

**PUBLIC CONSULTATION ON THE  
REGULATORY APPROACH TO  
NEXT GENERATION ACCESS  
NETWORKS (NRA)**

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## Executive Summary

Substantive changes are being seen, at both a national and European level, in electronic communications networks. These changes are initially taking place in the “core” network (i.e., in the traditional network, the part of the transport network which interconnects the various local exchanges), known as NGN<sup>1</sup> and, in a second phase, in the access network, designated as NGA<sup>2</sup>.

These changes have the aim of responding to various combined phenomena, including:

- The growing need for broadband by users of services based on IP protocols, driven in great part by the growing adoption of “*triple-play*” services where image assumes a primary position;
- The substitution of the importance of asymmetric bandwidth (dominated by the “*downlink*”) by progressively symmetric bandwidth, particularly as a result of the growing popularity of the collective forms of Internet use;
- The decline of the business model traditionally associated with copper networks, arising from the migration of voice services to the mobile network and the apparent fact of the limit of technical possibilities having been reached, in terms of “extracting” bandwidth from the copper pair.

This evolution of access networks could take on various configurations, whereby it may be phased, starting with the reduction in the length of copper pair loops (connecting the secondary access points closest to the end customer, where DSLAM is installed, which are in turn connected to the originating exchange with fibre optic), and leading to solutions where the loop may be totally constituted in fibre optic (the solutions known as fibre to the home – FTTH<sup>3</sup>). The different solutions are associated with different levels of investment and bandwidth provision to the final customer, while having the use of fibre optic in the access network in common, to a greater or lesser extent depending on the approach taken.

In geographical terms, the different solutions can co-exist, with the expectation that FTTH solutions will be developed essentially in urban zones and areas of high population or company density.

The implementation of these solutions brings a set of challenges:

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<sup>1</sup> “*Next Generation Networks*”.

<sup>2</sup> “*Next Generation Access*” .

<sup>3</sup> “*Fibre To The Home*”.

- Firstly, in the definition of the underlying business model and the necessary capacity for raising the funds needed for the investment that would allow implementation;
- Secondly, in the technical capacity for carrying out the large scale implementation of networks with different characteristics from those seen in the recent past, which were seen – with the exclusion of cable distribution networks – in wireless networks;
- Thirdly, in view of the fact that the issue concerns significant changes that are in a market (still) subject to ex-ante regulation, according to the responsibility of the sectoral regulator, there is a need to assess the implications of these changes for the market and its protagonists carefully, ensuring that regulation is directed at the promotion of investment and innovation, while not losing sight of the key objective of promoting competition. The present public consultation focuses essentially on this third challenge.

In Portugal, PT Comunicações has an access network, which covers the entirety of the national territory, consisting mainly of copper pairs and with advanced functionalities in terms of IP Protocol<sup>4</sup>. In view of the dominant position which it has in various electronic communication markets and its quality as basic network concessionaire, PT Comunicações is currently obliged to provide access to its network, at various levels, according to reasonable conditions as regulated by ICP-ANACOM. As far as the access network is concerned, it is worth noting the wholesale offers of the company for conduit access<sup>5</sup>, access to the local loop and the wholesale supply of broadband access, which have had a determinate role in the affirmation of competition in the electronic communication markets.

It is natural, in view of the market and technology developments seen and forecast, that it will be necessary to put conditions in place for the evolution of the current access network to NGA. However, it must be considered that the development of NGA, depending on the solution adopted, may have implications for these regulated offers, while a guarantee is needed that efficient investments already made by the operators, especially with respect to the local loop offer, are not compromised.

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<sup>4</sup> Currently all exchanges of PT Comunicações have ADSL access available, which, with the limits stemming from the length of the local loops safeguarded, allows it be affirmed that this service is available in the entirety of the national territory. Even with respect to longer local loops, it is noted that on 26 June 2006 a protocol was signed between the Government and PT Comunicações, with the aim of defining procedures for the financing of the investment necessary for the satisfaction of requests for broadband access in zones where access is difficult.

<sup>5</sup> It is noted that access to conduits results from its status as concessionaire, as set out in article 26 of the Law of Electronic Communications – Law no 5/2004 of 10 February.

