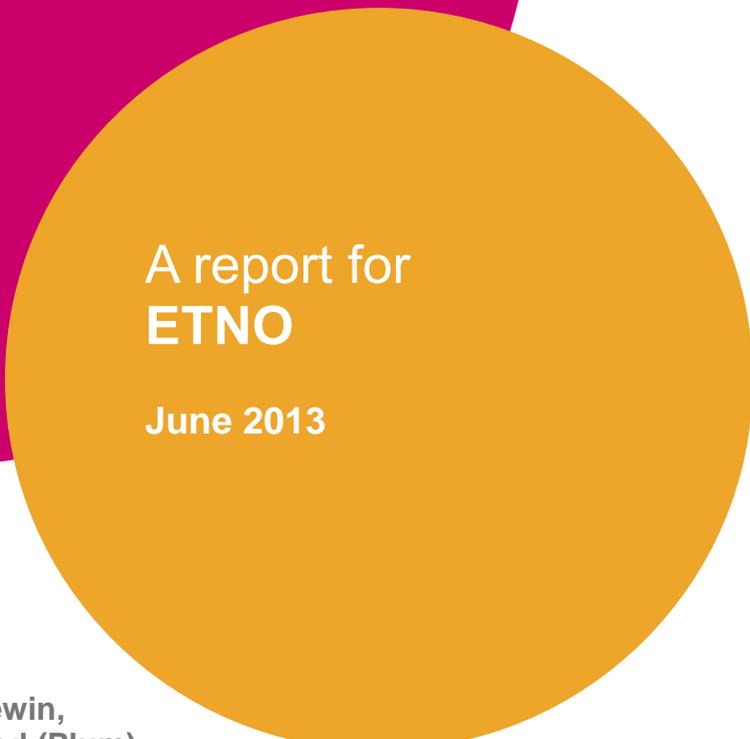


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# Relevant Markets in the Telecoms Sector: The Times They are a- Changin'

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A report for  
ETNO

June 2013

Brian Williamson, David Lewin,  
Stefano Nicoletti, Sam Wood (Plum)  
Damien Gerardin (Covington & Burling LLP)  
Tommaso Valletti (Imperial College London)



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Plum Consulting offer strategy, policy and regulatory advice in the telecoms, media and online sectors, and on radio spectrum as a key sector input. We draw on economics, our knowledge of the sector and our clients' perspective to shape and respond to convergence.

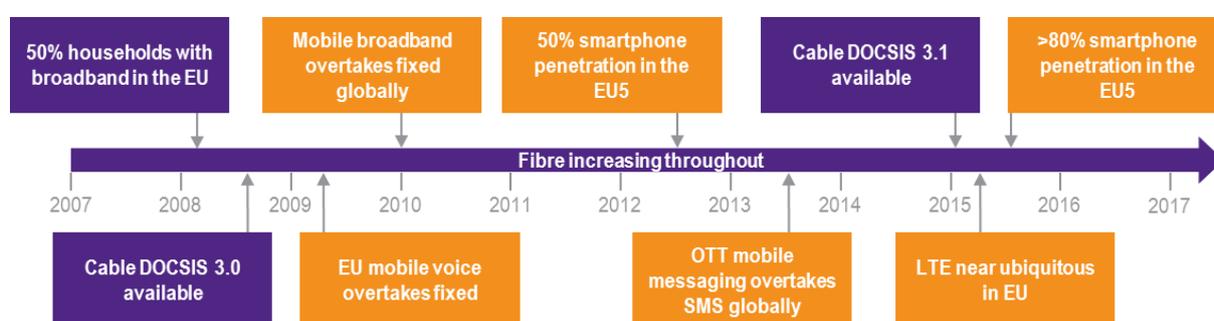
## Table of Contents

Executive Summary.....	1
1 Introduction and context.....	4
1.1 The role of the Recommendation.....	4
1.2 The need for revision .....	4
1.3 The structure of the report.....	5
2 2007-2013: an era of growing convergence and competition.....	6
2.1 Overview of convergence.....	6
2.2 The internet and broadband become the key platforms .....	7
2.3 Platform competition intensifies .....	8
2.4 Broadband speed improves .....	9
2.5 The smart mobile device era begins .....	9
2.6 Applications-based competition intensifies .....	10
2.7 Producer bundling and consumer led unbundling .....	12
2.8 Business connectivity is changing with growth in cloud services & consumerization.....	14
3 Post 2013 – an era of wireless, fibre and apps.....	15
3.1 LTE will be near ubiquitous by 2015 and offer a step-change in capability.....	15
3.2 Compression undergoes a once-in-a-decade step-change.....	18
3.3 New standard enhances the capacity and speed of Wi-Fi.....	18
3.4 Wireless growth and over the top applications are mutually reinforcing.....	20
3.5 Fibre deployment accelerates and technology mix shifts towards VDSL .....	20
3.6 Cable upgrades (again) increasing capacity and speed.....	20
3.7 A transition to all-IP networks gathers pace.....	21
3.8 Anticipated changes to 2015 and beyond – more competition, local & global .....	21
4 Adapting to the changing market .....	23
5 Revising the approach to take full account of competitive constraints .....	25
5.1 Step 1: Start with retail markets .....	26
5.2 Step 2: Test whether retail market would be competitive absent regulation .....	27
5.3 Step 3: Define relevant wholesale market .....	29
5.4 Step 4: Assess SMP and decide on appropriate remedies .....	32
6 List of markets for the revised Recommendation.....	37
6.1 Focus on access rather than services .....	37
6.2 Review of existing list of markets.....	38
6.3 Summary of changes to proposed list of markets.....	45
Appendix A: Fixed-mobile broadband substitution.....	46
Appendix B: Indirect constraints.....	48

## Executive Summary

This report assesses how the 2007 European Commission Recommendation on relevant product and services markets should be revised, taking account of market and other developments since its last review and anticipated market developments to 2015 and beyond.

There have been a number of fundamental changes to the economy and to the electronic communications market, as well as an evolution of goals in terms of broadband access (the European Digital Agenda) since the last review of the Recommendation in 2007. The following provides an overview of changes in the communications market since the last review and anticipated to 2015 and beyond.



Broadband is now the primary form of connectivity and access competition is increasing. Over the top network independent applications have greatly reduced entry barriers and now compete intensively with legacy voice and text services. Further, the development of both access platform competition and competition from over the top applications are independent of regulation i.e. they represent “regulation independent” competition.

“Regulation independent” competition is expected to further intensify by 2015 and beyond with copper, fibre, upgrades to cable (DOCSIS 3.1) and wireless access technologies (LTE or 4G). The shift to smartphones and apps will also facilitate additional competition from over the top applications and lead to more intense competition between mobile and fixed broadband access.

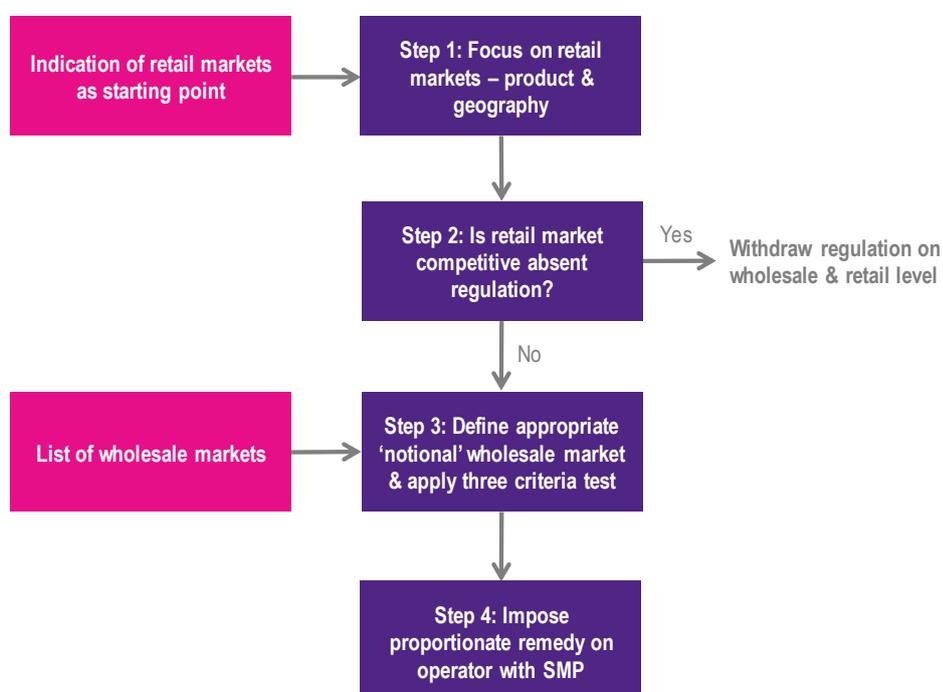
In the light of these changes, regulation should focus on broadband access bottlenecks with the removal of the fixed telephony retail access and fixed voice origination markets from the list of relevant markets. Fixed and mobile voice termination should also be removed from the list of relevant markets (given the costs of maintaining the existing approach) subject to safeguards. No new services markets should be added to the list of relevant markets, given low barriers to entry and competition from over the top applications.

In relation to access, the focus should be on broadband access at a fixed location taking into account competition from all networks including mobile broadband. Geographical differences in competition should be given more consideration, reflecting in particular differences in the availability of competing platforms at the retail level. We also assessed bundling and found that one source of growth in the take-up of bundling (apart from TV services) has been broadband and fixed voice. This represents the provision of a declining voice service alongside broadband, rather than an economically important bundle. We also observe that over the top allows consumers to unpick existing bundles, for example, providing alternatives to bundled voice and SMS. Bundling is therefore a dynamic phenomenon with bundling and unbundling occurring over time, and changes in the economic importance of given

elements of a bundle. We therefore do not consider that there are clear and enduring implications of bundling which are generally applicable to the review of relevant markets.

In terms of regulatory process, there is a tendency to narrow the focus to “merchant” wholesale markets and to conclude that the sole supplier of a particular input, say unbundled local loops, therefore has significant market power. In effect there is a tendency to focus on competitors *per se* and the particular wholesale inputs they use at present rather than on market outcomes in terms of competition and investment.

We propose that the revised Recommendation and Explanatory Memorandum include greater clarity in relation to a process in which NRAs first analyse the retail market situation in order to assess the need for wholesale regulation and, where relevant, define appropriate wholesale markets taking account of direct and indirect constraints and the three criteria test, and then identify the appropriate level of intervention – as set out below.



In Step 1 it is proposed that the focus should be limited to broadband access at a fixed location (where bottlenecks may arise) and that all technologies that can deliver broadband access at a fixed location including cable and wireless should be considered. If it is concluded that the retail market would be competitive absent regulation due to the presence of vertically integrated competitors then there is no longer a need for wholesale regulation and regulation should be withdrawn (with analysis conducted in different geographic sub markets starting from differences in terms of the presence of competing access platforms).

In relation to the list of wholesale markets we consider that distinct markets for mass market products and large corporate markets (leased lines) should be maintained. In the mass market for broadband access, where it is concluded that a given national or sub-national retail market would not be competitive absent regulation, proportionate wholesale access regulation should be considered at the passive or active wholesale access layer. This represents a change to the existing definition of Markets 4 and 5 - consistent with a more technology neutral approach - and ensures that access regulation targets the appropriate level of the network.

In relation to the choice of wholesale obligations - to support innovation and investment, minimise regulatory complexity and ensure consistency with the 12 July 2012 statement by Commission Vice-President Kroes - we propose that:

- Any wholesale access regulation should apply at only one level - active or passive - in a network in relation to a given retail market.
- Any wholesale price control should only apply to one network during transition e.g. from copper to fibre.

The appropriate choice between passive and active remedies will depend on the technology and market circumstances, taking account of the anticipated impact on innovation and investment. For example a passive unbundling remedy may be incompatible with vectoring VDSL or cable, whilst a passive remedy may be preferred with co-investment, since an active remedy might in those circumstances undermine incentives to co-operate.

The following table summarises our conclusions with markets indicated by purple to be removed and those indicated by magenta to be retained.

	Existing market	Proposal/Reasoning for change	Safeguards/guidance
Remove with safeguards	Market 1. Access to the public telephone network at a fixed location for residential and non-residential customers	Remove Anachronistic with shift to broadband access Fixed access competition based on alternative platform and /or wholesale broadband access, including free voice as add on	Competition based on broadband access (regulated where required)
	Market 2. Call origination on the public telephone network provided at a fixed location	Mobile competition Competition from over the top	
	Market 3: Call termination on individual public telephone networks provided at a fixed location	Remove Competition from over the top applications Low price due to regulation	Symmetric interconnection rules (Article 5 Access Directive) Threat of re-notification if prices rise or explicit safeguard cap based on existing price
	Market 7. Voice call termination on individual mobile networks	High time/money cost of continuing with market reviews & cost modelling	
Retain but modify approach	Markets 4. Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location	Redefine as wholesale passive access at a fixed location (technology neutral formulation) Regulate either M4 or M5 in view of a given retail market(†)	Intervention on either Market 4 or Market 5 depending on circumstances (recognition of innovation & investment disincentive with multiple points of intervention)
	Market 5. Wholesale broadband access	Redefine as wholesale active access at a fixed location (technology neutral formulation) Regulate either M4 or M5 in view of a given retail market(†)	Assess varying degree of competition in different geographies
	Market 6. Wholesale terminating segments of leased lines	Leased lines market for dedicated capacity (distinct from mass market)	Assess varying degree of competition in different geographies

Note: No new markets are proposed.

(†) For a given access technology in transition, for example, copper to fibre

# 1 Introduction and context

This report assesses how the 2007 European Commission Recommendation on relevant markets<sup>1</sup> should be revised to make it suitable for use by NRAs in the period to 2015 and beyond, consistent with the lifetime of the revised recommendation.

## 1.1 The role of the Recommendation

The EU regulatory framework for electronic communications networks and services has established a market review process for determining where *ex ante* regulation is needed. This process requires NRAs to:

- Define retail markets from a forward looking perspective<sup>2</sup> in term of products and geographic scope using competition law techniques.
- Test for the presence of significant market power (SMP) within these markets, again using competition law techniques.
- On related wholesale market, impose on the SMP operator the minimum *ex ante* remedy required to deal with the problem.<sup>3</sup>
- Withdraw regulation when retail markets are competitive<sup>4</sup>.

As part of this regulatory framework the European Commission is required to issue a Recommendation on relevant markets. The purpose of this Recommendation<sup>5</sup> is to provide guidance to NRAs when conducting market reviews so as to:

- Produce consistent regulation across EU
- Provide market players with legal certainty

The first version of the Recommendation, issued in 2003, listed seven retail markets and 11 wholesale markets which were susceptible to *ex ante* regulation. The next version of the Recommendation, issued in 2007, reduced this list to one retail and six wholesale markets.

## 1.2 The need for revision

The European Commission is in the process of revising the Recommendation for a second time. This revision will need to take account of:

- Market developments – both in terms of those which have occurred since 2007, and those which we can predict with reasonable certainty over the next few years and beyond.

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<sup>1</sup> *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*, Brussels, C(2007) 5406 rev 1

<sup>2</sup> Recital 4 of the 2007 Recommendation

<sup>3</sup> Article 8.4 of the Access and Interconnect Directive

<sup>4</sup> Recital 1 of the 2007 Recommendation

<sup>5</sup> As set out on Page 4 of the accompanying Explanatory Note

- Economic developments. We have seen a dramatic slowdown in economic growth in the EU since 2007. This has affected the prospects for investment in network infrastructure in Europe.
- Policy developments. Recognising the central role which broadband infrastructure can play in reinvigorating the EU's economy, the European Commission has set Digital Agenda targets for broadband roll out and take-up by 2020.
- High-level regulatory developments. The 12 July 2012 European Commission statement set out a framework for regulation of next generation access investments intended to give access providers pricing freedom for wholesale NGA, as long as they meet non-discriminatory obligations towards access seekers.<sup>6</sup> This new framework is designed to unlock dynamic gains in terms of investment, innovation, competition and the single market.

### 1.3 The structure of the report

With these drivers of change in mind our report is structured as follows:

Section 2 describes the main market changes which have occurred since 2007.

Section 3 considers further changes we can expect in these markets over the next few years.

Section 4 considers the implications of market change and experience for the Recommendation.

Section 5 sets out proposed approach and guidance for NRAs.

Section 6 sets out proposals in relation to relevant markets.

