
- OFCOM excludes sales where it can see that the leased line is being supplied as part of a VPN, or is being used to support internet access, and exclude circuits sold to MNOs.

3.2 ARCEP approach

ARCEP's aim is to assess to market shares for the market of wholesale lease lines terminal segments. This includes both copper-based and fibre based access.

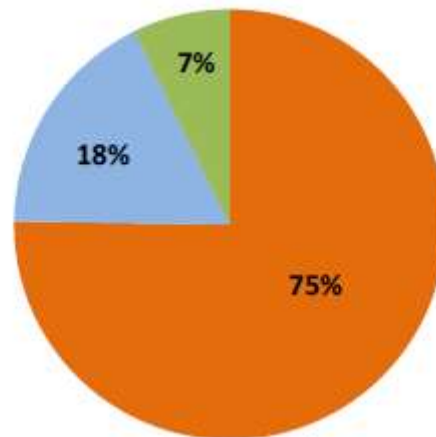
To assess these market shares, ARCEP excludes the self-supply and focus on the “free market”. This follows an advice from the French competition authority “Autorité de la Concurrence”. This reasoning behind this assumption is that the self-supply is not on the “free market” as it cannot be captured by a competitor (a player that can use its own infrastructure to provide a service would never purchase it from other players).

However, the self-supply is taken into consideration in the qualitative assessment (as this plays a role in the economies of scale).

As a consequence, only two products are considered (see p44):

- Terminal segments sold by Orange to an alternative player;
- Terminal segments sold by an alternative operator (that would purchase wholesale inputs to Orange: copper network unbundling, access to Orange civil engineering in order to build its own fibre network) to another alternative operator.

Figure 3 – Copper (alternative interface) wholesale market shares for 2013



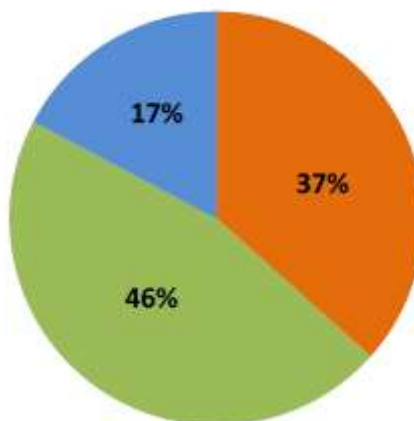
Orange: Sold by Orange at wholesale level

Blue: Sold by a private alternative operator at wholesale level (alternative operator builds its offers thanks to unbundling with SLA³ products)

Green: Sold by a public player at wholesale level (public player builds its offers thanks to unbundling with SLA products)

Source: ARCEP, *Décision no 2014-0735*, p45

Figure 4 – Fibre wholesale market shares for 2013



Orange: Sold by Orange at wholesale level

Blue: Sold by a private alternative operator at wholesale level

Green: Sold by a public player at wholesale level

Source: ARCEP, *Décision no 2014-0735*, p45

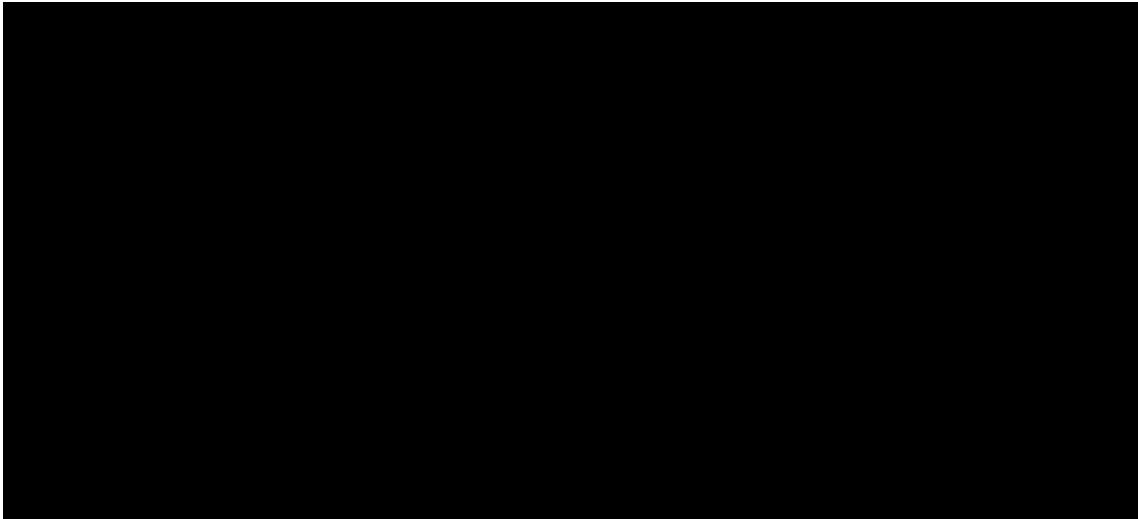
It should be noted that ARCEP excludes microwaves from the relevant market (see §2.1.2.7).

³ ARCEP defines offers targeting business customers thanks to "fault repairs guaranteed within 4 hours or less" SLA ("*une garantie de temps de rétablissement inférieur ou égal à 4 heures*").