Accordingly, one of the key questions which needs analysis, from a regulatory standpoint, with respect to the evolution to NGA, is how to achieve the objective of reconciling the promotion of investment in these networks and the maintenance of the level of competition in the market, through the development of a clear, transparent and consistent regulatory approach with respect to the envisaged, which are not currently stabilised.

At a European level, the discussion on this issue began with the announcement of investment plans in NGA, essentially, on the part of certain incumbent operators (even though some alternative operators have had a fundamental role in the development of NGA, as occurred in France) and, more recently, with preliminary positions of some regulators, reached in the scope of public consultations<sup>6</sup>.

It should be noted that the current regulatory framework allows the issue of NGAs to be addressed, although the application of this framework to NGAs may have certain specifications associated with it, whereby:

- Current regulation provides for a progressive framework of liberalisation of the electronic communications sector, where access to the copper network of the incumbent operator with significant market power identified as a result of analysis carried out, in particular, in respect of the wholesale provision of access to the local loop and broadband access, constitutes a fundamental instrument for ensuring a greater degree of competition;
- With the development of NGAs, access to the copper network of the incumbent operator gradually loses its importance, insofar as the copper pairs are replaced by fibre optic pairs, while access to the conduits and infrastructure inside customer premises will assume a particularly relevant role in their installation.

Consequently, at a European level – and without prejudice to possible consideration of NGAs as potential natural monopolies – the discussion on the focus of regulation with respect to NGA has had three prongs:

- Access to conduits and infrastructure in buildings as a means of facilitating NGA development and the promotion of appropriate competition in this new reality;
- The transition between the current situation, in which competition in the market is ensured, in great measure, by access to the local loop, and the envisaged situation;

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<sup>6</sup> Regulators of the following countries have launched public consultations or taken a public position: Germany, Austria, Belgium, Spain, France, Holland, United Kingdom and Sweden.

- Consideration of the access to the local sub-loop, particularly with possibility of co-installation in street cabinets, or of “*bitstream*” wholesale offers in function of adopted technical solutions.

Portugal – it is important to note – embarks on this debate from a privileged position, given that it is one of the few European countries where access to the conduits of the incumbent operator is regulated – with prices defined and linked to costs and with indicators of quality of service, whereby there is provision for the payment of compensation in the event of non-compliance -, which process was instigated in 2004. The existence of a regulated offer of access to conduits is in itself an important facilitator for the country’s transition process to NGAs, in that it may facilitate the installation of fibre optic in the access network by alternative operators<sup>7</sup> in determined areas and where there are no technical or other impediments.

Without prejudice to the importance of the reference conduit access offer in a context of NGA development, it must be stated that ICP-ANACOM is aware that a significant investment effort needs to be made, which shall always have to be analysed in view of the market to be served, which has revealed mixed characteristics with respect to the sign up to new services, which range between cases of high rates of sign up – as highlighted by the success of mobile offers (voice and broadband) and television – and certain difficulties of adoption, being essentially a consequence of the characteristics of social development still present in the country.

In addition, there are other measures which must be given due consideration, in order to facilitate the development of these networks and ensure high levels of competition.

As an example of these issues, we have the evaluation of ways to ensure:

- The continuity of models based on the LLU, while there is dominance by PT Comunicações with respect to access markets;
- Greater transparency and predictability so that the various market agents might take informed and timely investment decisions;
- The more speedy development of networks, especially through incentives for access to the infrastructure of public or semi-public bodies as well as access to the public domain, in respect of which the role of the State may be important;

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<sup>7</sup> The reference conduit access offer (RCAO) has been in force since 14.06.2006, despite having been the object of court actions by PT Comunicações.

- The resolution of potential constraints on the development of the NGAs, including those associated with access to building and urban developments, which take on a fundamental importance in terms of FTTH.

The next generation networks will represent, according to the potential that they bring, a challenge for Portugal and the Portuguese. It is therefore necessary that the various aspects of this challenge be duly set out and considered, with the broad participation of stakeholders in this process. Such is the intention of the present public consultation, which should bring important contributions, in order that it might be possible, in a timely manner, to design a regulatory policy which will allow the objectives set out above to be accomplished.

In terms of structure, this consultation begins with the introductory chapters, where the factors which form the basis of the need for evolution of the access networks are identified and where the objectives of the consultation are clarified. This is followed by a chapter describing the access networks in Portugal and, in particular, the network of PT Comunicações. The third chapter identifies the various types of generic solutions for the evolution of traditional networks for NGA and the solutions already put forward by certain incumbent European operators. This chapter also covers the alterations to be introduced by PT Comunicações in the Portuguese network access.