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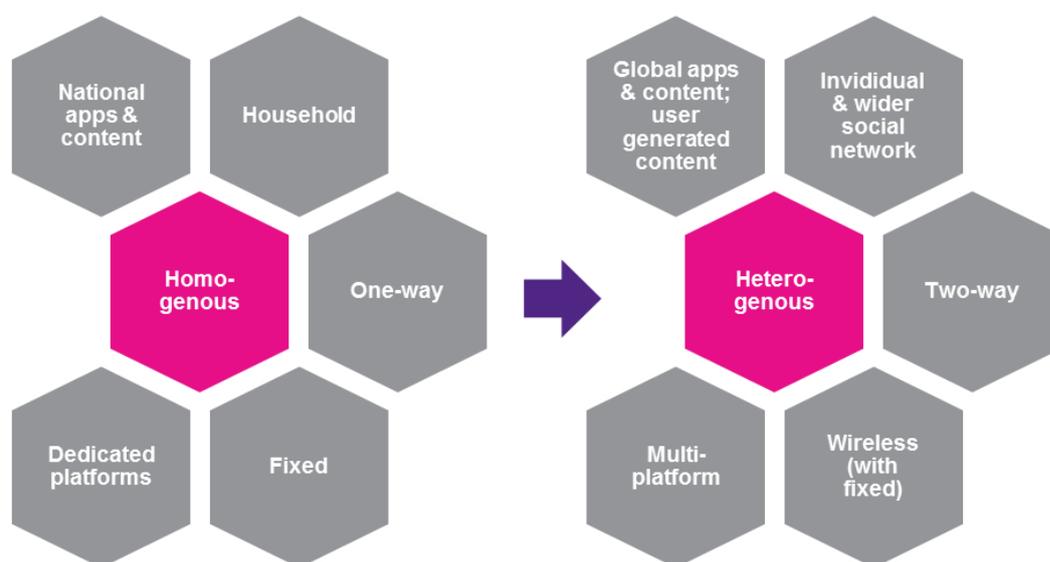
<sup>6</sup> [http://europa.eu/rapid/press-release\\_SPEECH-12-552\\_en.htm](http://europa.eu/rapid/press-release_SPEECH-12-552_en.htm)

## 2 2007-2013: an era of growing convergence and competition

### 2.1 Overview of convergence

In the period since the last Recommendation on relevant markets in 2007, market change (driven by increasing use of the internet and advances in computing), often described as convergence, has been dramatic. Figure 2-1 illustrates these changes.<sup>7</sup>

Figure 2-1: The changes involved in convergence



Whilst a number of these developments were already underway in 2007, they are now more advanced and have been reinforced by new developments, in particular rapid uptake of smart mobile devices. We have seen major changes in production and consumption behaviour such as:

- A shift from a simple world of fixed and mobile telephony to one with a multiplicity of devices, platforms, services and applications.
- A shift from applications content and services which are predominantly national in character to global, over-the-top, services.
- A shift from household consumption to individual consumption.
- The development of sharing and communication across extended social networks.

These developments reflect changes in underlying technology which involve:

- A shift from dedicated fixed, mobile telephony and broadcasting platforms to multi-service broadband access platforms.

<sup>7</sup> Plum. June 2012. "Connectivity metrics for a converged era."  
[http://www.plumconsulting.co.uk/pdfs/Plum\\_June2012\\_Connectivity\\_metrics\\_for\\_a\\_converged\\_era.pdf](http://www.plumconsulting.co.uk/pdfs/Plum_June2012_Connectivity_metrics_for_a_converged_era.pdf)

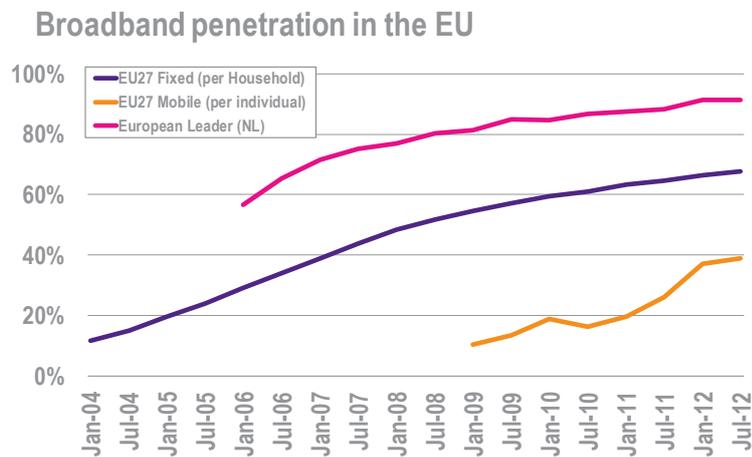
- A shift from fixed access to mobile and wireless (Wi-Fi) access.
- A shift from one-way (broadcast) to two-way (broadband) platforms allowing interaction.

## 2.2 The internet and broadband become the key platforms

Use of broadband and the internet was important and growing in 2007. Now it is mainstream with:

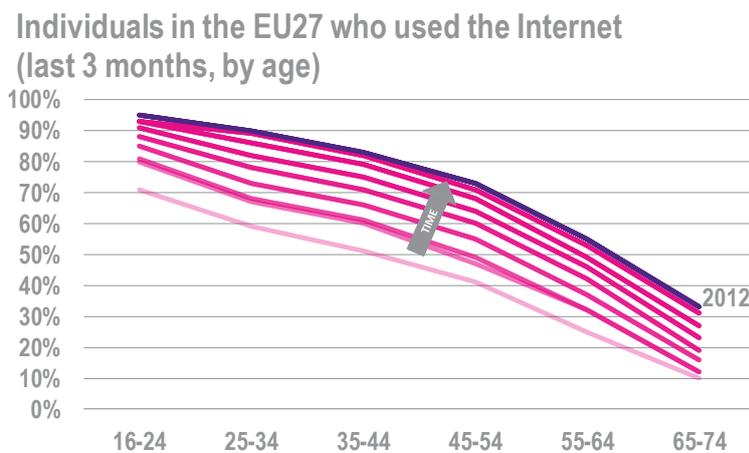
- Over two-thirds of households having a fixed broadband connection (and 92% in the Netherlands – the highest take-up in Europe), with use of mobile broadband rising rapidly. See Figure 2-2.
- 73% of all adults using the internet and 85% of those under 16-54 years of age. See Figure 2-3.

Figure 2-2: Broadband adoption



Source: Plum Consulting, Digital Agenda Scorecard

Figure 2-3: Internet use



Source: Plum Consulting, Eurostat

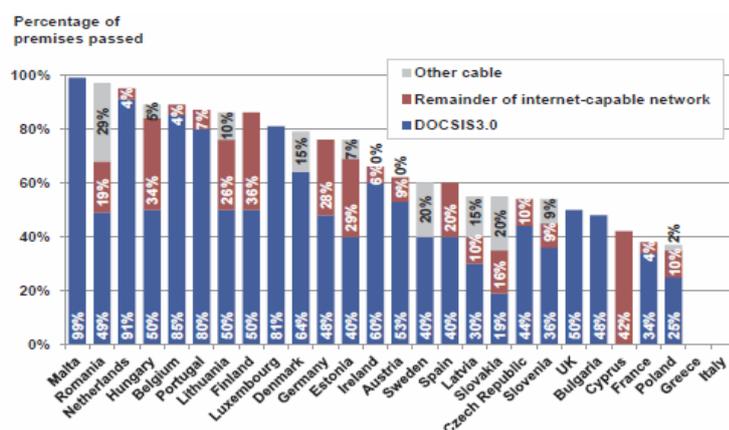
Broadband access to the internet is fast becoming the main way end users access services and applications which are, as a result, becoming network-independent. This trend means growing competition in the supply of services and applications at a global (and pan-European) level.

## 2.3 Platform competition intensifies

Higher speed DOCSIS 3.0 cable equipment was certified from December 2007<sup>8</sup> and deployed commercially from 2008 in Europe. Figure 2-4 shows a snapshot of DOCSIS 3.0 available across Member States in 2011.<sup>9</sup> In areas with cable footprint, DOCSIS 3.0 is now a strong competitor to the broadband services offered over fixed telecommunications networks. Moreover, Numericable in France is offering wholesale bitstream to Bouygues Telecom on commercial terms.

The extent of this competition between fixed access platforms is in general local. A given consumer of broadband at a fixed location can only choose between the broadband access platforms provided at that location and therefore the level of competition may vary by location.

Figure 2-4: Cable broadband availability (4Q, 2011)<sup>10</sup>



Improvements in wireless speed and spectrum efficiency, as 3G standards have evolved, have also increased platform competition from wireless. Competition between fixed and mobile broadband platforms varies significantly across Member States. Such competition is especially strong in parts of Eastern Europe and in countries like Austria, where fixed broadband offers have not been as attractive to consumers as elsewhere in the EU.

<sup>8</sup> <http://www.cablelabs.com/anniversary/timelines/2007.html>

<sup>9</sup> In some countries this data may underestimate cable broadband availability, for example, in the Netherlands and Belgium. Source: WIK Consult. September 2012. "Re-thinking the Digital Agenda for Europe (DAE): A richer choice of technologies." <http://www.lqi.com/PDF/public-policy/LGI-report-Re-thinking-the-Digital-Agenda-for-Europe.pdf>

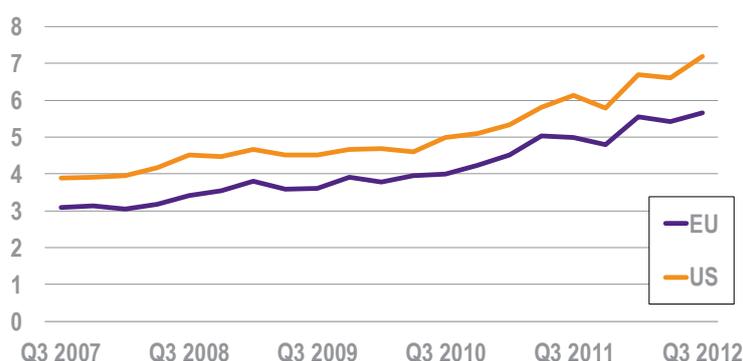
<sup>10</sup> The position continues to evolve with Cable Europe noting that "By the end of 2013 nearly all cable operators will have upgraded to DOCSIS 3.0, enabling 100-200 Mbps speeds — and higher. With DOCSIS 3.0 rolled out, 100 Mbps speeds are already becoming the standard and cable is projected to offer 51% of EU households 100Mbps or more by 2013." <http://www.cable-europe.eu/cable-europe-statement-cables-next-generation-access-offers-key-coverage-in-push-to-achieve-digital-agenda-says-new-european-commission-report/>

## 2.4 Broadband speed improves

Figure 2-5 shows that broadband access speeds have steadily improved in Europe (and the US) since 2007.<sup>11</sup> We note that there is considerable variation in broadband speed within Europe.

Figure 2-5: Broadband connection speeds EU vs. US

### Average connection speed (Mbps)



Source: Plum Consulting, Akamai

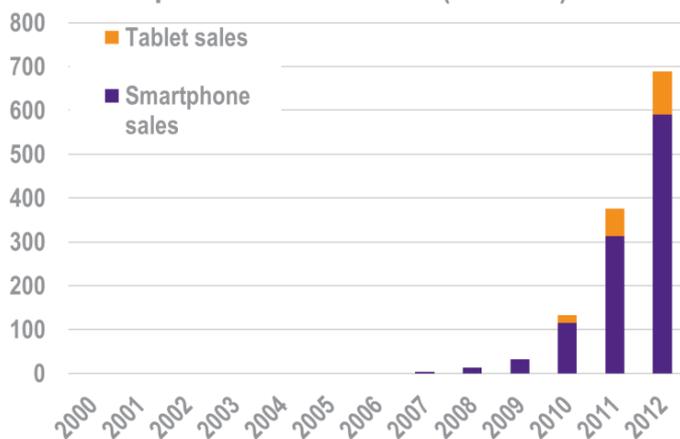
EU numbers based on national average speeds weighted by number of fixed broadband lines

## 2.5 The smart mobile device era begins

Figure 2-6 plots the global growth in multi-touch personal device sales including smartphones and tablets.

Figure 2-6: Growth in the use of smartphones and tablets

### Global smartphone & tablet sales (millions)



Source: Plum Consulting, Apple quarterly financial results, Gartner, Strategy analytics

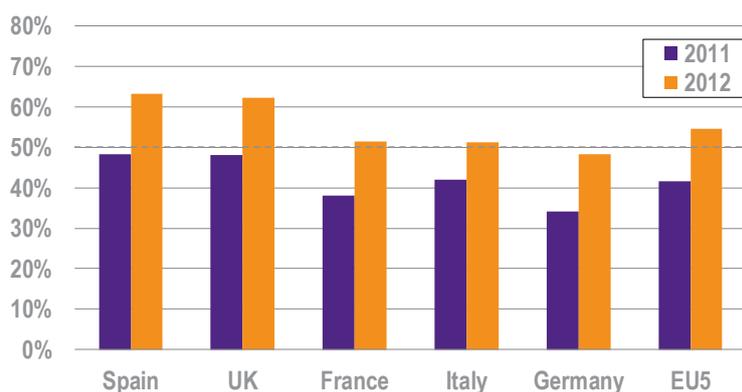
<sup>11</sup> We utilised Akamai data rather than advertised speeds. Whilst there is no perfect measure advertised speeds can be very misleading. The European Commission has launched a study to measure actual speeds.

<https://ec.europa.eu/digital-agenda/en/news/report-broadband-lines-eu-1st-july-2012>

Widespread adoption of smartphones and tablets followed the launch of the iPhone in June 2007 and the iPad in April 2010 respectively. PC sales declined 13.9% in Q1 2013 compared to the same quarter in 2012.<sup>12</sup> Figure 2-7 illustrates recent growth for the EU5. It shows that smartphone ownership exceeded 50% in 2012 with growth of around ten percentage points per annum.

Figure 2-7 The growth in smartphone use in the EU5

### Smartphone penetration in the EU5



Source: Plum Consulting, Comscore

The potential growth in smartphone and tablet ownership is also indicated by more recent data for the US where smartphone and tablet penetration amongst internet households grew from 52% to 57% and from 35% to 53% respectively in the three months between Q4 2012 and Q1 2013.<sup>13</sup>

This extraordinary growth is a very recent phenomenon. It is important, not only in terms of the functionality available to consumers on the go, but also because it changes the way people go online, the applications they use and those which are developed globally. These changes will in turn impact on demand for wired versus wireless broadband.

## 2.6 Applications-based competition intensifies

By applications we mean internet based (network independent) services. In relation to personal communications, internet based applications such as Skype (illustrated in Figure 2-8) compete with one another and with traditional voice and text communications.

Figure 2-8: Illustrative communications applications



<sup>12</sup> IDC, April 2013. *PC Shipments Post the Steepest Decline Ever in a Single Quarter, According to IDC*

<http://www.idc.com/getdoc.jsp?containerId=prUS24065413#.UWXMRytARps>

<sup>13</sup> <http://www.connected-intelligence.com/about-us/press-releases/internet-connected-devices-surpass-half-billion-us-homes-according-npd-group>

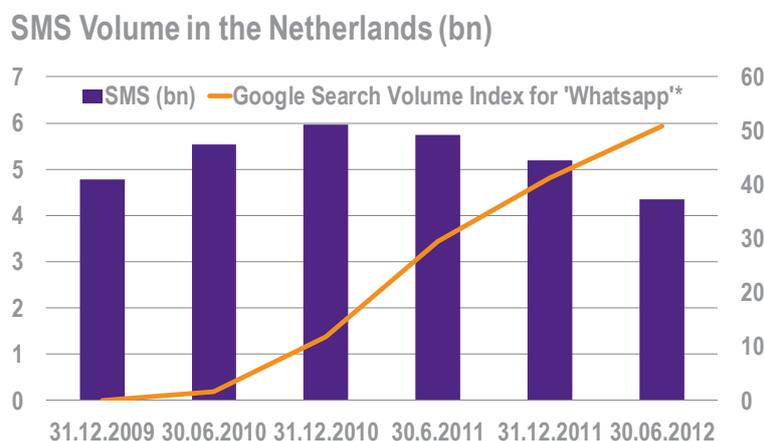
The development of network independent (or over the top) applications has intensified competition for the supply of communication services and has done so independently of regulation. There are various ways in which online apps are replacing traditional forms of voice and text based communication including:

- Substitution of “equivalent” over the top services for legacy voice and text services (Note that over the top applications may also include service enhancements such as video communication).
- Use of web-based services and apps for information, sales and after sales support etc. instead of call centre based services.
- Substitution of social networking and location-based services for voice or text based person-to-person communication.

We found a lack of aggregate market statistics which consider the market including over the top. However, the following statistics indicate that substitution is well advanced and developing rapidly:

- WhatsApp (launched in 2009) outbound message volumes reached 11 billion messages globally on 31 December 2012.<sup>14</sup>
- In the Netherlands, WhatsApp adoption is widespread amongst smartphone users and has contributed to a fall in text messaging volumes. See Figure 2-9.
- Globally over the top instant messaging is expected to overtake text volumes in 2012/2013.<sup>15</sup>
- Skype now accounts for around one-third of international call minutes. See Figure 2-10.