3.3 Implementation in the case of Ireland

ComReg has performed a preliminary market share assessment based on sections 4.2.1 and 5.2.1 of the data collection as a starting point:

Figure 5 – Preliminary market share calculations ✂[REDACTED]



Source: ComReg

During the data collection process, operators have provided raw data that does not always enable to understand their recording system (e.g. 1 circuit represents an end-to-end link between two sites of the end user, 1 circuit represents a half leg from the end user site to my network... What is the unit: bearer, VLAN?).

To build these market shares, ComReg has assumed that operators have provided the data for half circuits. However, this could be double checked to make sure there is no bias in the analysis.

In its preliminary calculations, ComReg has assessed both wholesale and retail market shares with and without “off-net” lines. “off-net” lines are lines for which the operator purchases wholesale inputs to a 3rd party. This approach without the “offline” circuits seems to be in line with the OFCOM approach where wholesale circuits ends bought are subtracted (best possible approach with the data provided).

As in the OFCOM approach, ComReg has intended to stick to the chargeable basis to define the right counting unit. ComReg has used the VLAN.

Potential actions:

- Set a clear mapping of interfaces that are within or without the market (see Figure 2).

This is indeed to be performed during the market analysis itself.

Potential questions to be asked in the next data request :

- Could you specify how circuits are recorded within your system? (e.g. 1 circuit represents an end-to-end link between two sites of the end user, 1 circuit represents a half leg from the end user site to my network... What is the unit: bearer, VLAN?)

To check whether there is consistency between operators responses or not.

4 Dynamic analysis

This section aims at identifying how the NRAs have captured trends in market shares.

4.1 OFCOM approach

In its SMP assessment, when listing the criteria to be taken into account, OFCOM puts “market shares and market share trends” in the first position (§7.39).

On top of the market shares levels themselves, market shares trends are considered key to assess the market power:

“Furthermore, we have assessed the development of market shares over time. Consequently, we consider our assessment of market shares and market share trends using volume of leased line termination points enables us to paint an accurate picture of the position and economic significance of CPs in the relevant wholesale markets.” (§7.59)

In order to tackle the market shares trends in its assessment, the OFCOM compares its latest market shares assessment with the ones from its former market review (2007/08):

Figure 6 - BT's volume shares in the retail low bandwidth TI leased lines market in the UK excluding the Hull area

Product segment	Volume share 2007	Volume share 2011
Analogue	98%	96%
Digital TI < 2Mbit/s	79%	73%
Digital TI >=2Mbit/s	60%*	45%
All low bandwidth TI	80%	68%

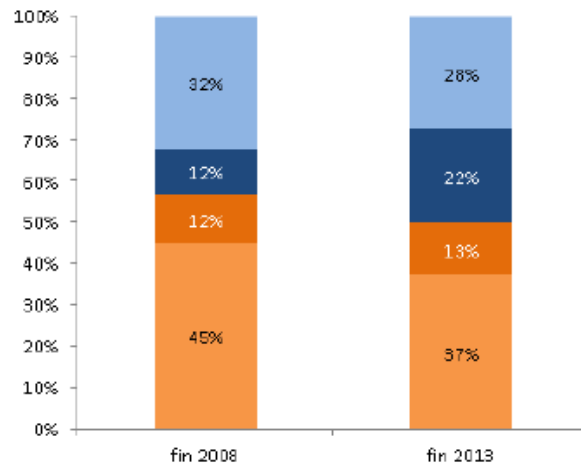
Source: OFCOM, Business Connectivity Market Review, Fig. 7.25

4.2 ARCEP approach

ARCEP does not monitor the market shares trends for the copper products. Market shares are just assessed for 2013 (latest available year).

However, the ARCEP compares the 2013 market shares for the fibre products with the outputs of its former market analysis (in the quantitative analysis, no analysis performed in the qualitative analysis):

Figure 7 – Volume market shares of operators at retail and wholesale level on dedicated fibre access given to non-residential customers



Light blue: Sold by an alternative player at retail level et built with its own infrastructure (self-supply)

Dark blue: Sold by an alternative player at wholesale level and resold buy another alternative player at retail level

Dark orange: Sold by Orange at wholesale level and resold buy an alternative player at retail level

Light orange: Sold by Orange at retail level (self-supply)

Source: ARCEP, Décision no 2014-0735, p48

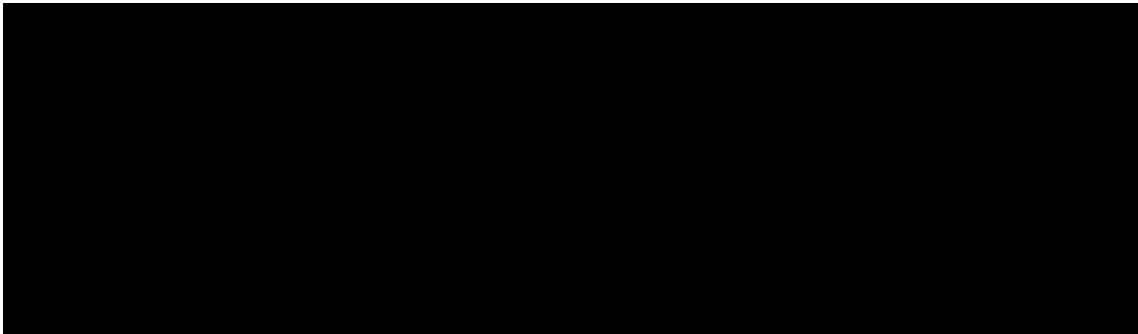
4.3 Implementation in the case of Ireland

With the data currently available, it is not manageable to perform any dynamic analysis as a number of operators have been unable to provide a dynamic view of their customer base. This can only be conducted by comparing market shares with the previous market analysis but the approach to assess market shares could be too different in this market analysis compared to the former one to conduct any comparison.