This is followed by a chapter with discussion of the technical and economic impact of the various solutions associated with the evolution to NGA.

Finally, analysis is made of the NGAs in the context of the relevant markets and the last chapter describes the regulatory situation in Portugal, the role of the State and the implications on the regulated offers of the evolution to NGA.

In this framework, various questions are put to the market and its various stakeholders (including operators, users and manufacturers) through the present consultation including questions on the following aspects:

- Evolution in the demand for networks and services and the implications in terms of provided bandwidth;
- Technical solutions envisaged for the implementation of the NGE and their constraints;
- Consequences for the current networks (supported in copper pairs) and the measures necessary to safeguard the investments already made.



- Models of NGA development and the role of the various stakeholders in its implementation – business plans, investment return and competition safeguards;
- Role of the State, of local and regional initiatives and of public-private partnerships;
- Specific regulatory measures: their suitability, necessity and opportunity; evolution of current wholesale offers with respect to access to conduits, the local loop and broadband bitstream access; and the scheme governing access to infrastructure inside buildings (ITED).

# 1 Introduction

Over recent years, important developments have been seen in the electronic communications market, especially growth in:

- Demand for higher speeds;
- Demand for and provision of “triple-play” services (and “quadruple-play”, including mobile services), including, besides voice and broadband Internet access, video services (e.g. IP-TV<sup>8</sup>, HDTV, VoD, interactive TV and video-security) and potential future services such as 3D applications and “Home Theatre”.
- Demand for upload capacity for the provision of personalised content by users, due to alterations in usage patterns, including greater interactivity and the spawning of social networking based on the real-time sharing of multimedia content, video calls and games, use of “peer-to-peer” functionality and instant message services, giving rise to the need for “ever increasing symmetric bandwidth”;
- Trend towards the convergence of services and use of multiple simultaneous applications, offered on any one of the technological platforms, whether mobile or fixed,

and in terms of infrastructure and technologies;

- The use of IP supported packet switching technologies, which are seen as the catalysts for network and service convergence and which allow the operational costs of the networks to be reduced;
- The use, by operators of their own infrastructure (e.g. with recourse to the local loop) and complementary technologies, in order to better address the various market segments and cover distinct geographic zones;
- The significant investment in quality of service (QoS) in terms of network parameters and, fundamentally, network bandwidth, in order to satisfy demand for the new services of the Information Society<sup>9</sup>;
- The appearance of more stable technology in terms of standardisation (e.g. VDSL, MPLS or SIP).

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<sup>8</sup> See definitions and acronyms in the Glossary in Annex.

<sup>9</sup> Especially, access to the Internet and the new multimedia services such as IP-TV and VoD.

Naturally, the evolution in terms of services and infrastructure is driven by the visible evolution in the needs of citizens. It may be argued that the offer of bandwidths in hundreds of Mbps or even Gbps is not currently essential for the general population, although it may be for certain companies which represent the fringes of the market<sup>10</sup>, which already have communication services at their disposal with large bandwidths.

On the other hand, the use of video and television images is one of the main reasons for anticipating an increase in the data transmission capacity of Internet access networks<sup>11</sup>, for both download and upload, seen as spanning diverse population groups and corporate and residential segments. This greater capacity will respond the requirements of:

- Entertainment for younger generations (e.g. online games) and older generations (e.g. IP-TV); and
- medical and family assistance to all the generations (e.g. paediatric tele-medicine or for the elderly as well as distance supervision and monitoring).

There will be effects which are expected to change demand for communication services and, consequently, stimulate the introduction of new services. In particular, the increase in broadband will facilitate the adoption of innovative services by residential and corporate users, and give impetus to the content industry. It will further provide improvements in corporate management, which, it is expected, will have a visible impact on productivity levels. Tele-working, e-learning and e-government will be among the areas which may be given impetus by higher capacity networks.

**Question 1:** What do you anticipate to be the potential needs of greater bandwidth on the part of final consumers, especially in terms of (new) services offered and downstream and upstream speeds?

**Question 2:** To what degree might the expected development in the data compression algorithms offset the need to increase bandwidth without compromising the necessary increase in data transmission capacity?