Figure 2-9: The impact of WhatsApp on SMS use<sup>16</sup>



Source: Plum Consulting, OPTA, Google

\*Used average search volume index over each period

<sup>14</sup> <http://bqr.com/2013/01/24/apple-icmessage-growth-analysis-whatsapp-304019/>

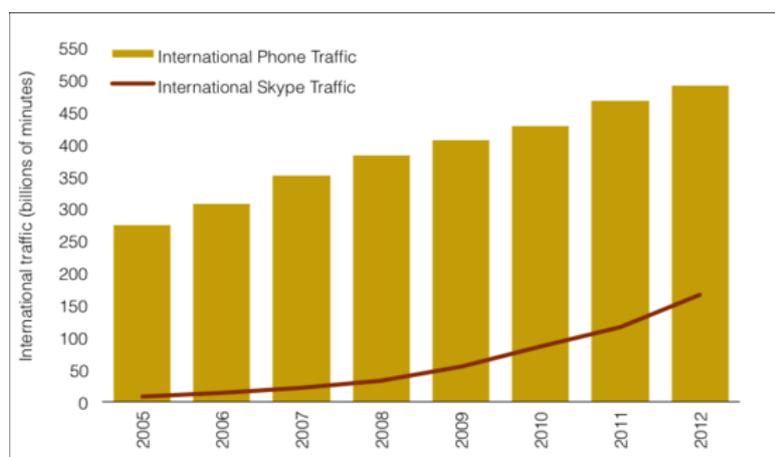
<sup>15</sup> Gigaom. January 2013. “Converged-mobile-messaging analysis and forecasts.”

[https://www.tyntec.com/fileadmin/tyntec.com/whitepapers/Whitepaper-GigaOM\\_tyntec\\_-\\_Converged\\_Mobile\\_Messaging\\_-\\_Jan\\_15\\_2013.pdf](https://www.tyntec.com/fileadmin/tyntec.com/whitepapers/Whitepaper-GigaOM_tyntec_-_Converged_Mobile_Messaging_-_Jan_15_2013.pdf)

Also <http://blogs.informatandm.com/12861/news-release-ott-messaging-traffic-will-be-twice-the-volume-of-p2p-sms-traffic-by-end-2013/>

<sup>16</sup> January 2013. “Converged-mobile-messaging analysis and forecasts”. <http://www.telecompetitor.com/images/tyntec-GigaOm-Whitepaper-FINAL.pdf>

Figure 2-10: Skype's role in international voice communications<sup>17</sup>



Whilst communication applications need scale to achieve network effects, this can happen rapidly for a particular application in a particular market (e.g. WhatsApp in the Netherlands) or can build on an existing platform through integration or partnership. Examples include:

- iMessage integration into the iPhone OS
- Skype integration with Facebook
- A trial of calling from within the Facebook application from January 2013 in the US and Canada<sup>18</sup> and from March 2013 in the UK.

## 2.7 Producer bundling and consumer led unbundling

We have observed substantial growth in the bundling of communications products since 2007. This phenomenon needs careful analysis. In particular, we note that existing measures of bundling do not necessarily reflect what is economically important. They may include services that are not important to the overall bundle and potentially exclude services that are important. For example:

- Consumers who have home broadband and/or smartphones can substitute over the top apps for existing services including bundled voice and text.
- Email, which was once integrated as part of an internet service offer, is increasingly web based (e.g. Gmail) and independent of any particular ISP. There are many other examples, for example, the shift from music albums to downloading and streaming of individual songs.
- Consumers are increasingly able to unpick the bundle, a behaviour that could in future extend to video/TV as broadband access improves and over the top video services grow and originate content.<sup>19</sup>

<sup>17</sup> [http://www.telegeography.com/products/commsupdate/articles/2013/02/13/the-bell-tolls-for-telcos/?utm\\_source=CommsUpdate&utm\\_campaign=2f9f9b926f-CommsUpdate+13+February+2013&utm\\_medium=email](http://www.telegeography.com/products/commsupdate/articles/2013/02/13/the-bell-tolls-for-telcos/?utm_source=CommsUpdate&utm_campaign=2f9f9b926f-CommsUpdate+13+February+2013&utm_medium=email)

<sup>18</sup> <http://www.theverge.com/2013/1/16/3883538/facebook-launches-free-calling-in-messenger-for-iphone-us>

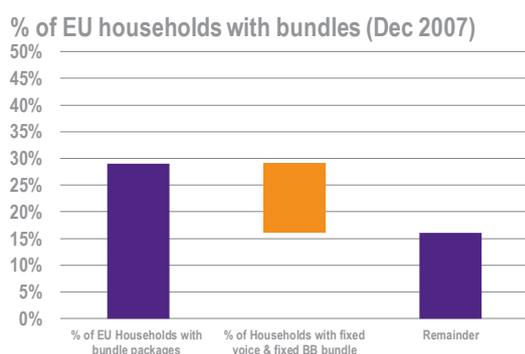
<sup>19</sup> For example, the \$100 million investment by Netflix in the series House of Cards (with all episodes available simultaneously).

- Fixed broadband is replacing fixed voice as the primary reason for having a fixed line and voice. Access to fixed voice is, in effect, an incidental add-on rather than an economically important part of the bundle (with some consumers placing little if any value on the fixed telephony element).<sup>20</sup>
- Other services which are not assessed in surveys may be, or become, important elements of bundled offers. For example, Wi-Fi access provided at multiple locations is a complement to Wi-Fi and fixed broadband at home.

Surveys, such as the Eurobarometer E-Communications survey, report high levels of bundling, particularly in relation to broadband access and fixed voice.<sup>21</sup> As mentioned above we do not consider this to be an economically important bundle. Rather it represents the continued provision of a declining service (fixed voice) alongside a growing service (broadband access) while both use the same underlying access infrastructure.

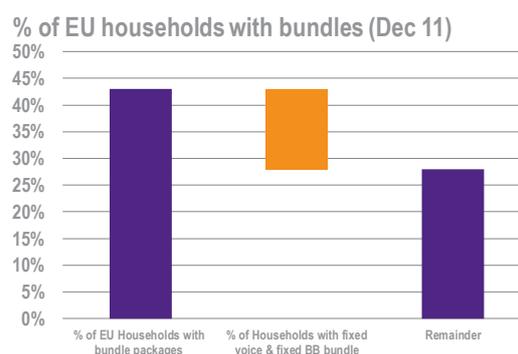
If we consider the level of bundling without the fixed voice fixed broadband bundle, we find that bundling has grown considerably less than the headline statistics indicate. Figure 2-11 and Figure 2-12 illustrate.

Figure 2-11: Bundling at the end of 2007



Source: Plum Consulting, Eurobarometer

Figure 2-12: Bundling at the end of 2011



Source: Plum Consulting, Eurobarometer

The majority of this residual growth in bundling is due to growth in TV and fixed broadband bundles. A key issue in relation to TV is content. We note that the TV market may itself be disrupted over time by over the top content and new devices and interfaces for consuming content.

We also note whilst bundling can advantage a competitor and/or create barriers to entry (for example, cable broadband with exclusive content), it might also foster competition and entry (for example, LTE broadband plus satellite or terrestrial broadcast TV offering a combination of two-way access and video to compete with fixed broadband).

Bundling is a dynamic phenomenon with changing supply and demand side developments leading to bundling and unbundling over time. We do not consider that there are clear and enduring implications of bundling for the review of relevant markets.

<sup>20</sup> Evidence for this includes declining fixed line voice minutes and reliance on mobile telephony even when at home. See Table 6.24 of <http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/icmr/ICMR-2012.pdf>

Also Table 22 (UK data only) <http://stakeholders.ofcom.org.uk/binaries/research/statistics/2013jan/wave3.pdf>

<sup>21</sup> [http://ec.europa.eu/public\\_opinion/archives/ebs/ebs\\_381\\_en.pdf](http://ec.europa.eu/public_opinion/archives/ebs/ebs_381_en.pdf)

## 2.8 Business connectivity is changing with growth in cloud services & consumerization

We observe rapid take-up of devices and cloud-based software applications by consumers who then want to use such devices and services in the work place. This has led to “consumerization of IT” in which consumers, rather than IT departments, then drive the development of workplace IT.

In parallel with these developments we have observed other major changes in the way businesses use communication services. In particular we see:

- Consumer grade broadband is now meeting many business requirements – both at the single sites of small businesses and for the smaller sites of large multisite organisations.
- A move by large organisations away from using their own private networks and towards use of IP-VPNs and cloud-based services. On the supply side more organisations are competing for this segment of the market.
- Competition at the retail level to supply large organisations with broadband-based services. This competition may depend on regulation.
- Competition from fibre-based carriers, especially in areas with high density of businesses. Some of these carriers may lack the national coverage that some end users demand and may rely on the availability of access products in areas where the density of demand for leased lines is lower.

### 3 Post 2013 – an era of wireless, fibre and apps

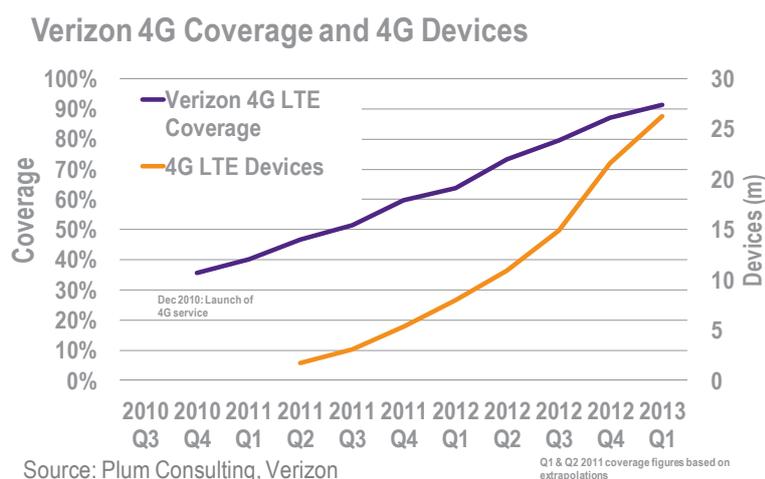
*"In the future, if it computes, it connects...without wires."*  
 Intel Chief Technology Officer Justin Rattner, September 2012

#### 3.1 LTE will be near ubiquitous by 2015 and offer a step-change in capability

LTE is important because it is faster and offers lower costs (per GB carried) than today's 3G services. Coupled with UHF spectrum below 1 GHz, it is also expected to be near ubiquitous as lower frequencies offer greater range and better rural and in-building coverage at much lower cost.

LTE deployment is also expected to be rapid - once suitable spectrum is made available. Figure 3-1 illustrates how fast LTE can be deployed based on experience in the US.<sup>22</sup> Verizon first offered LTE services in December 2010 and expects to complete nationwide rollout in mid-2013.

Figure 3-1: The speed of LTE deployment in the US



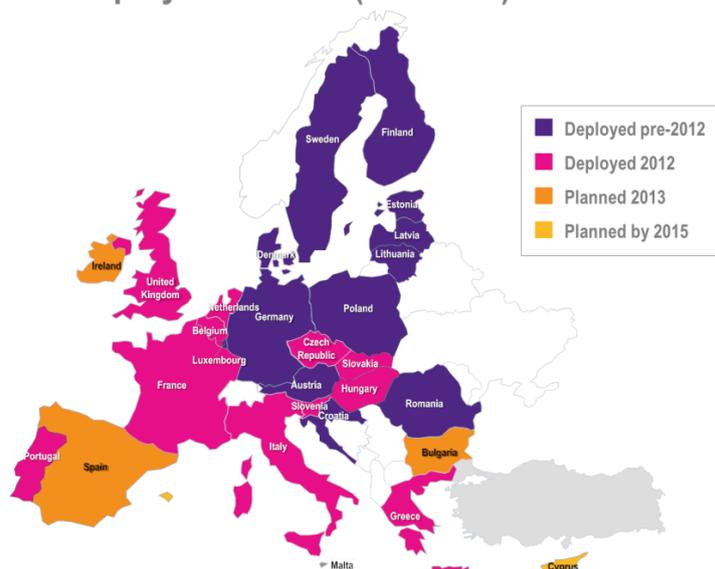
Whilst LTE deployment in Europe depends on spectrum availability, which varies by Member State, 2015 should see widespread availability of LTE given that many initial deployments began in 2012 and 2013 (see Figure 3-2).<sup>23</sup>

<sup>22</sup> Quarterly results including: [http://www22.verizon.com/investor/app\\_resources/htmls/vz\\_2013\\_q1\\_presentation.pdf](http://www22.verizon.com/investor/app_resources/htmls/vz_2013_q1_presentation.pdf)

<sup>23</sup> <http://itemaps.org/>

Figure 3-2

### LTE deployment in EU (Feb 2013)



LTE combined with additional spectrum will also offer a step-change in terms of capability – both in terms of cost and performance:

- LTE has higher capacity per MHz and lower unit costs (per GB of traffic). Verizon in the US noted that “...the 4G network is a less costly network to operate, at least 5 times less costly than the 3G network.”<sup>24</sup>
- LTE has lower latency and higher broadband speeds, around five-fold faster than 3G.

LTE therefore represents a step change in service performance per unit of cost. Further this is not simply a one-off effect. There are on-going improvements in performance which are anticipated as more spectrum is made available (Figure 3-3)<sup>25</sup>, the efficiency of LTE improves and cell architecture evolves towards heterogeneous networks which incorporate small cells to complement macro cell capacity.

<sup>24</sup> Verizon. 25 February 2013. [http://www22.verizon.com/investor/DocServlet?doc=vz\\_morganstanley\\_transcript.pdf](http://www22.verizon.com/investor/DocServlet?doc=vz_morganstanley_transcript.pdf)

<sup>25</sup> The figure is based on an estimate of potential spectrum availability for the UK. Whilst there can be no single representation of spectrum availability in Europe the figure provides an approximate view of the potential availability. Further prospects for release are under active investigation in order to meet the target of identifying 1200 MHz of spectrum suitable for mobile broadband by 2015 and potentially additional spectrum beyond the existing target. [https://circabc.europa.eu/d/d/workspace/SpacesStore/9367e691-df81-408c-a17e-ef895449bd7f/RSPG13-511\\_Rev1\\_Draft%20Opinion%20Wireless%20Broadband.pdf](https://circabc.europa.eu/d/d/workspace/SpacesStore/9367e691-df81-408c-a17e-ef895449bd7f/RSPG13-511_Rev1_Draft%20Opinion%20Wireless%20Broadband.pdf)

Figure 3-3: Spectrum for mobile services in the UK

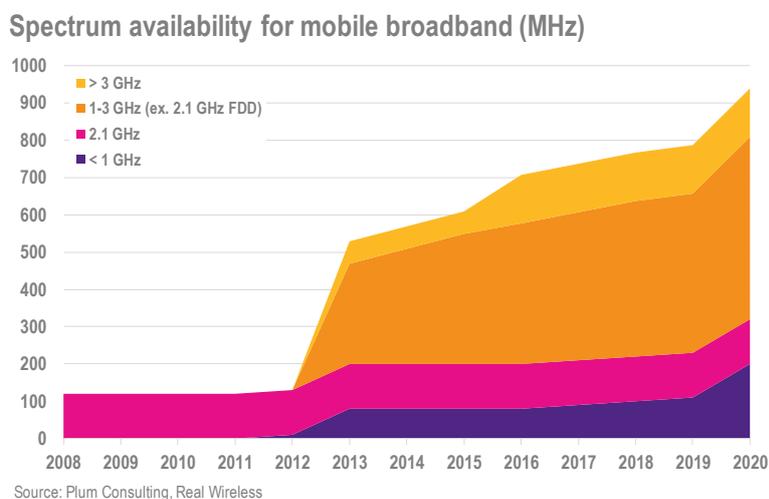
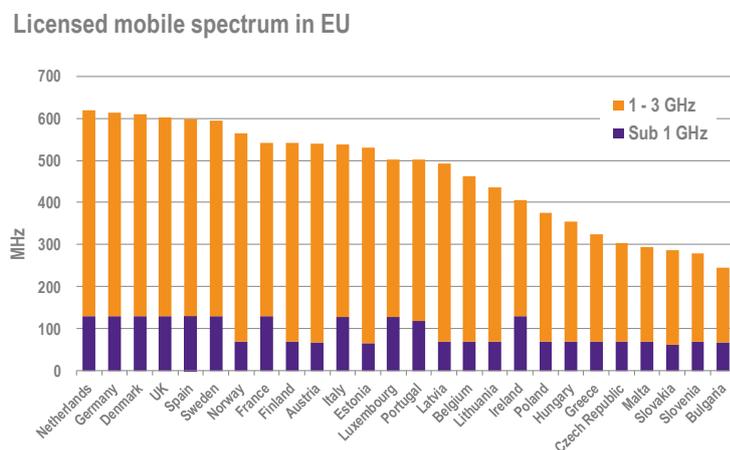


Figure 3-3 provides an indication of likely spectrum availability in Europe.<sup>26</sup> There will however be significant differences in the timing of spectrum availability nationally, as illustrated by differences in April 2013 shown in Figure 3-4. National differences should however reduce as individual Member States allocate 800 MHz and 2.6 GHz spectrum for mobile.