Considering the importance of market share trends in the market power assessment, finding a proxy for market trends would be helpful.

An alternative approach would be to study leased lines bids won and lost by market players over the last years. It is likely to be recorded by all operators because this is the most basic information to assess commercial efficiency. This provides a partial view of market trends (are some products are not sold via bids) but it is probably the best available proxy.

Figure 8 – Example of leased lines bid X[REDACTED]



Source: TERA Consultants, Leased Lines bids project

Potential actions:

- Investigate if latest bids could be used a proxy for market shares trends.
- Perform an additional “ARCEP-like” analysis of volume market shares (see Figure 7)

This enables to identify who captures what in the value chain.

Potential questions to be asked in the next data request :

- Please provide for the 2012-2014 period the detailed list of your bids:
 - Date of the bid
 - Name of Customer
 - Won/Lost
 - Number of bidders (potentially not available)
 - Price (potentially available only if bid is won)
 - Technology: NGN or SDH?
 - Types of access technologies - Copper DSL Yes/No - Copper SDSL Yes/No
Fibre Yes/No - Wireless Yes/No - Cable network Yes/No
 - Use Eircom infrastructure Yes/No
 - Use Other operator infrastructure Yes/No
 - If Won: price
 - Purpose of the bid (mainly international connectivity? Mainly Inside Dublin? Mainly national connectivity?)

5 Geographic analysis

This section aims at identifying how the NRAs have captured the geographical disparities in the competitive environment. This is an important aspect of leased lines markets especially in Ireland where there is a significant urban/rural divide and there is already geographic pricing differentiation in place.

5.1 OFCOM approach

In its leased lines market definition, OFCOM has isolated 3 different areas:

- The Hull area;
- The WECLA+ area (West East and Central London Area);
- The UK excluding the WECLA+ and the Hull area.

OFCOM's geographic market definition is summarized in the table hereafter:

Figure 9 – Summary of OFCOM's geographic market definition

Product market		Geographic markets		
Retail Traditional Interface and Alternative Interface	Very low bandwidth TI	The UK excluding the Hull area		-
	Low bandwidth TI	-		The Hull area
	Low bandwidth AI	-		The Hull Area
Wholesale Traditional Interface Symmetric Broadband Origination (TISBO)	Low bandwidth (LB TISBO)	The UK excluding the Hull area		The Hull area
	Medium Bandwidth (MB TISBO)	The UK excluding the WECLA+ and the Hull area	The WECLA+	The Hull area
	High bandwidth (HB TISBO)	The UK excluding the WECLA+ and the Hull area	The WECLA+	The Hull area
	Very high bandwidth (VHB TISBO)	The UK excluding the Hull area		The Hull area
Wholesale Alternative Interface Symmetric Broadband Origination (AISBO)	Up to and including 1 Gbit/s (AISBO)	The UK excluding the WECLA+ and the Hull area	The WECLA+	The Hull area
Wholesale Multiple Interface Symmetric Broadband Origination (MISBO)	> 1Gbit/s and WDM	The UK excluding the WECLA+ and the Hull area	The WECLA+	The Hull area

Source: OFCOM, Business Connectivity Market Review, Fig. 5.1

The Hull area is considered separately in the OFCOM market analysis as BT is not the owner of the local loop in this area.

The WECLA+ area case is more interesting for the Irish case as it has been considered apart from the rest of the UK due to a different competitive environment. In the end, OFCOM proposes a lighter regulation in the WECLA+ area as compared to the rest of the UK.

To determine the market geographical boundaries, OFCOM has followed the rules set by the ERG:

“Consistent with the ERG Common Position, we used three main steps to undertake a detailed geographic market definition exercise based on identifying variations in competitive conditions:*

- the selection of the basic geographic unit, for example postcodes or exchange areas or administrative areas;*
- our judgment on whether an area can be identified with heterogeneous competitive conditions compared to the rest of the country, according to factors such as the number of significant suppliers present, distribution of market shares and prices; and*
- the aggregation of areas with similar competitive characteristics in order to define the geographic areas over which to conduct the SMP analysis.”*

**Prior to conducting a detailed geographic analysis, the ERG Common Position recommends carrying out a preliminary analysis to determine “whether competitive conditions are such that a national approach to market definition, market analysis and the implications of remedies is justified” (see Executive Summary and Section 2). We consider that a detailed geographic review is appropriate in this case as the competitive conditions are clearly such that a national market is not appropriate for all of the product markets; e.g. in the 2007/8 Review we defined sub national geographic markets.*

(§5.9)

OFCOM used two cumulative criteria in order to assess the variations of competition from an area to another:

- number of suppliers with network in reasonable proximity to business customers (supposed to show the potential for competition); and
- distribution of service shares.