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<sup>10</sup>For example symmetric connection in excess of 100 Mbps may be necessary for image transmission or remote backups.

<sup>11</sup> The so called "Nielsen Law" states that Internet bandwidth grows by 50% per year.

This evolution has led to the development of Next Generation Networks (NGN), which have the capacity to provide, in an integrated form, a multiple set of multimedia services<sup>12</sup>.

In this respect, two levels of evolution can be identified in electronic communication networks with different implications for operators, regulators and consumers:

- On the one hand, the introduction of these packet switching technologies at a core network level, seeking gains in terms of scope and efficiency, as well as in the operation and maintenance of these networks<sup>13</sup>;
- On the other hand, the evolution in terms of the access network, that is the evolution to Next Generation Access – NGA<sup>14</sup>, with the necessary adaptation to satisfy the demand for new services and the bandwidth which they require<sup>15</sup>.

Various operators – copper network, cable and mobile distribution -, both at a global level and in Portugal, have already developed switching and transport networks (core) based on IP protocol, either replacing or complementing the PSTN network. However, the evolution in the access network, with respect to the traditional copper network of the incumbent operators, is starting on the first steps, especially with regard to the offer of IP-TV services.

With respect to the core network, it is a reasonable assessment that part of the investment in IP (NGN) has already been made and that, even while there is a need for new development in terms of capacity of QoS<sup>16</sup> in order to support new services or customers, efficiency gains (and gains in scope and even scale) will allow costs per customer<sup>17</sup> to be kept within limits or even reduced.

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<sup>12</sup> According to Recommendation “Y.2001 (12/2004) – General overview of NGN” of the ITU-T (see Glossary), a Next Generation Network is a packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.

<sup>13</sup> Allowing transport and switching of traffic on the same network with different characteristics and needs..

<sup>14</sup> NGA - “*Next Generation Access*”.

<sup>15</sup> The mobile and copper networks were initially developed to carry services with narrow band and/or reduced requirement in terms of QoS and capacity. This fact, together with the different conditions in terms of geography, the existence of access infrastructure (e.g. conduits), alternative networks (e.g. cable and wireless distribution networks), the strategy of operators and supplies, have a large impact on future solutions to be adopted in the development of (new) access networks. An NGA may consist entirely of fibre optic, part in fibre optic, part in coaxial cable or in copper (with DSL technology), of coaxial cable, of radio technologies or a combination of these solutions.

<sup>16</sup> For example, with the introduction of IP/MPLS solutions.

<sup>17</sup> It is recorded that ICP-ANACOM, as part of the “Public consultation on VoIP and opening of related numbering range” stated its position on various issues, including on the provision of VoIP services and Interconnection (Universal Service), quality of service and legal interception of calls with respect to IP networks

Furthermore, aspects connected to security and emergency may be raised, which are important for the defence of the citizen interest, while analysis must be made of whether there are significant aspects that need safeguarding in this respect, arising from the evolution to NGA.

**Question 3:** Do you see, at the level of the NGA, any aspects related to security and emergency issues which merit particular attention?

These developments on the initiative of the operators are positive, for both consumers and companies. In this respect, note should be made of the impact of these developments in terms of access to (new) services and the provision of investment.

It falls to the regulator to find a balance between creating a regulatory environment which allows this level of competition between infrastructure and its responsibility and duty to ensure that such initiatives are compatible with the levels of competition already present in the market, which levels arose in great part from regulatory interventions with respect to obligations imposed on undertakings with significant market power, including the provision of wholesale offers.

In fact, if investments in the core network do not have a great impact on the market in terms of competition, given that the changes in this network, namely the introduction of IP technologies, will not significantly affect regulated services<sup>18</sup>, the same might not occur with the changes arising as a result of the evolution to NGA. This is because this evolution and the solutions found may have a significant impact on investment decisions and on the viability of the offers of operators and service providers (OSP) whose services are supported on the access network of the incumbent operator, particularly resorting to the local loop offer.

## 1.1 International Context

In Europe, the European Commission (EC) and the National Regulatory Authorities (NRAs) are debating issues connected to NGN/NGA and their impact on the markets with regard to

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(and services). It is noted that the material relating to the core network (including interconnection), services and application, while relevant, will not be dealt with in depth in this document.