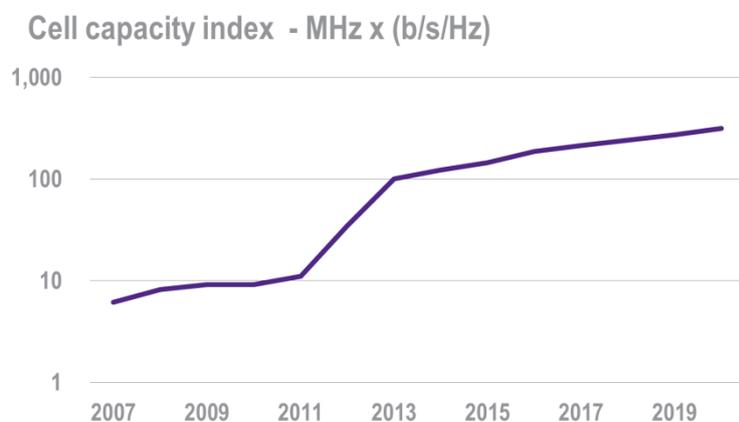
Figure 3-4: Spectrum supply for mobile services - 2013



Combining anticipated improvements in spectrum efficiency over time with increased spectrum availability, by taking the product of the two, provides a simple cell capacity index. This is shown in Figure 3-5.

<sup>26</sup> Spectrum licensed as of April 2013 is included in the figure (auctions scheduled in 2013 but not yet completed are not included). ECO. 8 April 2013. The licensing of 'Mobile bands' in CEPT.  
<http://www.cept.org/files/1050/Deliverables/ECO%20Reports/ECO%20Report%2003%20-%208%20April%202013.doc>

Figure 3-5: Historic and expected future improvements in cell capacity



Source: Plum Consulting

Note: Vertical scale is a log scale so capacity growth is exponential with acceleration during LTE transition

When the index of Figure 3-5 is combined with increased cell density from small cell deployment, it is reasonable to envisage a 1000-fold increase in capacity.<sup>27</sup> More advanced LTE standards and additional spectrum will also support higher speeds.

### 3.2 Compression undergoes a once-in-a-decade step-change

Significant advances in compression happen roughly once a decade. The High Efficiency Video Codec (HEVC or H.265), which offers a doubling in compression for constant video quality relative to MPEG4/H.264, was agreed in draft in January 2013.

In February 2013, DoCoMo announced software for decoding HEVC on smartphones.<sup>28</sup> HEVC, whilst requiring greater computing power, is expected to be compatible with a significant and growing number of existing devices after a software update.<sup>29</sup> The HEVC ecosystem is expected to develop and mature over the period 2014 to 2017.

The new standard will reduce the network capacity and access speed required for a given service, thereby reducing the advantage of fixed broadband access over mobile broadband access when viewing video content.

### 3.3 New standard enhances the capacity and speed of Wi-Fi

Vendors are working to finalise a new Wi-Fi standard (802.11ac) by February 2014, with some equipment already available. 802.11ac is more efficient and allows larger spectrum channels, up to 160 MHz in width, to be used. 802.11ac will therefore enhance the capacity and speed of Wi-Fi.

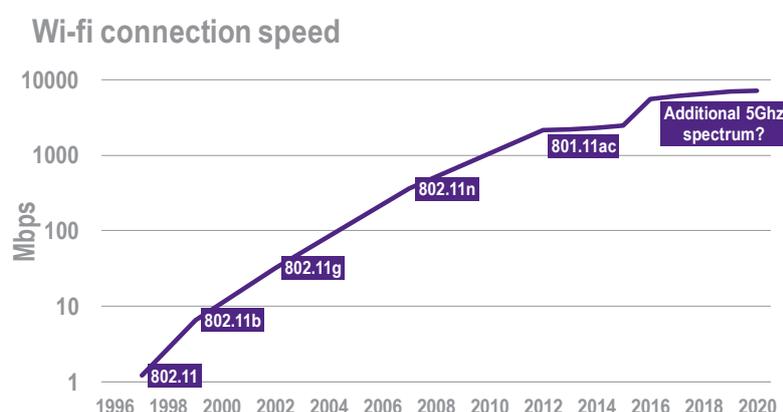
<sup>27</sup> See for example: <http://www.qualcomm.com/media/documents/wireless-networks-1000x-mobile-data-challenge>

<sup>28</sup> <http://www.nttdocomo.com/pr/2013/001625.html>

<sup>29</sup> [http://www.streamingmedia.com/Articles/Editorial/Featured-Articles/What-Is-HEVC-\(H.265\)-87765.aspx](http://www.streamingmedia.com/Articles/Editorial/Featured-Articles/What-Is-HEVC-(H.265)-87765.aspx)

Figure 3-6 plots the past and future development of Wi-Fi, including a possible increase in speed (and therefore also capacity) that additional shared use of spectrum at 5 GHz would make possible.<sup>30</sup> The RSPG has already identified candidate bands at 5 GHz for possible use on a shared basis.<sup>31</sup>

Figure 3-6: Historic and expected improvements in Wi-Fi speeds



Source: Plum Consulting, Broadcom

Note: Vertical scale is a log scale

Alongside the comparatively recent availability of smartphones and tablets which can use the 5 GHz band, these developments offer the potential for Wi-Fi to carry greater volumes of traffic and to support significantly higher speeds. These developments could be significant for the electronic communications networks and services markets of Europe. For example:

- Enhanced Wi-Fi both enhances high speed fixed connectivity, and allows substitution for fixed broadband. This has already occurred in the Czech Republic with use of Wi-Fi and wireless backhaul.<sup>32</sup>
- Enhanced Wi-Fi will also have an impact on mobile services. It is now incorporated into the base stations of small cells to increase capacity. Wi-Fi based services will also compete with mobile services for nomadic use and for traffic at the margin as operators move to tiered pricing structures.
- Wi-Fi lowers entry barriers since entrants do not need to acquire licensed spectrum to offer services.

<sup>30</sup> Plum. January 2013. "Future proofing Wi-Fi – the case for more spectrum."

[http://www.plumconsulting.co.uk/pdfs/Plum\\_Jan2013\\_Future\\_proofing\\_Wi-Fi.pdf](http://www.plumconsulting.co.uk/pdfs/Plum_Jan2013_Future_proofing_Wi-Fi.pdf)

<sup>31</sup> [https://circabc.europa.eu/sd/d/02b8e0db-957c-4a86-9f82-8d361290c5cd/RSPG13-511\\_Annex%20Rev1\\_Candidate%20bands%20for%20wireless%20broadband%20docx.pdf](https://circabc.europa.eu/sd/d/02b8e0db-957c-4a86-9f82-8d361290c5cd/RSPG13-511_Annex%20Rev1_Candidate%20bands%20for%20wireless%20broadband%20docx.pdf)

<sup>32</sup> <https://circabc.europa.eu/d/d/workspace/SpacesStore/895144c0-5abc-4eaf-9688-569e79495b7c/BEREC%20Opinion%20Art%207%20Phase%20II%20investigation%20on%20Case%20CZ%202012%201322.pdf>

### 3.4 Wireless growth and over the top applications are mutually reinforcing

When coupled with greatly enhanced wireless capability, growth in use of personal mobile devices that can run apps, will support growth in over the top applications which compete with legacy voice and text services. At the same time apps are increasingly optimised for mobile use. This reduces the relative service disadvantage of (existing) mobile access versus higher speed, higher capacity, fixed access. Mobile apps are now designed to work well on small screens, to optimise the user interface and to reduce bandwidth and data transfer requirements.

### 3.5 Fibre deployment accelerates and technology mix shifts towards VDSL

Fibre deployment deeper into the network has been on-going for many years. However, large scale deployments from the exchange to street cabinets and premises are expected to accelerate in the near term – particularly if the prospect of a more favourable regulatory environment is realised.<sup>33</sup> These changes reflect:

- Rising demand for higher speed access.
- The development of business models which make investment more attractive through service-price differentiation and/or co-investment.
- The recognition that fibre to the cabinet (FTTC) can, in many circumstances, provide a significant increase in speed at lower cost than fibre to the premise. There is also the prospect of higher and more consistent speeds with VDSL vectoring technology.

A heterogeneous mix of technology and significant variation in the anticipated extent of deployment is apparent from analysts' projections. For example, a forecast by Analysys Mason indicates a varying mix of VDSL and FTTH deployments and significantly different timings in different Member States.<sup>34</sup>

### 3.6 Cable upgrades (again) increasing capacity and speed

A transition from DOCSIS 3.0 to DOCSIS 3.1 will significantly increase the speed and capacity of cable, particularly the up-stream potential.<sup>35</sup> Vendors anticipate product in the marketplace by 2015, and operators are considering the potential of the shift in technology with Telenet noting in an investor call *"So that's [DOCSIS 3.1] going to be a huge leap forward"*.<sup>36</sup>

<sup>33</sup> [http://europa.eu/rapid/press-release\\_SPEECH-12-552\\_en.htm](http://europa.eu/rapid/press-release_SPEECH-12-552_en.htm)

<sup>34</sup> Analysys Mason. 25 April 2012. "FTTx roll-out and capex forecasts, 2012–2017." <https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&sqj=2&ved=0CC8QFjAA&url=http%3A%2F%2Fwww.analysismason.com%2FResearch%2FContent%2FWebinars%2FFTTx-forecasts-webinar-Apr2012%2F&ei=mBFoUeijlYabtAbCs4GYCQ&usq=AFQjCNEoT30SxCClq1BcvKWtMZBDTzzH5g>

<sup>35</sup> <http://blogs.cisco.com/sp/catching-up-with-ciscos-john-chapman-at-cable-congress-2013-this-week/#more-104374>

<sup>36</sup> Telenet. February 2013. Q4, 2012 Results – Transcript. <http://investors.telenet.be/phoenix.zhtml?c=241896&p=irol-resultcenter>

### 3.7 A transition to all-IP networks gathers pace

We anticipate that networks in the EU will move to all-IP technology over the next seven years:

- Mobile networks which shift to LTE will need to migrate to voice over LTE (VoLTE). Whilst handsets run on both legacy and LTE networks, legacy switched voice services will be supported. However, operators are now planning for the transition away from this dependence.<sup>37</sup>
- Cable networks already offer VoIP services over IP networks.
- Fixed telecommunications operators also plan to migrate to all-IP architectures. Eight operators were surveyed in an anonymous survey conducted by ETNO for Plum. All have plans or are conducting studies into PSTN/ISDN Network transformation. Of those with firm plans the target date for transformation is before 2020<sup>38</sup>, with the earliest planning to complete the transformation by 2017. Most of the operators surveyed envisage the migration of fixed voice to VoIP over either xDSL or Fibre.

On a forward looking basis the provision of services (in particular voice) and the need for wholesale access regulation should be assessed taking account of the transition to all-IP networks.

### 3.8 Anticipated changes to 2015 and beyond – more competition, local & global

The anticipated changes post 2013 discussed in this section are predictable. Many are underway now and most will have a material impact on the market by 2015. They should therefore be a central consideration in any future market analysis and in any review of the 2007 Recommendation.

Anticipated changes in network infrastructure by 2015 include:

- A significant strengthening of mobile broadband capacity in terms of coverage, cost efficiency and speed.
- A step change in compression and Wi-Fi capability with new standards from 2014.
- Substantial fibre deployment including VDSL running in parallel with copper ADSL.
- Intensifying platform competition including ADSL, cable (with DOCSIS 3.1 deployment from 2015), parallel fibre networks and wireless with LTE.

These developments will enhance platform competition, and see a more heterogeneous geographical mix of access technology in which service levels and competitive conditions vary by geographical location.

Anticipated changes in terms of services and applications include a shift from fixed to mobile services and a shift from legacy voice and text to increased reliance on a wide range of global internet based communications applications. These include VoIP, instant messaging, social networking and location based services which will substitute for traditional forms of communication. These developments will be accelerated by the rapid adoption of smart mobile devices and apps.

<sup>37</sup> For example, Verizon in the US plan to move to VoIP over LTE over the next two years.

[http://www22.verizon.com/investor/DocServlet?doc=vz\\_deutsche\\_conf\\_trans\\_2013.pdf](http://www22.verizon.com/investor/DocServlet?doc=vz_deutsche_conf_trans_2013.pdf)

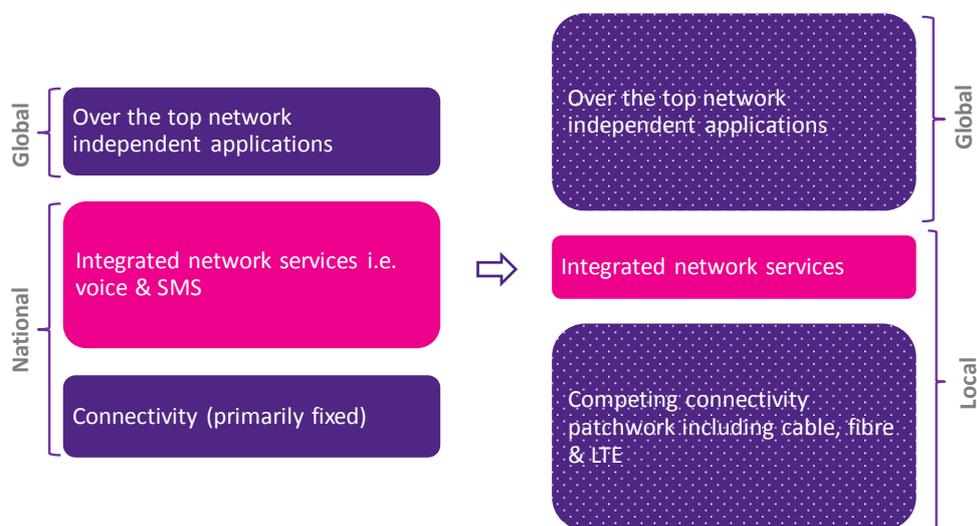
<sup>38</sup> With the exception of one which plans to finish the transformation between 2022 and 2025.

Figure 3-7 shows how we expect the relative importance of different aspects of electronic communications networks and services will have changed between 2007 and 2015 and beyond.<sup>39</sup> We anticipate that:

- Access and internet based applications grow in importance in terms of consumer focus while traditional network integrated services such as voice and SMS decrease in importance.
- Access competition intensifies but varies geographically with a patchwork of competing platforms. Wireless grows in importance.

Overall there is a growing component of competition – both at the application and connectivity layers - which is “regulation independent”.

Figure 3-7: Transformation of networks and applications from national to global-local



Note: the scale is illustrative of a relative shift in importance (and not necessarily in revenues), in particular in relation to the “shaded” regions where over the top service provision does not necessarily involve end user revenues and for connectivity where increased use and arguably willingness to pay may not necessarily translate into corresponding increases in revenue.

<sup>39</sup> A “Global-local” perspective was proposed by Richard Feasey. July 2012. “Global-local: European telecoms regulation in the 2020s.” <http://www.oxera.com/Oxera/media/Oxera/downloads/Agenda/Agenda-11-Telecoms-regulation.pdf?ext=.pdf>

## 4 Adapting to the changing market

*"When the facts change I change my mind, what do you do Sir?"* John Maynard Keynes

As Sections 2 and 3 set out, market conditions in the electronic communications network and services markets of the EU have changed substantially since 2007 and will change further in the period to 2015 and beyond. In summary we observe:

- A strong and continuing move from narrowband to broadband access and a gradual change from circuit switched to IP technology.
- A substantial increase in cross-platform competition since 2007 as cable operators have upgraded their networks to DOCSIS 3.0 enabling them to offer high-speed broadband access and local fibre built-out, e.g. by municipalities and power utilities occurred.
- Strong prospects for a further increase in cross-platform competition over the next few years with the rollout of LTE-based mobile broadband. This should provide substantial competitive constraints on the supply of fixed broadband.
- A rapid increase in competition for the supply of services and applications by global service providers which use the internet and broadband access.
- A move from markets which are essentially national in scope to markets which are either global or local in character. The markets for the supply of network access are becoming more local, while those for the supply of services and applications are becoming more global.
- Markets which are in transition. The fixed services market is in transition from copper to fibre-based broadband; the mobile services market is in transition from 3G to 4G technologies; and both are gradually moving from circuit-switched to IP-based core networks.

These changes have implications for regulation. In particular:

- The central role of broadband means that regulation - where competition is insufficient - should focus on broadband, rather than narrowband, access markets.
- The globally competitive nature of the market for the supply of services and applications including over the top applications (given low barriers to entry) suggests that regulation should be withdrawn from these markets and focussed on network access.
- The geographic variation in competitive conditions for the supply of broadband access within each Member State requires a greater focus on the definition of geographic submarkets as part of the market review process.
- The transitional nature of the markets raises problems of investment incentives which were not central when the 2007 Recommendation was drafted. But they are central now to achieving policy objectives in the telecommunications sector. So they need to be accommodated within the market analysis process.

The current list of markets does not reflect the market changes above, and drawing on experience of regulation under the existing process, we argue that *inter alia* the following problems can be identified:

- Voice services, though already subject to strong cross platform and over the top competition, continue to be subject to *ex ante* regulation.

- In the case of broadband access markets, some incumbent operators may be determined as having SMP even though platform competition is strong or another operator arguably has SMP at the retail level.
- There is insufficient consideration of heterogeneous competition/sub-markets.