The postcodes are chosen as the geographic unit as these have stable boundaries and are granular enough (over 10,000 postcodes) to capture geographical differences (§5.15 and following).

Number of suppliers with network in reasonable proximity

In order to assess the number of suppliers in a “reasonable proximity” to business customers, the following steps have been followed (§5.51 & 5.52):

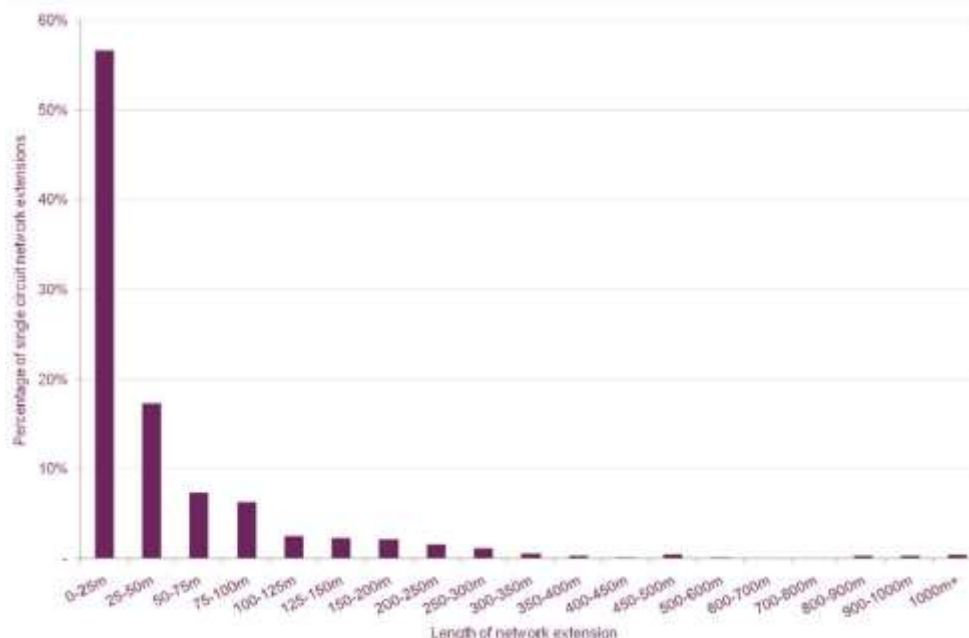
- the flexibility points for each alternative player (thus excluding BT) were plotted on a map;

- the site locations of businesses with 250 or more employees (across the entire business, not the individual site) were also plotted on the map;
- a buffer area of 200m was drawn around the location of each business site; and
- the number of different operators with flexibility points within the 200m buffer area around each business site (counting each operator only once) was calculated;
- this gave the number of OCPs from which each business site could seek supply, given the 200m buffer assumption. Values across all the business sites within a postcode sector are then averaged.

The 250+ employee threshold for the size of businesses to be considered has been set based on the results of a consumer survey showing that leased lines products are purchased by the biggest businesses in the UK. As a consequence, the biggest category within the business location database has been used (§5.54).

The 200m threshold is supposed to be representative of an “economic build distance”. This is based on the analysis of latest network extensions performed by alternative players (§5.57 and following):

Figure 10 - The distribution of build distance in alternative players network extensions over the past three years (extensions to customer site in order to supply leased lines)



Source: OFCOM, *Business Connectivity Market Review*, Fig. 5.3

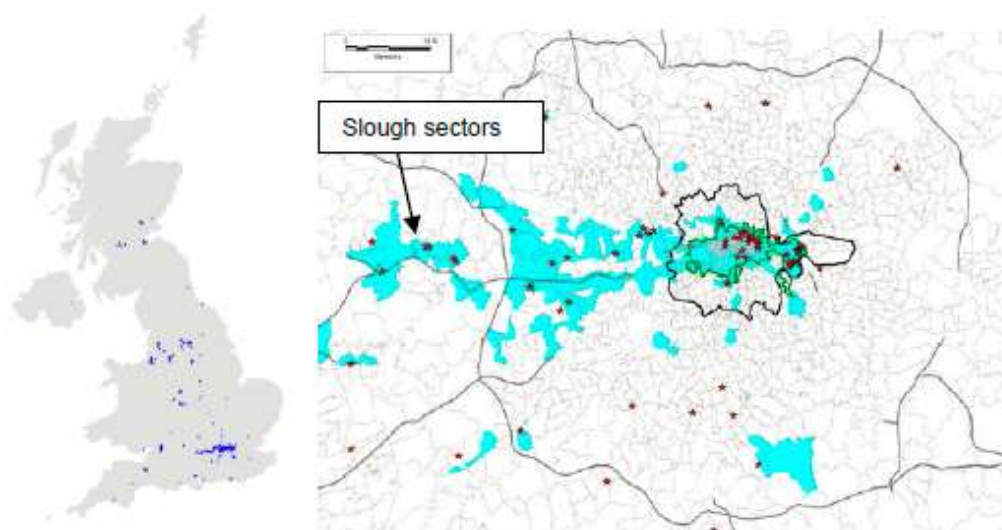
OFCom considers an area has a “high network reach” if **two alternative players or more are within reach of the business sites in average**. OFCom has observed a correlation between the presence or 2 or more alternative infrastructure and BT’s service shares in these areas (§5.56).