<sup>18</sup> Or such alteration may be easily accommodated in regulated services.

the importance of a stable and predictable regulatory framework which provides for investment and competition and preserves the interests of users<sup>19</sup>.

To this end, the EC has referred that the development of the NGAs alters the competitive environment in various markets, including the markets of unbundled access to the local loop and the wholesale supply of broadband access<sup>20</sup>.

The Recommendation of 17 December 2007<sup>21</sup> on relevant markets subject to *ex-ante* regulation, has altered in general terms, and in respect of the Recommendation which was until then in force, the framework relative to markets underlying the NGAs, including the extension of the scope of the market of local loop access to include access to (any) infrastructure, including conduits<sup>22</sup>.

Furthermore, the EC is working in conjunction with the European Regulators Group (ERG) on the analysis of these issues, with the aim of preparing a Recommendation on NGAs, which is expected shortly.

Meanwhile the ERG published two documents in 2007 on this issue: one on IP interconnection<sup>23,24</sup> and the other on the regulatory approach to the NGAs<sup>25</sup>. As stated by this group of regulators, the developments at this level are very important, both for increasing competition and the development of the internal market, and for bringing direct and significant benefit for users (including through the provision of innovative services), objectives which are essential in the community regulatory framework.

The common position document of the ERG on the regulatory approach to the NGAs addresses issues (technical and economic) of NGA implementation on the fixed networks

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<sup>19</sup> The developments in the direction of such next generation networks which have given rise to the most debate at an international level are those in the United Kingdom (BT 21CN) insofar as the core network is concerned, and in Holland and Germany (KPN/DT), insofar as the access network is concerned.

<sup>20</sup> See, for example, commentary of the EC on the notification of said markets made by BNetzA, the German regulator, available at

[http://circa.europa.eu/Public/irc/info/ecctf/library?/=germany/registerednotifications/de20070646/de-2007-0646\\_enpdf/EN\\_1.0\\_&a=d](http://circa.europa.eu/Public/irc/info/ecctf/library?/=germany/registerednotifications/de20070646/de-2007-0646_enpdf/EN_1.0_&a=d).

<sup>21</sup> See [http://eur-lex.europa.eu/LexUriServ/site/en/oj/2007/l\\_344/l\\_34420071228pt00650069.pdf](http://eur-lex.europa.eu/LexUriServ/site/en/oj/2007/l_344/l_34420071228pt00650069.pdf).

<sup>22</sup> The EC further clarified a set of related issues, including the definition of emerging markets, with the consideration (or not) of the internal supply in the definition of the relevant markets and in the assessment of PMS or whether the currently imposed obligations be maintained, whereas its alteration or elimination implies a new analysis of the market concerned. Additionally, the scope of the wholesale market for broadband access was extended to encompass virtual access to the network.

<sup>23</sup> See [http://erg.eu.int/doc/publications/consult\\_ip\\_interconnection/report\\_ip\\_ic\\_interconn.pdf](http://erg.eu.int/doc/publications/consult_ip_interconnection/report_ip_ic_interconn.pdf).

<sup>24</sup> See ERG communication on the new public consultation on IP/NGN interconnection, available at [http://erg.eu.int/doc/publications/consult\\_ngn\\_2008/erg\\_08\\_26rev1\\_consul\\_ip\\_ngn\\_080604.pdf](http://erg.eu.int/doc/publications/consult_ngn_2008/erg_08_26rev1_consul_ip_ngn_080604.pdf).

<sup>25</sup> See [http://erg.eu.int/doc/publications/consult\\_reqprinc\\_nga/erg\\_cons\\_doc\\_on\\_req\\_princ\\_of\\_nga.pdf](http://erg.eu.int/doc/publications/consult_reqprinc_nga/erg_cons_doc_on_req_princ_of_nga.pdf).

and the regulatory implications, also taking into account the recent developments in the copper and fibre optic networks in certain European countries such as Holland and Germany.

In the current regulatory framework (defined in a context where the dominant technology is circuit switching) it falls to the NRAs to provide a regulatory framework which neither imposes nor excludes the use of any one type of technology. In theory, and from the point of view of technological neutrality, the way in which a service is provided loses relevance, given that, for example, voice can be supported by circuit switching or packet switching technologies.