We argue that these tendencies exist in part due to a focus on already existing wholesale markets rather than on competition conditions in retail markets for consumers. For example, Article 1 of the Recommendation states:

*“In defining relevant markets appropriate to national circumstances in accordance with Article 15(3) of Directive 2002/21/EC, national regulatory authorities should analyse the product and service markets identified in the Annex [the list of relevant markets] to this Recommendation”*

Whilst analysis starts from a consumer-retail perspective, in our view, there is a tendency to narrow the focus to “merchant” wholesale markets created by regulation and to then neglect constraints due to competing platforms at the retail level.

We propose that the revised Recommendation and Explanatory Memorandum include greater clarity in relation to a process whereby NRA's first analyse the retail market situation in order to assess the need for wholesale regulation and, where relevant, define appropriate wholesale markets and identify the appropriate level of intervention in terms of remedies.

We also propose that the Recommendation and Explanatory Memorandum indicate the retail markets to be considered as a starting point, and provide a narrow list of wholesale markets focussed on access and guidance on the application of remedies in relation to wholesale markets.

These proposals would minimise the risk that regulation reduces competition, promote innovation and investment, and help ensure that regulation is removed as competition develops. The proposals are developed in the next section.

## 5 Revising the approach to take full account of competitive constraints

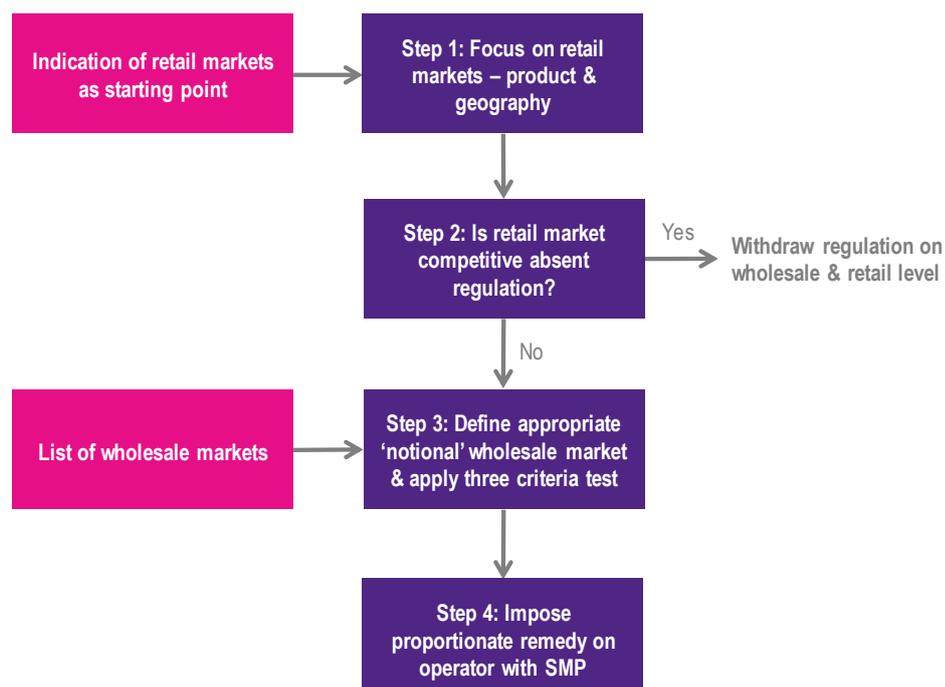
As noted in Section 4, there has been a general tendency by NRAs to focus on existing wholesale broadband markets created by regulation on these markets (since these markets are on the list of relevant markets) and, as a consequence of “sole supply of (pre-regulated) wholesale inputs” by existing regulated operators, conclude, in a rather circular manner, that they have significant market power on those markets.

In our view, this approach is unsatisfactory. From the standpoint of competition law, which must inform the analysis, notional wholesale markets are only created to address insufficient competition at the retail level. This is also what led the Commission to follow a regulatory framework whereby (so far non-existing) wholesale markets were defined so as to enable the imposition of regulatory remedies on incumbent operators so as to facilitate entry and thus stimulate competition at the retail level. When the - national or sub-national - retail market is competitive due to the presence of vertically-integrated competitors, i.e. competitors which rely on their infrastructure to compete with the incumbent, there is no longer a need for wholesale regulation.

In other words, regulators have a tendency to narrow the scope of the analysis too soon, without sufficient consideration of the impact of competitive constraints at the retail level (which may be considered directly or indirectly on wholesale inputs). In part, this may reflect the complexity (or perceived complexity) of analysis of indirect constraints. Nevertheless the status quo arguably results in foregone opportunities to reduce or remove regulation where there is sufficient competition.

Figure 5-1 sets out our proposed approach which would focus attention on the consumer, retail markets and competitive constraints, whilst also maintaining a clear focus on defining notional wholesale markets in relation to remedies.

Figure 5-1: Overview of process for NRA to follow



We set out the reasoning behind the approach below. The starting point for analysis should be those markets where insufficient competition is anticipated and where wholesale market remedies are most likely to be required. In deciding on the level of competition direct and indirect constraints should be considered taking account of all access technologies, and variation in supply in geographic locations should be considered and assessed.

In effect, we propose that the recommendation and accompanying documents provide guidance both by emphasising retail markets as a starting point for NRA's analysis and by listing the wholesale markets where remedies may be applied if SMP is found. We also propose guidance in relation to wholesale markets for broadband access in the new list of relevant markets to ensure wholesale regulation only applies at the appropriate level of the network depending on circumstances.

## 5.1 Step 1: Start with retail markets

The NRA should focus on retail markets as a starting point for analysis, both in terms of their product and geographic scope. Key considerations include:

- Considering all broadband access technologies at a fixed location including fixed broadband, cable and wireless (including mobile broadband where appropriate, considered in Appendix A).
- Differences in competition by geographic sub-market should be considered and assessed.<sup>40</sup>
- The competitive constraint of current generation access (which might be regulated or involving a price commitment) on next generation access should be taken into account.
- We do not consider that there are clear and enduring implications of bundling for the review of relevant markets. In considering bundles at Member States level the economic significance of the elements of the bundle should be assessed (including consideration of the existing and prospective impact of over the top services and applications on the bundle).

In defining the geographic extent of a market the following definition offers guidance:

*“According to established case-law, the relevant geographic market comprises an area in which the undertakings concerned are involved in the supply and demand of the relevant products or services, in which area the conditions of competition are similar or sufficiently homogeneous and which can be distinguished from neighbouring areas in which the prevailing conditions of competition are appreciably different”<sup>41</sup>*

Based on this starting point we make two proposals.

First, simple qualitative criteria should be used to assess whether competition is likely to be materially different in different sub-national markets. In particular the presence of competing platforms in some locations and not in others should be considered as *prima facie* evidence of appreciable geographic differences. The market share and intensity of competition from rival platforms may also vary in different sub-markets, but a first qualitative step is to assess the presence of competing platforms.

<sup>40</sup> Ofcom first identified geographic submarkets for wholesale broadband access in 2007, a decision welcomed by the European Commission “...the evolution towards the definition of sub-national markets may allow better targeted regulation.” Bringer and Schumm. 2008. “Revolution or evolution in telecoms? Sub-national markets in sector specific regulation when competition develops unevenly.” *Competition Policy Newsletter* 2008(2). [http://ec.europa.eu/competition/publications/cpn/2008\\_2\\_25.pdf](http://ec.europa.eu/competition/publications/cpn/2008_2_25.pdf)

<sup>41</sup> Para 56 Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services (2002/C 165/03)

Secondly, national pricing should not be considered as *per se* evidence of a national market when defining the geographic scope of markets. We note here that both the Commission in various comments letters under Article 7 and BEREC, in its work on geographic aspects of market analysis, put considerable weight on the existence of uniform national retail pricing as evidence of a market which is national in geographic scope. But recent analysis suggests that this indicator should be given little weight. There are three main reasons why a national operator facing competitive conditions which vary substantially by geography might continue to apply national pricing:

- Regulation. NRAs may impose national wholesale pricing on SMP operators. In combination with margin squeeze tests this leads them towards national retail pricing.
- Transaction cost and marketing considerations. The response to differences in competition may involve result in changing market shares rather than different prices.
- Reputational issues. An SMP operator may be concerned that geographically differentiated retail prices would damage its reputation with end-users and/or result in a politically adverse reaction.

This view was supported by Ofcom in a review of broadband markets, where it concluded that differences in competitive offers between areas “*may suggest that separate geographic markets are emerging at the retail level*”, despite the incumbent operator (and other ISPs) maintaining a national price on all their packages.<sup>42</sup>

## 5.2 Step 2: Test whether retail market would be competitive absent regulation

The NRA considers whether each of the retail markets identified in Step 1 is, in the absence of existing SMP-regulation, likely to be effectively competitive.

If the NRA decides that the market is, or will become, competitive then it should withdraw existing wholesale regulation. In considering the question of what would happen if wholesale regulation were withdrawn, the following should be considered:

- Existing and/or potential symmetric remedies, e.g. for access to passive infrastructure that apply irrespective of an SMP-finding due to national and/or EU law.
- Direct constraints from the retail market including cable and LTE on broadband pricing should be assessed.

In assessing the extent of market competition, the supply side and demand side changes discussed in Sections 2 and 3 should be assessed.

On the supply side, as next generation access is deployed current and next generation access will compete. Where cable is available, it is in many cases a strong competitor, and the migration from DOSCIS 3.0 to DOSCIS 3.1 from 2015 will offer higher speeds and higher capacity further strengthening competition from cable. Competition from wireless access, and mobile broadband in particular, should be carefully assessed on a forward looking basis. Rapid deployment of LTE, coupled with increased spectrum availability (including UHF spectrum), can be expected to improve the speed, coverage and capacity of mobile broadband substantially by 2015 in most Member States.

<sup>42</sup> Ofcom. March 2010. “*Review of the Wholesale Broadband Access Markets, Consultation on Market Definition, Market Power Determinations and Remedies.*” Paras 3.169-3.177.  
<http://stakeholders.ofcom.org.uk/binaries/consultations/wba/summary/wbacondoc.pdf>

Mobile broadband can be expected to become a much stronger competitor in the market for broadband access at a fixed location (as discussed in detail in Appendix A).

On the demand side, the shift in focus of consumers to mobile devices – smartphones and tablets – increases the prospects for substitution given that applications are increasingly optimised for lower capacity and (historically at least) lower speed mobile access. Additional data related to mobile broadband access at a fixed location may be viewed as an incremental add-on to a pre-existing mobile package, whilst fixed access may be viewed as an additional and unnecessary contract.

In relation to the corporate communications market, the central business districts of major towns and in large business parks there may be competitive supply of high-capacity broadband access from specialist suppliers. This may not make these suppliers competitive at the retail level absent regulation, given the requirement for nationwide supply, but allows lifting of wholesale regulation in the geographic area where services are provided in a competitive environment (geographic segmentation). The specialist supplier only remains dependent on the incumbent operator for wholesale components outside of such competitive areas (given that the costs of extending its network infrastructure to serve a handful of sites in, say, a small town or business park is unlikely to make entry profitable).

We note that if wholesale access regulation was withdrawn it would not necessarily follow that wholesale access would be withdrawn. The market conditions that might see regulation relaxed, namely platform competition, also encourage voluntary wholesale access. The transition to next generation access, when investors want to grow the market and face price elastic demand, may also foster voluntary wholesale access.

Evidence that a reduction in regulation need not result in a reduction in competition is provided by the experience in relation to MVNO following removal of Market 15 (access and call origination on mobile networks) from the list of relevant markets in 2007 – the market has continued to develop with 276 MVNOs active in Europe in 2011<sup>43</sup>. It is also provided by the experience following partial deregulation of broadband access in the UK summarised in Figure 5-2.

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<sup>43</sup> The way MVNO are accounted for can differ substantially depending from the source and by the definition of MVNO. Wireless intelligence reported 357 active MVNO in Western Europe and 34 in Eastern Europe at the end of Q2 2010. <https://wirelessintelligence.com/files/analysis/?file=100624.pdf>

### Figure 5-2: Experience following partial deregulation of wholesale broadband access in the UK

In May 2008, Ofcom published the final statement of the Wholesale Broadband Access market analysis in the UK<sup>44</sup> where, by means of geographic market analysis differentiation, it introduced substantial deregulation in the wholesale market.

Ofcom identified three sub-markets in line with the level of competition at the local exchange (number of unbundlers) and concluded that sub-market three, the segment where four or more unbundlers are active, corresponding to 69.2% of the UK premises, was deemed competitive. As a result of that BT was lifted from any obligation. However, Ofcom required a 12 month notice period for (wholesale) customers who have existing contracts with BT, so that they could continue to operate while making any necessary alternative arrangements.

During the period 2008- 2010, prior to the following WBA market analysis, there was no evidence of price increase of WBA. However, it is worth noting that in 2006 BT volunteered pricing commitments to Ofcom that set a floor and ceiling price for its WBA services. Following the 2008 review, these commitments remained in place. The commitment to price above a floor price expired on 1 July 2009 and there was also a commitment to not price above a ceiling price until December 2010.

The 2010 WBA market analysis<sup>45</sup>, slightly extended the boundaries of the so-called sub market three, adding all those exchanges where there are at least three unbundlers and BT market share is below 50%. Sub-market three was measured to 77.6% exchanges.

Table A3.11 of Ofcom market analysis, compares the evolution of competition of the various exchanges, and in particular how they migrate from market segment to others. With few exceptions, the trend in between 2008-2010 has been for exchanges to become more competitive rather than less. In annex 4 of the same market analysis statement, a number of charts are presented to show BT market share evolution from 2008 to 2010.

Figure A.4.1 through to A.4.9 show that in all cases BT market share has decreased, or the distribution of exchanges has evolved towards a more competitive market structure.

In conclusion, the partial deregulation of WBA in the UK introduced by Ofcom in 2008 has not produced a less competitive outcome, in fact by 2010 the market had become more competitive.

## 5.3 Step 3: Define relevant wholesale market

In Step 3, the NRA should not simply analyse the wholesale markets on the list of relevant markets and impose remedies, but systematically:

- Consider the impact of all technologies in terms of constraints on wholesale pricing including via indirect constraints from the retail market to the wholesale market and the existence/prospects for competition in wholesale supply (for example from cable). The three criteria test should be applied by the NRA in deciding whether a wholesale market should be subject to regulation.
- Consider the impact on investment and innovation of alternative wholesale market remedies in deciding what level of wholesale market intervention is appropriate i.e. choose the right level of intervention and therefore the corresponding wholesale market from the list of relevant wholesale markets. This step which involves deciding on the appropriate level for intervention is addressed in detail under Step 4 below.

<sup>44</sup> <http://stakeholders.ofcom.org.uk/binaries/consultations/wbamr07/statement/statement.pdf>

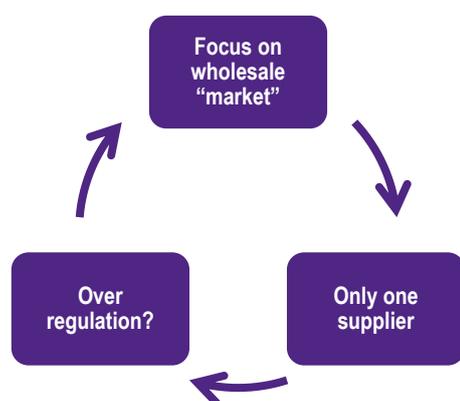
<sup>45</sup> <http://stakeholders.ofcom.org.uk/binaries/consultations/wba/statement/wbastatement.pdf>

### 5.3.1 Take into account alternative platforms in wholesale market definition

Step 2 is designed to ensure a focus on all technologies on the supply side and consumer behaviour and preferences on the demand side in assessing competition at the retail level. This focus, on all technologies and demand side characteristics, should be maintained when considering wholesale markets.

This approach is important to avoid the tendency, discussed in Section 4, to focus on specific access products and technologies in relation to the existing regulated network operator, and therefore by default to find that they are the sole supplier of the wholesale input under consideration and have significant market power – even if the retail market would be competitive absent regulation. This circular approach tends to lock in regulation, and potentially over-regulation, as shown in Figure 5-3.

Figure 5-3: Narrow focus tends to lock in regulation



To escape the above tendency:

- The focus should no longer be on *competitors per se* and the current regulated wholesale input. Rather, it should be on *competition in the market as a whole*.
- The initial focus should be on the retail market including all technologies and consumer preferences – as discussed in relation to Step 2.
- If under Step 2 the NRA finds that wholesale regulation is required, it should define the relevant wholesale market closely mirroring competitive conditions on the retail market. In particular:
  - Indirect constraints from the retail level to the wholesale level should be assessed. Are they sufficient to promote good outcomes absent regulation? (Figure 5-4 below).<sup>46</sup>
  - The existence and scope for commercial wholesale offers by all technologies including cable, independent fibre and telco copper and fibre should be assessed, and the possibility that removal of price controls might promote commercial wholesale access should be considered.