In order to set the market boundaries, OFCOM has **also considered the contiguity** of "high network reach postcodes":

"We noted that the contiguity requirement reflects the fact that competition in wholesale provision of leased lines is based on investment in infrastructure, rather than the use of BT's network. We considered that for an operator to be able to compete in an unregulated leased line geographic market it must have, or be able to obtain access to, infrastructure at both ends of the leased line and also between the two end points." (§5.64)

Out of the 10,043 UK postcodes, 822 are HNR ("high network reach areas"). Half of these are located in London and Slough. The rest are sparsely and disjointedly distributed across different areas, mostly located in other urban areas.

Figure 11 - Location of "high network reach areas" + focus on London



Source: OFCOM, Business Connectivity Market Review, Fig. 5.4 & 5.5

It is to be noted that OFCOM has performed sensitivity analysis considering customer ends locations instead of large business sites locations or considering a 11+ employee threshold. This did not change the boundaries of the competitive area to a significant extent.

Service market shares

OFCOM has checked the pertinence of the WECLA+ area to assess competition disparities by looking at the service shares in the corresponding areas.

The analysis underlines the low BT market shares in the WECLA+ area for the products highlighted in yellow.

BT market shares in HNR areas within Leeds, Manchester and Birmingham remain high.

Figure 12 - BT Service shares for different market

Product market	2007			2011 – June BCMR			2011 - Statement			
	UK	WECLA	UK excl WECLA and Hull	UK	The WECLA	UK excl WECLA and Hull	UK	WECLA	WECLA+	UK excl WECLA+ ⁴⁸³ and Hull
LB TISBO	87%	73%	90%	85%	68%	89%	87%	61%	62%	93%
MB TISBO	37%	22%	45%	59%	17%	74%	56%	12%	13%	77%
HB TISBO	43%	18%	57%	39%	12%	49%	35%	7%	8%	51%
VHB TISBO	7%	6%	7%	5%	3%	8%	15%	3%	3%	35%
AISBO	65%	47%	69%	62%	41%	67%	69%	51%	51%	74%
MISBO	65%	62%	66%	47%	15%	59%	47%	25%	24%	57%

Product market	WECLA+	HNR Birmingham	HNR Manchester	HNR Leeds
MB TISBO	13%	31%	71%	46%
HB TISBO	8%	60%	62%	82%
AISBO	51%	58%	79%	65%
MISBO	24%	39%	96%	39%

Product market	HNR Birmingham, Manchester and Leeds combined	Rest of UK excluding WECLA+ and Hull
MB TISBO	47%	77%
HB TISBO	72%	51%
AISBO	69%	74%
MISBO	69%	57%

Source: OFCOM, Business Connectivity Market Review, Fig. 5.15, 5.16, 5.21

It is to be noted that OFCOM has also performed a specific analysis to assess the network reach of specific sites: mobile base stations (only for mobile sites using leased lines for connection), BT local exchanges and data centres (see A5.228):

“For the BT local exchange and data centre sites, the network reach data was processed further to give:

- sum of local exchange or data centre sites, within 200m, 500m and 1000m, by OCP. This provides an indication of the number of such sites each OCP is able to serve for a given build distance; and*
- absolute number of local exchange or data centre sites, within 200m, 500m and 1000m, of 0, 1, 2, 3 etc. OCPs. This gives an indication of the number of OCPs able to supply these sites.” (§A5.259)*

NB: data centres are not treated as a separate market as they represent less than a percent of UK leased lines revenues.

5.2 ARCEP approach

In its leased lines market analysis, ARCEP defines a nationwide market.

However, it proposes different price control obligations depending on the areas due to heterogeneous competitive environments.