It should be noted that, distinct practices have been adopted in a community context with respect to VoIP<sup>26</sup> and the NGN/NRAs, reflecting the complexity of the problems involved and the potential specification of the market in the different Member States.

Accordingly, given that, in Portugal and in Europe, NGAs are still in the first stage of development and there is not yet a wide degree of harmonisation in this matter, it is important from the outset to develop a transparent, coherent and consistent regulatory framework with as much predictability as the rate of innovation allows and which, at the same time, provides incentive to all operators to invest. These aspects will be further addressed in the section on the objectives of the consultation.

This consultation therefore comes at a time when, at a community level, concerns are emerging about this issue and when, besides the common position of the ERG referred to above, the majority of European regulators have not set out a position on their approach to the NGAs, for which solutions have still not taken shape.

## **1.2 Consultation objectives**

The objectives of ICP-ANACOM, as enshrined in article 5 of the Law of Electronic Communications, Law no 5/2004, are to contribute to the development of the internal market of the European Union, to promote competition in the offer of electronic communication networks and services, resources and associated services and protect the interests of citizens<sup>27</sup>. In the pursuit of this objective, ICP-ANACOM shall, in particular, ensure that there is no discrimination in the treatment of companies and no distortions or restrictions with respect to competition, in order to promote innovation and encourage efficient infrastructure investment.

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<sup>26</sup> See also the above mentioned ERG communication about IP Interconnection.

<sup>27</sup> See <http://www.anacom.pt/template20.jsp?categoryId=105319&contentId=180332>.

In these terms, ICP-ANACOM intends to ensure a coherent regulatory approach to NGAs that is consistent with the regulation objectives enshrined in law, particularly, the promotion of competition and the encouragement of the development of quality, innovative and diverse services, thereby ensuring that the interests of users are defended<sup>28</sup>.

ICP-ANACOM has to reach a compromise balanced between:

- The promotion of competition and the correct incentive for efficient and lasting investment, also taking the associated risks into account;
- The benefits which may be derived from investments in NGN/NGA, particularly in terms of competition, innovation and new services, social inclusion and the reduction of the digital divide.

Accordingly, in light of the fact that current developments in the access networks have given rise to various questions related to the issues raised above, the intention of the present consultation is:

- To start the debate and gather contributions from all stakeholders, in order to identify possible adaptation in the regulation of wholesale products in the light of the expected evolution in access networks and to instil an appropriate, transparent and consistent regulatory approach; and
- To compile updated information – beyond the information compiled through the study on NGN<sup>29</sup> being developed – on the potential plans for the evolution towards NGA, which permits this Authority to better carry out an assessment of its impact on the market and which enables informed and timely action.

This is in order to promote competition in a sustainable form and to allow operators to take more informed investment decisions.

The present consultation will focus fundamentally on the developments in terms of the fixed access network, given that the majority of regulated products are supported using the fixed network of the incumbent operator, while on fixed core networks and even other networks, such as mobile or cable distribution networks, the main change appears to be, as previously outlined, the introduction of IP technology to support any type of service.

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<sup>28</sup> Fundamentally, residential or SME, given that the majority of larger companies are currently served by tailor-made solutions, supported by high-capacity fibre optic networks.

<sup>29</sup> See Determination of ICP-ANACOM of 10 October on the “Consultation for study on next generation networks (NGN)” at <http://www.anacom.pt/template31.jsp?categoryId=255622>.



Therefore, the debate centres on the adoption of fibre optic on the fixed access networks, whereby, without prejudice to the relevancy that the conceptualisation of the NGAs in the diverse range of associated support technologies has (especially for operators), the document focuses, hereafter, on the alternatives to and implications of the development of fibre optic fixed access networks.

Therefore, it is considered fundamental to prospectively analyse the developments with respect to NGA investment, particularly in fibre optic infrastructure, in terms of its scope and its impact on the current networks and offered products, as well as the regulated wholesale access products, such as the offers of access to conduits (ORAC), to the local loop (ORALL) and to broadband (“Rede ADSL PT”<sup>30</sup>)<sup>31</sup>. It is noted that the necessary evolution in the network, fundamentally in terms of access, might have implications both for the investments already made by operators in the OLL – which ANACOM does not wish to put at risk -, and in future investments and in the expansion of their networks.