<sup>46</sup> Indirect constraints are particularly powerful when the regulated access provider is the only supply in the wholesale market and faces substantial competition at the retail level. These are often the circumstances faced by a telecommunications operator in the supply of wholesale broadband access. See for example *A tale of two constraints: assessing market power in wholesale markets*, Inderst and Valletti, ECLR 2007.

#### Figure 5-4: Indirect constraints (discussed in greater detail in Appendix B)

The analysis of retail product and geographic markets is made prior to the definition of wholesale markets. This is because demand for a wholesale product is derived from demand for access at the retail level, i.e. the level of demand for the upstream input depends on the demand for the retail services which it supports. The principle that market power in a wholesale market may be constrained by competition in a related downstream market is well established (indirect constraints). Failure to consider retail-level constraints could lead to incorrect conclusions regarding market power and inappropriate remedies at the wholesale level.

Indirect constraints affect the market power of upstream firms by making derived demand more elastic. Suppose that the DSL incumbent operator were to push up the upstream price. If there were no vertically-integrated rival (e.g. cable), all competing downstream firms would be equally affected by this increase in their costs. In contrast, if one downstream firm (e.g. the cable operator) can rely on self-supply, then this firm will now have a competitive advantage because it does not face the same price increase.

Because of indirect constraints, at least other fixed access platforms including cable should be part of the same wholesale market as the incumbent's products. The product market thus consists at least of traditional telecom loop-based and cable-based wholesale broadband access provision at a fixed location. At the very least, self-supplied wholesale cable products must be accounted for.

### 5.3.2 Apply three criteria test to markets defined at national level

In addition we propose that in order to ensure that regulation is applied only where it is still required, each NRA should carry out the three criteria test on any market defined at national level, including those that are contained in the list of relevant markets. The three criteria, as set out in 2007 Recommendation, are (emphasis added):<sup>47</sup>

*“The **first criterion** is the presence of high and non-transitory barriers to entry. These may be of a structural, legal or regulatory nature. However, given the dynamic character and functioning of electronic communications markets, possibilities to overcome barriers to entry within the relevant time horizon should also be taken into consideration when carrying out a prospective analysis to identify the relevant markets for possible ex ante regulation. Therefore the **second criterion** admits only those markets whose structure does not tend towards effective competition within the relevant time horizon. The application of this criterion involves examining the state of competition behind the barriers to entry. The **third criterion** is that application of competition law alone would not adequately address the market failure(s) concerned.”*

### 5.3.3 Identify the appropriate level of intervention

In addition, NRAs should at this stage consider the appropriate level of intervention in the network in case the revised Recommendation contains several wholesale markets that allow the imposition of remedies in view of one retail market (e.g. two wholesale markets addressing the retail mass market for broadband, see section 6.2.4). In that case, the relevant wholesale market to promote retail competition should be identified to ensure that the market analysis is instrumental to addressing the competition problems identified at retail level.

<sup>47</sup> [http://ec.europa.eu/information\\_society/policy/ecomm/doc/library/proposals/rec\\_markets\\_en.pdf](http://ec.europa.eu/information_society/policy/ecomm/doc/library/proposals/rec_markets_en.pdf)

This is of particular importance in telecoms where wholesale markets were initially identified in relation to specific wholesale remedies ('notional' markets).

This step which involves an assessment of the most appropriate level for intervention is closely linked to the assessment of remedies and therefore addressed in detail under Step 4 below.

## 5.4 Step 4: Assess SMP and decide on appropriate remedies

In this step, the NRA must decide who has SMP and what constitutes a proportionate remedy at the wholesale level. Until now the answer to the question of who has SMP has been unambiguous in almost all Member States – the incumbent operator has been designated as having SMP. But this situation has changed as cable operators have captured a major share of the mass market for broadband at a fixed location in some areas. For example, in the geographic submarket formed by a cable operator's area of operation in one Western European Member State, we estimate that the cable operator currently has a 65% market share of the broadband market.

In deciding on a proportionate remedy the NRA should take into account in particular:

- Competitive constraints at the retail level (acting as indirect constraints on wholesale inputs) may imply that a full set of remedies including cost orientation are not required.
- Existing symmetric remedies, e.g. for access to passive infrastructure that apply irrespective of an SMP-finding due to national and/or EU law. Symmetric remedies may reduce the need for (asymmetric) remedies in relation to wholesale access.
- The costs and benefits of alternative forms of regulation including the potential impact on investment and innovation.

We now focus on the latter above and consider in particular the role of an analysis of costs and benefits and its implications for the application of wholesale remedies (and in Section 6 for the list of relevant markets).

### 5.4.1 Choice of level for wholesale remedy

The approach to date has been to provide more than one level of wholesale product in the value chain and to provide access as deep within the infrastructure as is technically feasible and economically sustainable – in order to support independent investment and innovation by access seekers. For example, in some Member States price regulated access to unbundled local loops has supported product innovation (ADSL2+) and price competition, though it may have impeded investment in next generation access.<sup>48</sup>

The appropriate choice of wholesale market depends on the technology, business model and regulatory approach in each Member State or geographic sub-market. As technology and markets change, so too will the trade-offs in terms of what is technically feasible, economically sustainable and best able to deliver net benefits considering the impact on investment, innovation and competition. In particular:

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<sup>48</sup> Cave and Peitz. January 2013. "The next regulatory frontier for European telecommunications."  
[http://www.cerre.eu/sites/default/files/130117\\_CERRE\\_CES\\_Telco\\_DiscussionPaper.pdf](http://www.cerre.eu/sites/default/files/130117_CERRE_CES_Telco_DiscussionPaper.pdf)

- Passive optical networks and cable networks are not readily unbundled, and passive unbundling may be incompatible with vectoring VDSL. In all these circumstances active remedies may be the only feasible option, if regulation is applied.
- Fibre to the cabinet and sub-loop unbundling is less economically attractive for alternative operators than full unbundling because each cabinet serves far fewer customers than a telephone exchange undermining the business case for multiple operators to access the network at the cabinet level.
- A particular wholesale market may, depending on the circumstances, support or undermine scope for service-price differentiation at the retail level, therefore undermining incentives to invest.

Figure 5-5 sets out the benefits of service-price differentiation whilst the subsequent text discusses the relationship to market structure and the level of wholesale remedy.

#### Figure 5-5: Benefits of service-price differentiation

The benefits of differentiation are illustrated by Figure 5-6. From an investor perspective differentiation supports additional revenue with a lower-quality lower-priced product and a higher-priced higher-quality product in addition to an intermediate product compared to a single intermediate product at a single price where the two squares labelled  $+\Delta R$  show the benefit. From a consumer perspective differentiation involves both lower prices for some and higher prices for others, but overall it expands demand by facilitating take-up by those with low willingness to pay and, by supporting timely investment, also improves the timing and availability of higher quality broadband access.

Figure 5-6: Benefits of price differentiation



Price differentiation may also be used to offer transition or entry products to encourage residual customers with low willingness to pay to switch from copper to fibre and to discourage them from switching back (for example, Verizon in the US offer a 3 Mbps low cost product over FTTH for this purpose).

The above picture is static in that it does not capture investment dynamics. Price differentiation, by more closely aligning revenue with willingness to pay for new services (such as fibre), better aligns investor and consumer interests in investment in new technology. Further, where there are competing platforms, competition will be more intense and consumer interests' are best served where there is freedom for both platforms to innovate in terms of the services and prices offered.

We now consider in different market circumstances what level of wholesale remedy is required to minimise constraints on service-price differentiation.

In relation to co-investment and risk sharing, offering an active access product alongside passive access (including symmetric remedies) could undermine the incentive to co-invest since the active product may involve no commitment and reduced risk for the access seeker. A regulated active product might then undermine incentives to invest by discouraging co-investment and risk sharing.

In relation to asymmetric investment with one operator investing and others gaining access via an active access product, there is a trade-off between control and flexibility for the access seeker and scope to sustain pure service-price differentiation, in particular by access speed, at the retail level.

The orthodox argument for access at the deepest level is that control by the retailer offers the greatest scope for innovation and consumer benefit. For example, control over technology choice with unbundled local copper loops allowed access seekers to invest early in ADSL2+ in some Member States. Where access seekers have control over backhaul capacity they might also differentiate by offering lower prices with data caps versus higher cost unlimited packages.

However, when it comes to service-price differentiation according to access speed over fibre the orthodox argument may be reversed with sustainable service price differentiation dependent on differentiation at the wholesale level. If this were not the case and a single passive wholesale product were available then significant differences in pricing by access speed would not be sustainable since they would not be underpinned by cost differences and could be arbitrated away.<sup>49</sup> The reason for this is that the fibre wholesale product price effectively sets a floor and a cap on retail prices since:

- Lower speed packages below the single wholesale price would be unprofitable; whilst
- Higher speed higher priced packages would be undercut by others who purchase the single price wholesale input.

Only if retail speed-price differentiation is mirrored by wholesale speed-price differentiation will the position be sustainable with third party access in a competitive market (where the speed differentiation is not a function of third party investment). However, at the wholesale level only active products can be differentiated to offer different speeds (say over fibre or VDSL) with corresponding differentiated wholesale prices.

The reasoning set out above underpins the decision by the European Commission to allow fibre pricing flexibility subject to non-discrimination, as set out by Vice President Kroes:<sup>50</sup>

*“More flexibility for “next generation” wholesale products: national regulators will no longer be required to apply cost-oriented price regulation in almost all circumstances.”*

We therefore propose that where a wholesale remedy is applied, the following constraints apply:

- A wholesale remedy should only be imposed at a single level on a given network.
- A price control should only be imposed on one network during transition.<sup>51</sup>

<sup>49</sup> In practice the extent of commercially optimal differentiation may be substantial. For example Verizon in the US charge a wide range of price for different speed points for FTTH. Verizon offer a low price 3 Mbps migration/retention product as a copper substitute over fibre, and standard packages ranging from down/up 15/5 Mbps for \$49.99 to 150/65 for \$129.99 per month and 300/65 Mbps for \$200 per month (price not listed). <http://www22.verizon.com/home/fios-fastest-internet/features/#plans>

<sup>50</sup> <http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/12/552&format=HTML&aged=0&language=EN&quiLangu age=en>

<sup>51</sup> In general this would imply a price control on copper and not fibre, but might involve a regulated virtual anchor product on fibre with similar service levels and the same price as copper based ADSL in anticipation of copper retirement.

This approach would, for example, allow a non-discrimination requirement in relation to VULA access to a fibre network and a price control plus non-discrimination on copper during transition. It would not allow, for example, price controls on copper and fibre or an active and passive remedy in relation to copper or fibre. Where the revised recommendation contains several wholesale markets that allow the imposition of remedies in view of one retail market such as the mass market for broadband access, NRAs should consider the above trade-offs when opting for intervention in one or the other market. The Recommendation and Explanatory Memorandum should offer guidance on the choice of appropriate wholesale market in a given market situation.

There is also a linkage to margin squeeze tests which may be applied. If there is more than one price regulated wholesale product, potentially with different cost standards applied, then complying with multiple potential imputation tests simultaneously may prevent product innovation and launch, contrary to the objective of promoting broadband and next generation broadband investment. Hence *ex ante* imputation tests with multiple access points involve a high risk of false-positive test results and involve large economic costs associated with reduced investment incentives.

#### **5.4.2 Application of a cost benefit test before imposing remedies**

An assessment of costs and benefits involves an additional test beyond the three criteria test which would assess the scope of remedies. An explicit cost benefit test is applied in relation to airport regulation in the UK (see Figure 5-7).

### Figure 5-7: Illustrative framework for applying an explicit cost benefit test to regulation

In the UK the need for airport regulation is assessed against a three criteria test which in effect combines criteria of the telecoms three criteria test and adds a cost benefit criteria:<sup>52</sup>

*“Test A is that the relevant operator has, or is likely to acquire, substantial market power in a market, either alone or taken with such other persons as the CAA considers appropriate.*

*Test B is that competition law does not provide sufficient protection against the risk that the relevant operator may engage in conduct that amounts to an abuse of that substantial market power.*

*Test C is that, for users of air transport services, the benefits of regulating the relevant operator by means of a licence are likely to outweigh the adverse effects.”*

In an application of the test to Stansted airport the following impacts were considered in relation to Test C:<sup>53</sup> price; efficiency (which impacts on future prices); service quality, in terms of the range and level of services; and investment, which in capital intensive industries such as aviation, can impact on future levels of service quality. Against the potential benefits the assessment considered the adverse effects of licence regulation in terms of:

- *“the direct costs to the CAA, regulated companies and their users for example in manpower and expenditure, and*
- *the indirect costs/effects such as:*
  - *management distraction,*
  - *distortions to incentives,*
  - *crowding out of a more commercial approach,*
  - *distortions to competition more widely, for example on other airports, and*
  - *other potential adverse effects such as those on consumers.”*

A cost benefit test should be applied in deciding what if any intervention is appropriate in the telecommunications sector where SMP is found.

<sup>52</sup> Civil Aviation Act 2012. <http://www.legislation.gov.uk/ukpga/2012/19/section/6/enacted>

<sup>53</sup> [http://www.caa.co.uk/docs/78/FINAL%20STAL%20Market%20Power%20Assessment%20\(Summary,Tests%20A,B,C\).pdf](http://www.caa.co.uk/docs/78/FINAL%20STAL%20Market%20Power%20Assessment%20(Summary,Tests%20A,B,C).pdf)

## 6 List of markets for the revised Recommendation

The existing list of wholesale markets includes the following markets:

- Market 1: Access to the public telephone network at a fixed location for residential and non-residential customers
- Market 2: Call origination on the public telephone network provided at a fixed location
- Market 3: Call termination on individual public telephone networks provided at a fixed location
- Market 4: Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location
- Market 5: Wholesale broadband access
- Market 6: Wholesale terminating segments of leased lines
- Market 7: Voice call termination on individual mobile networks

We first consider high level conclusions drawing on our analysis in previous sections and then consider existing and potential prospective markets for inclusion in the list of relevant markets and apply the three criteria test, proposing a list of markets susceptible to *ex ante* regulation.

### 6.1 Focus on access rather than services

The analysis in Sections 2 and 3 implies that the focus should be on access rather than services since the latter can be expected to be competitive. Given access to end users, it takes only modest investment for suppliers to deliver services. So we would expect the services markets (including over the top services) to be competitive, provided access is available on non-discriminatory terms. We therefore propose that the focus be narrowed to access and not service markets.

#### 6.1.1 Focus on access at a fixed location in mass and corporate markets

In relation to access we distinguish two types of services as a focus for analysis:

- Broadband access at a fixed location for mass-market customers (consumers and SMEs)
- Dedicated connection and capacity (Leased line access) by large multi-site organisations

In relation to mass market broadband access at a fixed location (including cable), we consider that mobile broadband may create significant competitive constraints on the retail pricing of fixed broadband and that this constraint should be assessed. Whilst the outcome of such an assessment cannot be judged *a priori*, and will differ between Member States reflecting different market conditions (for example as regards fixed line penetration, user preferences for bundles etc.), the deployment of LTE coupled with additional spectrum will provide a potential substitute to fixed broadband which may offer sufficient capacity and speed at a competitive price to meet many consumers' needs (see Appendix A). The prospective impact of mobile broadband, particularly given that the supply side change with LTE is reasonably predictable, should be assessed.

We do not propose that the mobile broadband market should be on the indicative list of retail markets on grounds that the market is likely to be competitive absent regulation. This conclusion is consistent

with that reached in the 2007 review of the Recommendation. In addition the conclusion that mobile broadband access is competitive is supported by:

- Potential market entry with future spectrum releases. For example BT in the UK acquired 2.6 GHz spectrum in February 2013. It plans to enter the market with a sub-national Wi-Fi network,<sup>54</sup> potentially complemented by a commercial relationship with an existing mobile operator.<sup>55</sup>
- Sub-national Wi-Fi networks which support nomadic access and which place competitive constraints on mobile broadband. This development is coupled with increasing demand for nomadic access and Wi-Fi only devices such as tablets. The capacity and speed of Wi-Fi will increase with deployment of 802.11ac technology and potentially additional spectrum.
- Substitution for mobile data by Wi-Fi offload, particularly given the shift to tiered mobile data pricing. Wi-Fi off-load is estimated to rise from 33% in 2012 to 46% in 2017<sup>56</sup>, i.e. a substantial share which can be expected to be sensitive to the price of mobile data.

### 6.1.2 We do not consider bundling to have clear and enduring implications

We concluded in Section 2.7 that bundling is a dynamic phenomenon with changing supply and demand side developments leading to bundling and unbundling over time. We do not therefore consider that there are clear and enduring generally applicable implications of bundling for the review of relevant markets.

## 6.2 Review of existing list of markets

We apply the three criteria test - set out in Section 5 - cumulatively in order to identify wholesale markets that are susceptible to *ex ante* regulation.