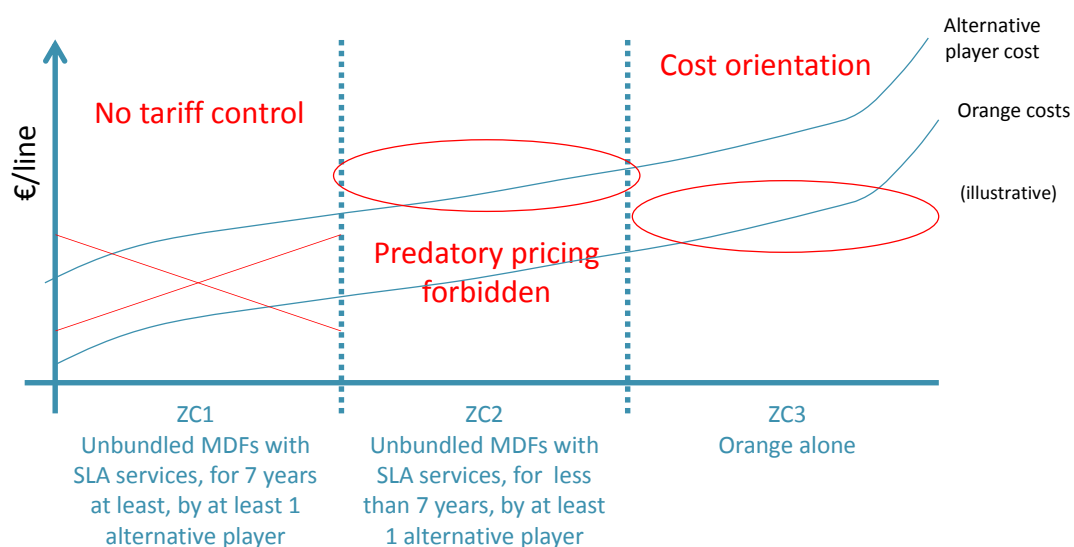
Copper products

For the alternative interfaces products, ARCEP explains that competition is driven by the unbundling (LLU) extension. ARCEP monitors the MDFs that are enabled for business-specific products.

To set its price control obligations, the ARCEP has identified 3 areas:

- ZC1: Unbundled MDFs with SLA services, for 7 years at least, by at least 1 alternative player;
- ZC2: Unbundled MDFs with SLA services, for less than 7 years, by at least 1 alternative player;
- ZC3: Orange alone.

Figure 13 – Summary of the price control obligations (copper products, alternative interface⁴)



Source: ARCEP, Decision 2014-0735

The 7-year threshold has been set in order to protect alternative players' investment to provide business-specific products. This limit has been set based on the views from the different contestants (both Orange and alternative players) to a public consultation.

Fibre products

⁴ According to the ARCEP, PDH / SDH are "traditional interfaces", ATM / Ethernet are "alternative interfaces"
Ref: ComReg - LL data analysis

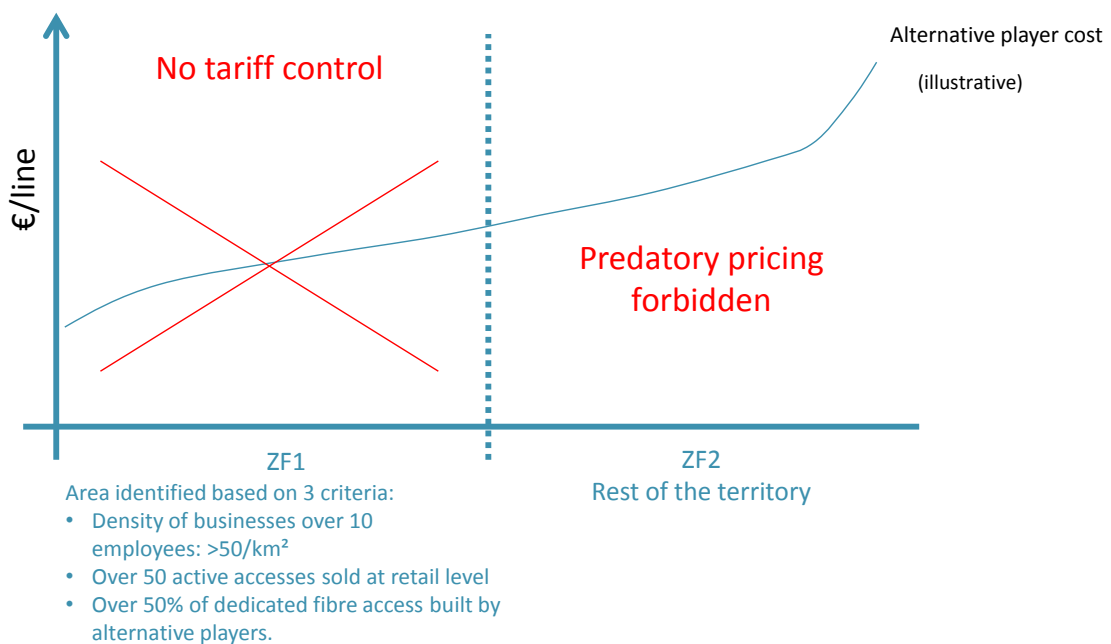
For fibre products, ARCEP also sought to identify competition disparities between areas.

To set its price control obligations, ARCEP has identified 2 areas:

- ZF1: Area identified based on 3 criteria:
 - Density of businesses over 10 employees: >50/km²
 - Over 50 active accesses sold at retail level
 - Over 50% of dedicated fibre access built by alternative players.
- ZF2: The rest of the territory.

ARCEP notes that Orange retail market share is 33% in the ZF1 and 56% in the ZF2.

Figure 14 – Summary of the price control obligations (fibre products)



Source: ARCEP, Decision 2014-0735

European Commission's views

It is to be noted that when giving its views on the ARCEP's draft decision, the **European Commission has underlined the need for considering market shares and market shares trends on top of the existence of alternative infrastructures:**

“The Commission would like to recall that the number of operators present in a given area is not by itself a criterion sufficiently detailed or robust to identify real differences in competitive conditions. Irrespective of the outcome of the pending acquisition process of a major LLU player by a coaxial cable-based wholesale broadband access provider or of any other possible transaction, the Commission wishes to observe that the market structure at any given moment could have an impact on the strategy of the various operators to deploy FTTH networks and on the availability of adequate wholesale access offers.