In this context of transition, the intention is to define a regulatory approach to NGA which provides market agents with a degree of certainty, especially in the short and medium term<sup>32</sup>, and which allows innovative retail offers to be developed at competitive prices and with the widest possible coverage, guaranteeing at the same time competitive conditions so that operators may continue to develop their activity. Such an approach must follow the principle of restricting regulatory intervention to the minimum that is strictly necessary, to resolve identified constraints that cannot be surmounted by other means. That is to say, any obligations need to be appropriate to the identified problems, proportional and justified in the light of the basic objectives set out in article 5, as cited above, of Law no 5/2004 of 20 February.

It is noted however that it is not the intention of this document to substitute the process of market analysis, given that, in accordance with the current regulatory framework, it is essential that a regulator is able to impose, maintain, amend or suppress any obligation on an undertaking with significant market power in a given market.

ICP-ANACOM seeks contribution from all parties with an interest in this subject, sent where possible by email to *consulta\_nra@anacom.pt*, but otherwise by traditional means, in order that responses received may be published<sup>33</sup>. For such purpose, interested parties are

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<sup>30</sup> Reference wholesale offer “Rede ADSL PT”, hereinafter RAPT.

<sup>31</sup> Other products, such as pre-selection or ORLA, or retail or wholesale markets are not analysed by this consultation.

<sup>32</sup> Period for the migration from current networks to NGA.

<sup>33</sup> On the website of ICP-ANACOM, at [www.anacom.pt](http://www.anacom.pt).

asked to supply all information which they consider relevant, clearly indicating anything in their responses which is considered confidential and, in such cases, providing a non-confidential version.

This Authority will take all contributions which it receives into consideration in function of the degree of reasonability of the ground provided. ICP-ANACOM will not be constrained, in respect of its future decisions, by the results of this consultation and will not consider such results to be binding.

The deadline for the receipt of comments is thirty working days.

## 2 Access in Portugal

In the first place, and without the intention of substituting an analysis of the market under the terms of Law no 5/2004 of 10 February, ICP-ANACOM will identify the networks currently available in local access and their respective development, and describe the national situation in terms of the traditional network. In subsequent chapters, assessment will be made of the implications and possible solutions in the evolution towards NGAs.

### 2.1 The access market

The main OSPs in the Portuguese access market and the relevant infrastructure and wholesale offers used are summarised below:

**Table 1.** Principal operators which predominantly have their own access infrastructure.

Example of operators	Predominant technologies
PT Comunicações	Twisted copper pair / fibre optic <sup>34</sup>
ZON Multimédia	Coaxial cable/ fibre optic <sup>35</sup> / DTH
Other cable distribution networks	Coaxial cable/ fibre optic <sup>36</sup>
COLT	Fibre optic
AR Telecom	Fixed wireless access (FWA)
Optimus / TMN / Vodafone / Radiomóvel	3G (UMTS) / CDMA

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<sup>34</sup> Especially in “backhaul”, in particular in the connection between the MDF/aggregation node and the local exchange.

<sup>35</sup> In the core network (from the CMTS).

<sup>36</sup> Ditto.

**Table 2.** Principal operators which predominantly have rented access infrastructure.

Example of operators	Relevant wholesale offers <sup>37</sup>
Sonaecom <sup>38,39</sup>	ORALL / "Rede ADSL PT"
Vodafone	ORALL
Other ADSL providers	"Rede ADSL PT"

A number of the operators mentioned above also use the reference conduit access offer (ORAC) to install access infrastructure.

It may be hoped that, given the number of operators with different network access offers, the access market would have to be relatively competitive. However, from the point of view of the offer of networks and services, it is seen that:

- Sonaecom, including the operations connected to the residential segment of ONITelecom and Tele2, and the other providers of ADSL services in the most part use the network of PT Comunicações to support their services;
- With the exception of ZON Multimédia, the operators of cable distribution networks, which include Cabovisão and Bragatel, Pluricanal and TVTel<sup>40</sup>, have a geographical coverage that is still limited, even while some of these operators have announced important expansion plans<sup>41</sup>;
- AR Telecom is currently expanding its network in the metropolitan areas of Lisbon and Porto, while not covering other areas of national territory;
- The coverage of the UMTS network of the mobile telephone service operators and, for the highest access speeds, is currently limited to the main cities, while the

<sup>37</sup> Reference offers of PT Comunicações.