### 6.2.1 Market 1: Access to the public telephone network at a fixed location

The proposed focus on broadband access in terms of retail markets as a starting point for analysis implies that existing Market 1 “Access to the public telephone network at a fixed location for residential and non-residential customers” should be dropped from the list of relevant markets. When the 2007 Recommendation was drafted the European Commission took the view in the explanatory memorandum that:

*“In the absence of any regulation (at retail or wholesale level), the incumbent public telephone network operator(s) would face little competitive constraint in terms of price or quality of services and customers would have little choice of supplier in relation to either access or calls (with the possible exception of large business users).”*

This is no longer the case for the reasons discussed in Sections 2 and 3:

<sup>54</sup> <http://www.btplc.com/news/Articles/ShowArticle.cfm?ArticleID=1933E628-6973-4835-AF50-5548CD979649>

<sup>55</sup> <http://www.ft.com/cms/s/0/6f81a472-ace9-11e2-b27f-00144feabdc0.html>

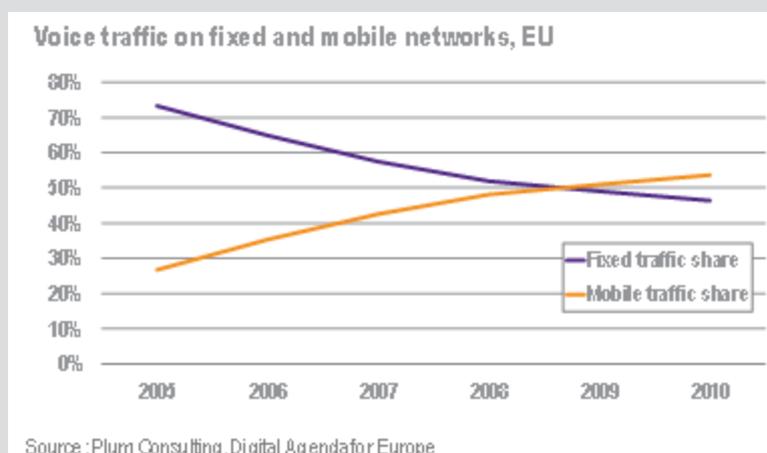
<sup>56</sup> [http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white\\_paper\\_c11-520862.pdf](http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf)

- On the supply side, access to the telephone network at a fixed location is no longer required to support voice services given mobile voice and both fixed and mobile broadband access which support a wide range of communications services including voice.
- On the demand side, demand for network access is shifting from narrowband to broadband access and there is increasing use of communications applications over broadband.

Figure 6-2 provides more information which shows that network operators which offer voice telephony at a fixed location now face substantial constraints (even where regulation is absent).

**Figure 6-2: Competition with fixed voice in the person-to-person communications market**

Mobile voice competes with fixed voice with mobile call volumes now exceeding fixed call volumes in the majority of countries. Fixed call volumes have also been falling whilst mobile minutes have risen, with the cross over point in late 2008 (see below).



When at home only 45% of people in the UK identified the fixed line as the main way of making calls, a share that declined to 11% for 16-22 year olds. The price of mobile calls has also fallen over time, and with calls included as an add-on to packages may be effectively free at the margin for both fixed and mobile.

The fixed line is increasingly purchased primarily for broadband with voice as an add-on. In terms of minutes of use, the average household in the UK uses broadband to access the internet for around 10 times the amount of time spent making fixed calls.

Both fixed line broadband (typically with regulated access to unbundled local loops) and mobile broadband and smart devices provide platforms for over the top personal communications applications that can substitute for fixed voice calls. Skype accounts for around one-third of international minutes the share is rising. Facebook is also trialling the inclusion of calling from the Facebook app in the US, Canada and UK. The impact of over the top is substantial and growing.

BEREC has argued that mobile and fixed access are complements rather than substitutes because the majority of households purchase both.<sup>57</sup> But we observe that most households now continue to purchase a fixed access line in order to use fixed broadband, rather than to use fixed voice services. Many use fixed line voice access very little or not at all, preferring to use their mobile phone for voice calls. Given the high level of mobile ownership and the disappearance of the price premium on mobile voice calls, this is an option open to almost everyone in the EU. This suggests that mobile and fixed access are substitutes rather than complements.

<sup>57</sup> BEREC report on impact of fixed-mobile substitution in market definition, BEREC. December 2011 Page 17-18. [http://berec.europa.eu/doc/berec/bor/bor11\\_54\\_FMS.pdf](http://berec.europa.eu/doc/berec/bor/bor11_54_FMS.pdf)

Applying the three criteria test, we find that barriers to entry are absent, voice services are increasingly viewed as part of a wider market in personal communication services and there is therefore effective competition in relation to voice telephony services. Further, competition will also be supported by regulatory intervention in relation to broadband access (considered below) should broadband access bottlenecks be identified. We therefore propose that Market 1 is removed from the list of relevant markets.

### 6.2.2 Market 2: Call origination

In the 2007 Recommendation, the European Commission reached the view that call origination was an essential input to support the retail provision of fixed voice telephony services. We set out our arguments in the previous Figure 6-2 as to why the retail market for voice telephony services is effectively competitive in the absence of regulation.

Anticipated developments in the market to 2015 and beyond will reinforce competition in the personal communication market. In particular, the number of households that have fixed access and no mobile access can be expected to continue to decline, whilst broadband access (both fixed and mobile) can be expected to continue to grow as well as the adoption of smart mobile devices and over the top communications apps. In relation to voice over broadband services, the 2007 Commission explanatory note stated that:

*“On the basis of quality differences and product characteristics (e.g. whether conventional handsets can be used and/or whether a connected computer must be switched on in order to receive calls), unmanaged VoB services appear for the time being to be less of a substitute for managed VoB, but that distinction may disappear over time as the quality of unmanaged VoB services improves and technical features change.”*

Provided a reasonable broadband connection is available, unmanaged VoB offers high call quality (and may also support video). As computing has moved to smartphones and tablets, these devices tend to be always on, overcoming the requirement for a connected computer to be switched on. The shift to tablets, smartphones and almost all recent laptops also overcomes the need for a conventional handset with built in speakers and microphones, and the option to use external microphones and headphones (often supplied with a smartphone). Arguably, the distinction has not only disappeared over time but is tipping in favour of over the top services.

Applying the three criteria test we find that high and non-transitory barriers to entry are absent. We therefore propose that Markets 2 be removed from the list of relevant markets.

### 6.2.3 Markets 3 and 7: Fixed and mobile termination

Markets 3 and 7 are wholesale markets related to interconnection whereas other markets in the current list of relevant markets relate to access. The economic analysis required to determine appropriate remedies is different in the two cases:

- Wholesale access involves access seekers purchasing wholesale services or facilities from an access provider. Regulation is imposed where necessary to ensure that the access provider does not abuse its significant market power.

- Interconnection involves operators exchanging traffic. An any-to-any interconnect requirement is required as provided for in Article 5 of the Access and Interconnection Directive to ensure that:
  - Subscribers to competing networks can communicate with each other.
  - The larger operator in any negotiation does not refuse to terminate traffic from the smaller operator so as to make its own network more attractive to potential subscribers.

In the past, the main interconnection problems arose because of asymmetric regulation rather than because of market power. Specifically, call termination charges of fixed operators were regulated while the call termination charges of mobile operators were not. This asymmetric regulation, in combination with the any-to-any interconnection requirement, gave the mobile operators a strong bargaining position relative to the fixed operators, and strong incentives to raise their call termination charges so that they could use the profits generated to subsidise retail offers. The mobile operators set high, unregulated, termination rates and this behaviour led to the regulation of all call termination charges.

We can see from this analysis that the dynamics of access and interconnection problems are very different and require different analysis and remedies. As a result, the Recommendation on relevant markets, which otherwise deals with access issues, may not be the best framework within which to address interconnection issues.

As a result of regulation, termination rates for calls to mobile networks have fallen substantially.<sup>58</sup> There are now strong arguments for removing Markets 3 and 7 from the list of relevant markets. In particular:

- The growth in over the top services means that there are now alternatives to call termination by a network operator. Over the top competition will intensify as mobile broadband access becomes more capable and ubiquitous and as alternative means of establishing a two-way connection with another party develop, for example, messaging from within a social platform.
- Continued inclusion of termination on the list of relevant markets involves a misallocation of resources by regulators and operators in continuing to analyse the market and in modelling incremental costs. In the past such activities have generated costs running into hundreds of millions of euros in some Member States. NRAs are open to considering less costly and less cumbersome procedures in relation to termination markets.<sup>59</sup>
- Experience in other jurisdictions suggests that *ex ante* price regulation of termination rates is unnecessary, provided that operators are subject to symmetric any-to-any interconnection requirements. In Hong Kong, for example, the regulator has withdrawn guidance on fixed mobile interconnection charging without any problems arising with termination rates<sup>60</sup>.

Given this analysis we propose that Markets 3 and 7 are withdrawn from the list of wholesale markets in the revised Recommendation. Whilst over the top services are increasing competition in relation to personal communications including termination, safeguards may nevertheless be sought alongside removing termination markets from the list of relevant markets. NRAs might, in the absence of any ex

<sup>58</sup> COMMISSION RECOMMENDATION of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC)

<sup>59</sup> Paragraph 99. BEREC. March 2013. "BEREC's response to the European Commission's questionnaire for the public consultation on the revision of the Recommendation on Relevant Markets."

<sup>60</sup> *Next generation networks: next generation regulation?* Plum for OFTA, January 2012.

[http://www.plumconsulting.co.uk/pdfs/Plum\\_Jan2012\\_Next\\_generation\\_networks\\_next\\_generation\\_regulation.pdf](http://www.plumconsulting.co.uk/pdfs/Plum_Jan2012_Next_generation_networks_next_generation_regulation.pdf)

*ante* price regulation of call termination charges, wish to continue to closely monitor termination markets by:<sup>61</sup>

- Requiring operators to inform them of all termination charges
- Monitoring changes in termination charges
- Requiring negotiating operators to set symmetric termination rates
- Reserving the right to re-notify the termination markets under the three criteria test if prices rise.

The starting point in Europe is regulated termination rates which have been reduced significantly. Given this starting position and the costs and time involved in doing market analysis and cost modelling it is proposed that an alternative approach to call termination be developed and Markets 3 and 7 be removed from the list of relevant markets. We propose that call termination be subject to:

- A symmetric interconnection obligation under Article 5 of the Access Directive; and
- The threat of re-notification if prices rise; or
- An explicit safeguard cap based on existing regulated termination rates rolled forward over time.<sup>62</sup>

#### 6.2.4 Markets 4 and 5: Broadband access

Competition in the broadband access market is likely to vary by location. In some locations the market, taking into account all competing access platforms, may be found to be competitive. In other locations bottlenecks may persist.

In terms of the first criterion of the three criteria test, barriers to entry in terms of duplicating the existing network are likely to be high. However, barriers to entry are arguably lower compared to 2007 for two reasons:

- The transition to fibre provides an opportunity for market entry.
- Advances in wireless technology and spectrum release increase the prospects for entry, including entry by fixed wireless access providers (who may utilise efficient antenna at customer premises).

In terms of the second criterion, we find that competition is already strong in many locations due to cable DOCSIS 3.0 and is likely to intensify as LTE is deployed. In other locations where cable is absent, competition will be weaker. We propose therefore that broadband access remain on the list of relevant markets but that NRAs carefully consider the competitive conditions taking account of all competing access technologies before applying wholesale remedies.

An important remaining question in relation to the list of relevant markets is whether a single wholesale broadband market should be defined or more than one wholesale market should remain on the list of relevant markets. In our analysis of Step 4 in Section 5 we concluded that no single wholesale access remedy is appropriate in all circumstances with passive remedies at a deeper layer appropriate in some circumstances whilst an active remedy at a higher layer may be appropriate in others, and that multiple points of intervention act as a disincentive for innovation and investment.

<sup>61</sup> This takes place in the US, cf. [ftp://193.196.11.222/pub/zew-docs/div/IKT04/Paper\\_Marcus\\_Parallel\\_Session.pdf](ftp://193.196.11.222/pub/zew-docs/div/IKT04/Paper_Marcus_Parallel_Session.pdf)

<sup>62</sup> Analogous to the approach applied, for example, by Ofcom in relation to post. <http://consumers.ofcom.org.uk/2012/03/safeguarding-the-uk%E2%80%99s-universal-postal-service-2/>

We therefore propose that two distinct wholesale broadband access markets be retained and included in the Annex to the Recommendation. The Annex should, however, clarify that regulation would be imposed on one, but not on several layers of the network in view of a given retail market failure identified under step 2 above. We also propose that the wholesale markets be defined on a more technology neutral basis.<sup>63</sup>

- A notional market for wholesale passive access (including any unbundling) at a fixed location.
- A notional market for wholesale active access at a fixed location.

The choice of the appropriate wholesale market on which to impose regulation should be made dependent on the technology, business models and regulatory approach in each Member State or geographic sub-market.

It should be justified by the market circumstances and be guided by what is technically feasible, economically sustainable and best able to deliver net benefits considering the impact on investment, innovation and competition.

As outlined above, we propose that where wholesale regulation applies,

- A wholesale remedy should only be imposed at a single level on a given network.
- A price control should only be imposed on one network during transition.<sup>64</sup>

## 6.2.5 Market 6: Terminating segments of leased lines

In the enterprise market, some demand will be met by mass market broadband, particularly as fibre is deployed and particularly for smaller enterprise and potentially small sites of larger enterprises.<sup>65</sup> However, generally speaking, demand for high quality dedicated end-to-end capacity by large corporate customers may not be met in all locations on a competitive basis. Whilst hybrid fibre coaxial networks are generally more suited to providing broadband access in the mass-market, high speed dedicated lines may also be offered by cable operators.<sup>66</sup> Further, independent suppliers serve business needs, particularly in high density areas.

In terms of the three criteria test we consider that entry barriers have been reduced with the trend towards use of IP networks and cloud based services attracting specialist connectivity providers, and also in some geographic areas where alternative infrastructure providers are present. In addition, for some segments of the market and some locations for multi-site corporations, mass market broadband access may meet enterprise requirements, particularly as fibre is deployed more deeply into access networks and given the trend towards “consumerization of IT”. In terms of the second criterion, whilst there is a trend towards effective competition for some customers and/or locations, bottlenecks are likely to remain in some Member States.

<sup>63</sup> Where technology neutral here refers to, for example, copper versus fibre versus cable; each of which might in principle have passive or active access elements.

<sup>64</sup> In general this would imply a price control on copper and not fibre, but might involve a regulated virtual anchor product on fibre with similar service levels and the same price as copper based ADSL in anticipation of copper retirement.

<sup>65</sup> According to a recent Ofcom survey small sites of big companies increasingly use consumer-based broadband products. For example a large retail pharmacy chain in the UK has replaced an old asynchronous transfer mode network with consumer DSL for branches while banks increasingly use DSL lines (two per machine for redundancy) to connect their automatic teller machines.

<sup>66</sup> <http://www.virginmediabusiness.co.uk/Business-types/Wholesale-Markets/Mobile-Backhaul-Network/>

We propose that terminating segments of leased lines remain on the list of relevant markets for the time being, but that full account is taken of competing infrastructures in deciding an appropriate geographic segmentation of the market.

## 6.2.6 No new markets should be added to the list

Given our analysis in Sections 2 and 3 we do not see any case for proposing new markets for the list of relevant markets. Nevertheless, we have considered:

- Whether market dynamics would warrant the definition of a separate pan European market in relation to corporate communications services for multinational companies; and
- Whether there is a need for any additional services markets.

In both cases we conclude that such additions to the list of relevant markets are not warranted given the competitive dynamics across EU markets.

In relation to the existence of a separate pan-European market for corporate communications services, we conclude that this market is national rather than international in geographic scope. Retail service providers in this market typically supply on a national basis to match the needs of the organisations they serve. Some supply on an international basis to match the needs of multi-national organisations, but this does not make the market international in scope. If a hypothetical monopolist in Country A made a small but significant and non-transitory increase in price (SSNIP) for corporate services, then the price rise is likely to be profitable (and the market national in scope) given that:

- Multinationals in Country A are unlikely to substantially reduce their presence in Country A, at least in the short term, because of the price rise (little demand side substitution)
- A price increase may provoke market entry in some geographies, but this is unlikely to be nationwide given that entrants need broadband access components which are expensive to build and are unlikely to be profitable outside dense commercial areas (little supply side substitution).

The characteristics of the broadband access required at large corporate sites are different and are addressed under the current market for dedicated connection and capacity. Beyond the large business needs, consumer grade broadband has improved substantially both in speed, capacity and contention since 2007. It is now meeting many business requirements – both at the single sites of small businesses and for the smaller sites of large multisite organisations, and providing a cost-effective solution for connecting such sites.

Meeting the needs of multinational companies for corporate communications services in an effective way across the EU may require harmonisation of wholesale broadband access inputs between Member States. But, as a WIK report notes, this does not mean that there is a transnational market in the supply of corporate communications services.<sup>67</sup>

We also consider whether any other services markets should be included in the list of relevant markets. Provided broadband access is available, any given communications service (for example mobile call origination or SMS) can be expected to be competing with over the top applications in the broader person to person communications market. Application of the three criteria test would

<sup>67</sup> *Business communications, economic growth and the competitive challenge*, WIK, January 2013.  
<http://www.ectaportal.com/en/REPORTS/WIK-Studies/WIK-Report-Business-Communications-Jan-2013/>

therefore be expected to conclude that the first of the three tests, namely the presence of high and non-transitory barriers to entry, is not met.