Against this background, the Commission calls on ARCEP to include in its final measure additional evidence that will be taken into account for delineating the

boundaries of the areas. Such evidence should include information on the distribution of market shares and the evolution of shares over time in a given MDF or area and evidence of differentiated retail or wholesale pricing, which might indicate different competitive pressures and may even, if such differences are strong and stable enough, lead to identify different product markets (e.g. a segmentation according to bandwidths), which could be subject to different price remedies.” (Commission decision concerning Case FR/2014/1604: Leased lines markets in France)

5.3 Implementation in the case of Ireland

Copper products

Our understanding is that the available LLU-based alternative remains very limited at this stage. As a consequence, a geographical analysis on copper will probably not give interesting outputs.

It would be interesting to understand why alternative players do not use their unbundled MDF to compete on the non-residential market (e.g. by installing SDSL cards).

Fibre products

A geographical analysis on fibre could be implemented by replicating the OFCOM approach. This should however be adapted in a pragmatic way to build the most robust approach considering Irish case specificities:

- The availability of data on businesses locations;
- The availability of data on operators' footprint;
- The size of businesses purchasing leased lines (this should be investigated).

The first task will be to investigate the availability (and the cost) of databases on the location of businesses within Ireland.

The Kompass database provides the number of businesses (ordered by size) in each of the circa 3,000 electoral division ('ED'). This provides a reasonably disaggregated view on the locations of businesses in urban areas as electoral divisions are much smaller in these areas:

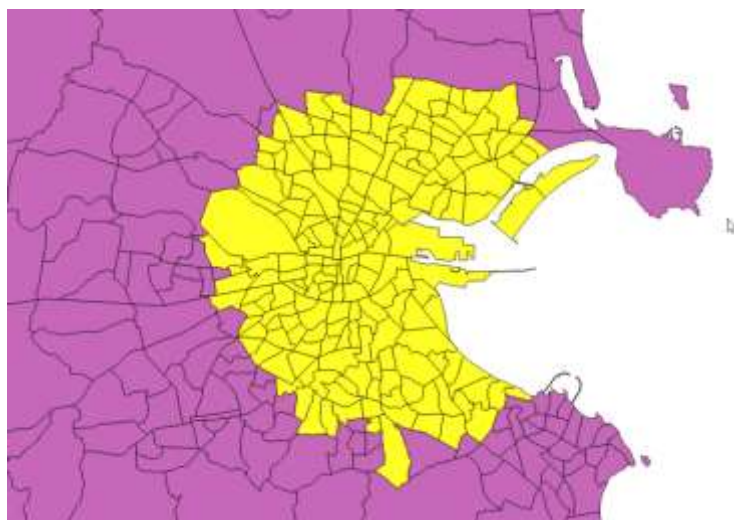
- Dublin : circa 1 km²
- Rural areas : circa 60 km²

Figure 15 – Shapefile of electoral divisions (Whole Ireland)



Source: TERA Consultants

Figure 16 - Shapefile of electoral divisions (Focus on Dublin small electoral divisions)



Source: TERA Consultants

The Kompass database provides for each ED the number of businesses and their size:

Figure 17 - Example of Kompass inputs for ED 01001

Number of employees	Number of businesses
0-10	260
11-20	32
21-50	21
51-100	9
101-250	4
251+	1

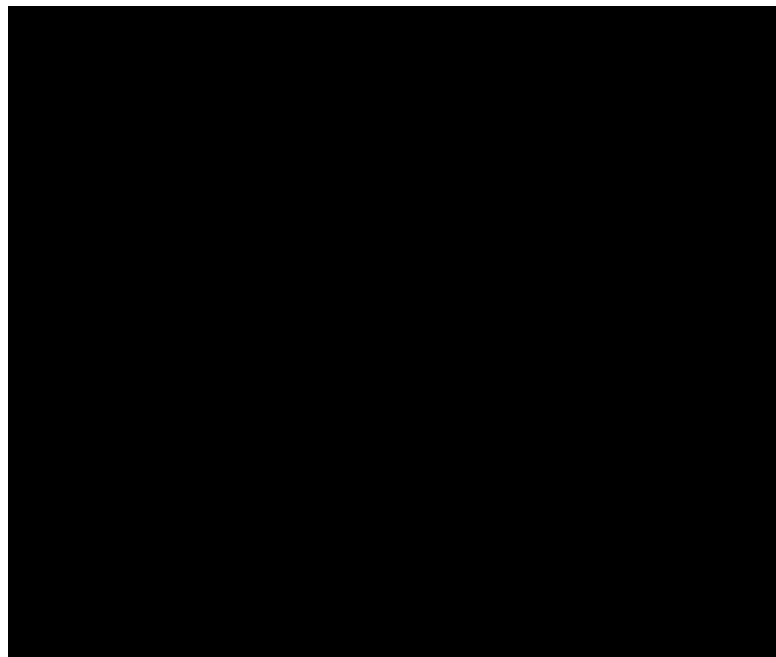
Source: TERA Consultants analysis of Kompass database

The relevant size of businesses to be considered should be identified based on the size of businesses purchasing leased lines products in Ireland.

It is to be noted that Kompass database is considered reliable for 20+ employees businesses. However, more precise databases may exist.