### 6.3 Summary of changes to proposed list of markets

Figure 6-1 provides a summary of changes to the proposed list of markets with markets indicated by purple to be removed and those indicated by magenta to be retained.

Figure 6-1: Overview of proposals

	Existing market	Proposal/Reasoning for change	Safeguards/guidance
Remove with safeguards	Market 1. Access to the public telephone network at a fixed location for residential and non-residential customers	Remove Anachronistic with shift to broadband access	Competition based on broadband access (regulated where required)
	Market 2. Call origination on the public telephone network provided at a fixed location	Fixed access competition based on alternative platform and /or wholesale broadband access, including free voice as add on Mobile competition Competition from over the top	
	Market 3: Call termination on individual public telephone networks provided at a fixed location  Market 7. Voice call termination on individual mobile networks	Remove Competition from over the top applications Low price due to regulation High time/money cost of continuing with market reviews & cost modelling	Symmetric interconnection rules (Article 5 Access Directive) Threat of re-notification if prices rise or explicit safeguard cap based on existing price
Retain but modify approach	Markets 4. Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location	Redefine as wholesale passive access at a fixed location (technology neutral formulation) Regulate either M4 or M5 in view of a given retail market (†)	Intervention on either Market 4 or Market 5 depending on circumstances (recognition of innovation & investment disincentive with multiple points of intervention)
	Market 5. Wholesale broadband access	Redefine as wholesale active access at a fixed location (technology neutral formulation) Regulate either M4 or M5 in view of a given retail market (†)	Assess varying degree of competition in different geographies
	Market 6. Wholesale terminating segments of leased lines	Leased lines market for dedicated capacity (distinct from mass market)	Assess varying degree of competition in different geographies

Note: no new markets are proposed.

(†) For a given access technology in transition, for example, copper to fibre

## Appendix A: Fixed-mobile broadband substitution

A forward looking assessment of fixed-mobile substitution in relation to broadband access requires consideration of rapid but predictable change in wireless technology, increase in spectrum availability and changing consumer behaviour. Whilst consumers may substitute between fixed and mobile services, the two network types offer different levels of mobility, speed, consistency and cost which all influence a substitution decision. Figure A-1 illustrates.

### Figure A-1: Differences in service and cost between fixed and mobile broadband access

Fixed access is only available at fixed locations whilst mobile access is available anywhere (within the coverage area). Mobile can provide broadband access at a fixed location whereas fixed cannot match the coverage of mobile (though with Wi-Fi it may offer sufficient coverage to act as a substitute for some applications and/or users).

Fixed networks have maintained a lead in terms of speeds with average speeds today of around 6 Mbps versus perhaps 2 Mbps for mobile (based on Akamai data). VDSL/fibre access speeds are expected to increase to around 30 to 100 Mbps+ whilst LTE mobile speeds are anticipated to reach around 10 Mbps. Mobile access speeds are also more variable depending on the level of use.

Fixed networks have high fixed costs and low incremental traffic related cost, whilst mobile networks have higher incremental costs and lower fixed costs.<sup>68</sup> Pricing does not necessarily reflect costs structures but is tending that way.<sup>69</sup> The incremental costs of mobile networks are falling substantially with more spectrally efficient technology (LTE) and additional spectrum. Further, as smartphone ownership grows the costs of a data contract are no longer incremental, and users may either share a data plan by tethering other devices via Wi-Fi or via data plans that are shared.<sup>70</sup>

It is clear that consumer preferences and willingness to pay, not simply technical characteristics, will play a key part in determining fixed mobile substitution:

- For broadband access at a fixed location some consumers may prefer mobile because it is cheaper or offers greater contractual flexibility, whilst others may prefer fixed given their greater demand for data capacity and/or speed.
- For mobile/nomadic use some consumers may prefer fixed broadband plus Wi-Fi for data, in combination with a basic voice package for mobile voice, rather than a full mobile broadband offering.

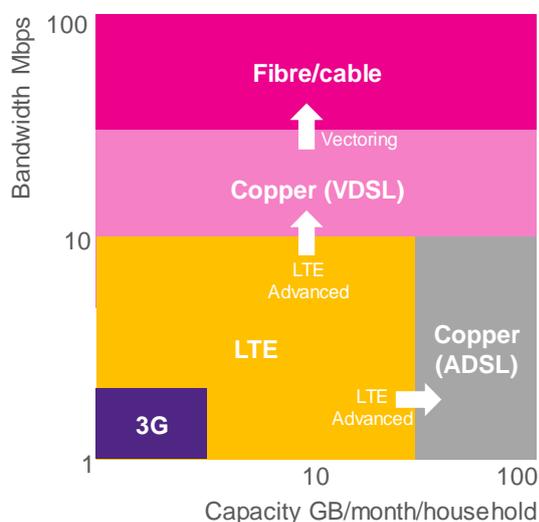
Figure A-2 provides a way of capturing some of the trade-offs involved in fixed-mobile substitution, given the impact of technology transition to fibre and LTE. The horizontal axis shows monthly data consumption whilst the vertical axis shows speed in Mbps.

<sup>68</sup> Fixed networks have zero incremental costs in the “last mile” from the exchange or cabinet to the premise since the final copper or fibre line is unshared. Mobile networks involve shared use of base station capacity over the air interface to consumers and therefore associated incremental costs of traffic growth associated with increasing the number of base stations and/or acquiring additional spectrum and supporting additional bands.

<sup>69</sup> Whilst some mobile tariffs involve unlimited data and some fixed broadband packages are capped, fixed broadband is increasingly characterised by no caps or very large caps (many tens to hundreds of GB per month) whilst mobile networks are characterised by tiered pricing in the range one to tens of GB per month).

<sup>70</sup> Mobile data plans that can be shared across multiple devices and/or individuals have also been developed and have seen rapid adoption in the US. For example, within six months of launch Verizon has seen 23% of post-paid accounts move to their “Shared Everything” plans. [http://www22.verizon.com/investor/DocServlet?doc=vz\\_4q\\_transcript\\_2012.pdf](http://www22.verizon.com/investor/DocServlet?doc=vz_4q_transcript_2012.pdf)

Figure A-2: Characteristics of competing technologies (with arrows indicating evolution)



Different fixed and wireless technologies are shown. Whilst the migration from fixed ADSL to VDSL or fibre increases speed but not capacity, the migration from 3G to LTE and LTE advanced involves both increased speed (vertical axis) and capacity (horizontal axis)<sup>71</sup> The evolution of fixed networks (to VDSL and fibre and to vectoring with VDSL) and mobile networks (towards LTE and LTE-Advanced) will impact on these choices. Note that the evolution to LTE-Advanced increases both speed and capacity (since efficiency gains reduce incremental costs). We anticipate commercial implementation by 2015. Whilst fibre is superior to LTE both in terms of speed and capacity, it does not follow that LTE cannot substitute for fibre since some consumers are likely to accept the limitations of mobile given the scope to avoid the costs of also paying for fixed broadband access. In Japan, NTT has cut its fibre prices 34% in response to competition from LTE:<sup>72</sup>

*“Sources at NTT East and NTT West are unequivocal in their views that the biggest, single reason for the slowdown in FTTH subscriber growth is the fact that many young subscribers now prefer to have their own ‘personalised’ LTE broadband services rather than paying for a household-based FTTH service – in addition to which they would be paying for a Smartphone LTE data plan anyway.”*

In Europe, there is already some evidence of significant substitution by mobile for fixed - for example in Austria. LTE coupled with UHF spectrum will enhance substitution by offering a more widely available service at speeds that are around 5-fold higher and with incremental costs that are around 5-fold lower. A potentially offsetting factor could be growth in demand and willingness to pay for high levels of traffic and/or speed. Given this analysis, we consider that there are strong *a priori* grounds for considering the competitive pressure from LTE in market analysis of broadband access at a fixed location and in considering what remedies are appropriate where market power is found.

<sup>71</sup> For LTE we assume 30 GB per month per user based on €30 expenditure and an average price of €1 per GB. Note that there are a range of price plans in the market which do not necessarily reflect estimated incremental costs, or the estimated efficiency of LTE relative to 3G. Incremental costs for LTE may fall below €1/GB, see Plum. January 2012. “Mobile data growth – too much of a good thing?” [http://www.plumconsulting.co.uk/pdfs/Plum\\_Insight\\_Jan2012\\_Mobile\\_data\\_growth\\_too\\_much\\_of\\_a\\_good\\_thing.pdf](http://www.plumconsulting.co.uk/pdfs/Plum_Insight_Jan2012_Mobile_data_growth_too_much_of_a_good_thing.pdf)

<sup>72</sup> <http://delimitter.com.au/2012/11/21/customers-dumping-fibre-for-4g-in-japan/>

## Appendix B: Indirect constraints

For the purposes of identifying any market where *ex ante* regulation is justified, it should be demonstrable, using a modified Greenfield approach,<sup>73</sup> that the related end-to-end retail market would, absent regulation, be characterised by a substantial degree of market power causing harm to consumers. To establish whether this is the case involves looking at competition on the retail market in the absence of upstream (wholesale) regulation. The aim is to ensure that regulation is only applied in those circumstances where there is a significant benefit to final consumers that cannot be achieved under competition law.

Logically, the analysis of retail product and geographic markets is made prior to the definition of wholesale markets. This is because demand for a wholesale product is *derived* from demand for access at the retail level, i.e. the level of demand for the upstream input depends on the demand for the retail services which it supports. The principle that market power in a wholesale market may be constrained by competition in a related downstream market is well established (*indirect constraints*). Failure to consider retail-level constraints could lead to incorrect conclusions regarding market power and inappropriate remedies at the wholesale level.

In telecommunications markets, services are arranged in vertical chains. A careful consideration of indirect constraints must therefore play a key role in the analysis of markets. The captive (self) supply of these firms can still exert an indirect constraint on the wholesale price.

In relation to broadband access, NRAs in Europe have generally included DSL bit-stream access in their wholesale market definitions. But their analysis has differed substantially with respect to the inclusion of other technologies, such as cable TV networks that have been upgraded to provide a return path, satellite TV networks, or wireless technologies. While some NRAs (such as RTR (Austria), BNetzA (Germany), Anacom (Portugal), MCA (Malta) and Ofcom (UK) have considered that cable-based services formed part of the relevant market, other NRAs, such as Arcep (France), and PTS (Sweden) have excluded those services in defining the market and have chosen to consider pricing constraints at the subsequent stage of dominance assessment.<sup>74</sup> In Belgium, BIPT excluded cable television services from the relevant product market.

The NRAs which did not include cable in the relevant market generally started their analysis too ‘mechanically’ at the wholesale level. They reasoned that since cable networks did not provide wholesale access, cable-based services could not be included in the broadband access market. According to this view, there is simply no “direct” constraint on DSL wholesale broadband access products. We, however, note cable operators – Numericable in France and Melita in Malta – have provided wholesale access on commercial terms.

In contrast, those NRAs that did include cable in the market, focused first on competition at the retail level. They concluded that, from the demand side at the retail level, all broadband access services belong to a single product market, whatever the platform used at the wholesale level. They also concluded that the indirect pricing constraints exercised by cable-based services at the retail level have a sufficiently significant impact at the wholesale level to justify their inclusion in the wholesale broadband market.

<sup>73</sup> A modified Greenfield approach takes account of non-SMP regulation and of SMP-related regulation originating in markets which are not a component of the value chain under review.

<sup>74</sup> Cave, Martin, Stumpf, Ulrich and Valletti, Tommaso, Review of the Commission’s Recommendation on Relevant Markets Subject to *ex ante* Regulation, Report prepared for the European Commission, July 2006.

The question therefore is not so much ‘whether’ indirect constraints and self-supply must be taken into account in the market analysis, but rather ‘when’, i.e. at the stage of defining the relevant market or in the subsequent stage of market power assessment, and ‘how’ to take them into account.

In a wholesale market, the competitive constraints faced by the input suppliers are particularly challenging to assess. A supplier to the wholesale (or upstream) market is constrained ‘directly’ by other firms that operate at the same level. The supplier may, in addition, be ‘indirectly’ constrained by competition on the retail (or downstream) market.

While European competition case law clearly prescribes that indirect constraints at the retail level *must* be taken into account, it currently seems to provide no clear guidance as to whether indirect constraints should already affect the delineation of the relevant market. In particular, the *Market Definition Notice* seems to put the emphasis more on direct constraints, namely on substitutability, and not so much on overall competitive constraints.

In the context of DSL, a provider’s wholesale services are the only ones on the market. It then appears that there is no direct competitive constraint which could force the DSL operators to offer network access and/or prevent them from raising wholesale prices above a competitive level. This, however, could represent a misleading picture of the competitive dynamics given that other entrants (such as cable operators) have invested in network build-out, and self-supply means that these entrants are not dependent on DSL incumbent operators’ wholesale inputs.

Indirect constraints affect the market power of upstream firms by making derived demand *more* elastic. Suppose that the DSL incumbent operator were to push up the upstream price. If there were no vertically-integrated rival (e.g., cable), all competing downstream firms would be equally affected by this increase in their costs. In contrast, if one downstream firm (e.g. the cable operator) can rely on self-supply, then this firm will now have a competitive advantage because it does not face the same price increase. It thus takes away market share from non-integrated firms following an increase in the wholesale price.

Derived demand on the wholesale market becomes more responsive (that is, more elastic) in the presence of vertically-integrated firms. The following factors affect the elasticity of derived demand:<sup>75</sup>

- *The price elasticity of final demand.* The higher the elasticity of final demand the higher the elasticity of derived demand.
- *Competition in the downstream market.* Indirect constraints become more effective the more competitive the retail market is.
- *Competition in the upstream market.* Indirect constraints are relatively more effective the *less* competitive the upstream market is. If the upstream market is very competitive, the input price would already be very close to marginal cost and indirect constraints do not have a large residual role to play.
- *The cost share of the wholesale input in the overall price of the wholesale based retail product.* The higher the cost share the higher the loss at the wholesale level following a wholesale price increase.

An important warning is needed here: in relation to the last bullet above a very small cost share does not necessarily indicate a weak indirect constraint and, therefore, the ability to exert SMP. This

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<sup>75</sup> Inderst, Roman and Valletti, Tommaso, “A tale of two constraints: assessing market power in wholesale markets,” *European Competition Law Review*, vol. 27(2), 84-91, 2007.

reasoning would tend to derive very narrow markets for inputs, with a strong presumption of SMP in each one of them, especially - and somewhat paradoxically - if they account only for a small share of the final price. Instead, the wholesale price may be already small because of strong direct constraints on the wholesale market.<sup>76</sup>

If the indirect pricing constraint from retail demand substitution is found to be strong enough, self-supply of competitors *and* the DSL incumbent should be included in the relevant wholesale market. If the indirect pricing constraint from short-run retail demand substitution is not strong enough to be reflected in the market definition, it may still have to be taken into account in the market analysis in the longer run as a factor limiting the market power of DSL incumbent operators.

We conclude that, because of indirect constraints, other fixed access including cable and potentially wireless access products should be put in the same wholesale market as DSL products. The product market thus consists at least of traditional telecom loop-based and cable-based wholesale broadband access provision at a fixed location. At the very least, self-supplied wholesale cable products must be accounted for.

Consistent with the modified Greenfield approach, we need to define the scope of the relevant market absent the imposition of SMP remedies at the level of the market being reviewed. That is, when reviewing the wholesale broadband access market, we cannot assume the presence of wholesale broadband access remedies already imposed as a result of previous findings of SMP in the market.

We proposed, in our retail market definition, that, where it is offered, cable-based broadband access imposes a sufficient constraint to be included within the same market. With no regulation, cable companies would provide services on their cable network and the incumbent on its copper network. It is also very possible that the incumbent would make wholesale products available.

What would happen in the wholesale market if *no* remedy was in place. Would access seekers disappear? Or would instead a wholesale market emerge? If wholesale products were provided voluntarily, an access seeker would be able to use these inputs to meet retail demand and compete with the incumbent and cable firms. Hence, even if the wholesale products were differentiated by speed, they would be subject to a direct common pricing constraint as well as an indirect demand-side substitution constraint from the retail level.

There is a reasonable prospect that the incumbent would still supply access seekers. The values of the cross-price elasticities should show that the offers of access seekers compete both with the incumbent and with cable operators. Hence it would be a mistake to assume that access seekers only cannibalise the incumbent's offers. On the contrary, they also expand the overall market, besides offering products that consumers see as substitutes to cable's offers.

Finally, the fact that cable is currently not supplying the wholesale market is not evidence of absence of direct constraints in the wholesale market. Rather it may reflect a perception by the cable operators that: they would become subject to regulation if they offered wholesale access; and there are currently limited wholesale margins (due to regulation).

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<sup>76</sup> Note that this could also be the case – even in absence of strong direct constraints on the wholesale market – due to the effect of strong existing wholesale price regulation.