The data on the operators' footprint has been sent by the operators during the data collections process (see for example BT submission hereafter showing significant fibre footprint in Dublin centre and connection to main business parks in the surrounding area):

Figure 18 – BT footprint in Dublin ✂[REDACTED]



Source: BT answer to the data request

As compared to OFCOM's approach, network flexibility points may not be easily identifiable. In this case, distance to the network itself could be used as a proxy.

As in the analysis already started by ComReg, specific analysis could be performed to analyse the competitive environment for business parks, mobile base stations and data centres (the OFCOM has performed specific analysis for data centres).

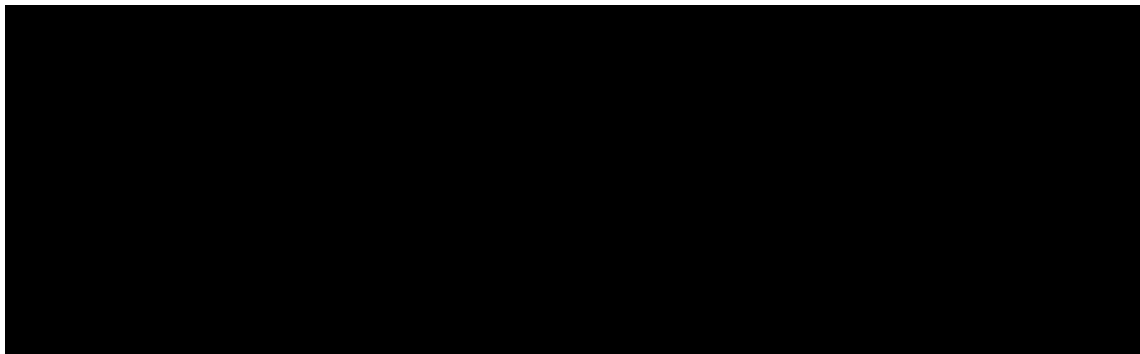
Geographical market share

It is to be noted that the European Commission considers that a network reach analysis needs to be complemented by a geographical analysis of market shares (see section 5.2).

With the current state of raw data provided by the operators (see § [REDACTED] hereafter), ComReg will not be in a position to assess robust geographical market shares.

As for the dynamic analysis, a potential proxy would be to analyse the results of the latest bids as these include some geographical information.

Figure 19 – § [REDACTED] list of circuits (geographical data is not available)
§ [REDACTED]



Source: § [REDACTED] answer to the data request

In order to mitigate the risk to receive comments from the European Commission on the absence of geographic market shares, ComReg could discuss the raw data issue with the EC and envisage with them the most suitable options (if any).

Potential actions:

- Investigate the size of companies typically purchasing leased lines
- Investigate the existence of barriers to deploy the last meters of network in urban areas when a prospect customer is “close to the existing network”
- Investigate the availability of more recent / more granular data on the location of businesses
- If relevant, replicate OFCOM's approach with adaptation to the Irish specificities (size of companies...)

- Check whether latest bids could provide some proxy to assess geographical market shares.
- Discuss with the European Commission on the impossibility to assess geographical market shares due to the unavailability of raw data

Potential questions to be asked in the next data request :

- What is the reason for alternative players not to compete on the copper leased lines market when they have unbundled an exchange (e.g. by installing SDSL cards)
- What is breakdown of leased lines business customers by size of company (number of employees)?

This would enable to determine the right companies sample to be used in the case of Ireland (e.g. 250+ employees for the UK, 20+ employees for France...)

6 Additional analysis

On top of the market share, the ARCEP and the OFCOM have monitored a number of qualitative parameters in order to perform their market power assessment. These include:

Figure 20 – List of qualitative parameters

OFCOM	ARCEP
<ul style="list-style-type: none">• Economies of scale• Economies of scope• Existence of sunk costs• Existence of switching costs• Countervailing buyer power	<ul style="list-style-type: none">• Company size and control of an infrastructure that is difficult to duplicate• Vertical integration of Orange and economies of scale• First mover advantage

Source: TERA Consultants

7 ComReg Data Treatment and Assumptions

This report includes a number of recommended actions to ComReg for its analysis of the leased lines data.

TERA Consultants understand that ComReg has implemented, or plans to implement a number of these recommended actions including:

- An investigation on how circuits are recorded within the operators' systems (1 circuit represents an end-to-end link or 1 circuit represents a half leg): ComReg did not manage to get more precise data (data unavailable) but made an impact assessment and conclude that this issue is unlikely to have a material impact on results;
- Collection of business location data for geographic analysis;
- Perform an analysis of bids conversion as a proxy to capture dynamic trends and/or geographic disparities; and,
- Implement a network footprint analysis.

In addition, ComReg has provided TERA Consultants with a document detailing its assumptions and treatment of the quantitative leased lines data which it has gathered from industry operators (subject to the limitations of industry operator's ability to provide such information) in a word document entitled "Leased Lines Data Treatment 21-04-2015.docx" document.

Having considered this document, in addition to checks (based on data samples) of the calculations conducted by ComReg, while considering the limitations of the quantitative data provided by the industry operators, TERA Consultants takes the view that the treatment and assumptions of the leased lines data gathered by ComReg is reasonable, the data is reliable, and the data supports the overall methodology towards assessment of market power of industry operators who provide leased line products/services.