<sup>38</sup> Operator which recently acquired Tele2 and the residential business (and SoHo) of OniTelecom, including the infrastructure of these two OLL beneficiary operators.

<sup>39</sup> Sonaecom recently announced an investment of 240 million euros over three years in an NGN which it said would be open to the access of other mobile and fixed operators. The retail offer of Sonaecom will be directed as much for the residential segment (broadband Internet and TV), as for the SME / SOHO segments (video-telephony, video surveillance, video conferencing; large-scale file sharing; virtual private networks; remote servers accessible at high speeds for storage, backup and CRM) and Corporate (including in particular the Public Administration). According to Sonaecom, the investment will cover a million houses and a quarter of the Portuguese population.

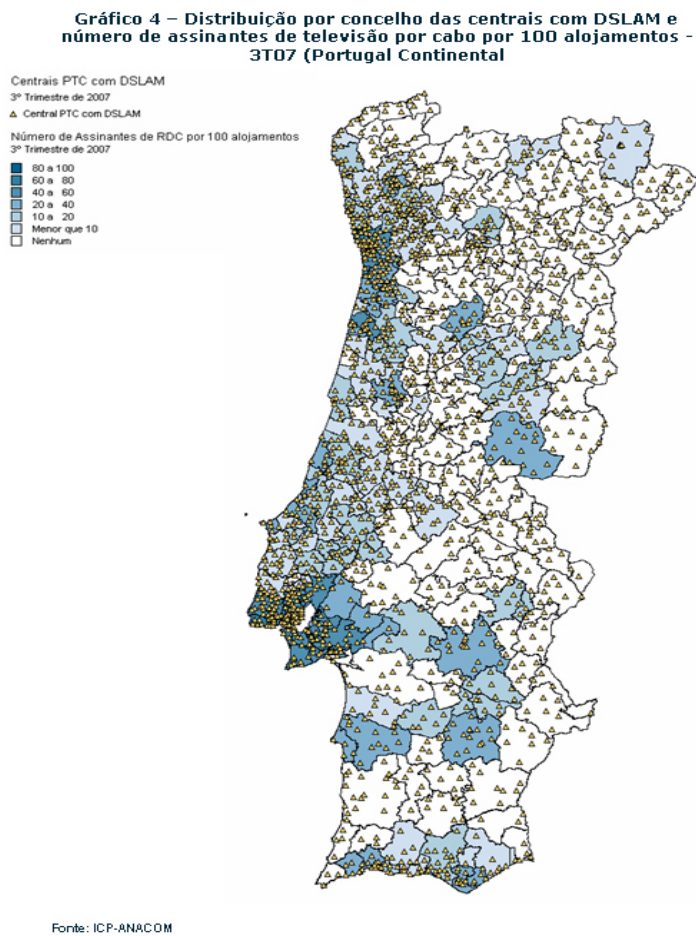
<sup>40</sup> ZON Multimédia recently notified Autoridade da Concorrência (the Competition Authority) of the agreements to purchase these last three cable network operators.

<sup>41</sup> Inclusively, TVTel has initiated an FTTH project in the zone of Carnaxide, with future expansion in the Municipality of Oeiras.

maximum speeds available commercially on these networks (7.2 Mbps<sup>42</sup>) is still substantially below the maximum speed available on the fixed networks (to the order of 24 Mbps<sup>43</sup>);

- The cable distribution network of ZON Multimédia has a relevant level of coverage, but is still inferior to the capillarity of the network of PT Comunicações, particularly in zones further from the metropolitan areas.

**Figure 1.** Distribution by municipality of DSLAM exchanges and the number of cable television subscriber per 100 households (Continental Portugal) – data from end of 2007.



<sup>42</sup> Recent offer which still has reduced coverage.

<sup>43</sup> currently 30 Mbps on the ZON Multimédia network but with very reduced coverage.

Accordingly, the network of PT Comunicações, in particular the traditional access network, in copper, is also a fundamental resource for the provision of services, especially broadband, to end users.

It is noted that the current mobile networks<sup>44</sup>, in their current state, will not be able to offer a bandwidth equivalent to that of the fixed networks and their shared character (as with the cable distribution networks<sup>45, 46</sup>) places more restrictions on the capacity to provide broadband.

BWA<sup>47</sup> (including WiMAX) may allow speeds of 40 Mbps for distances of up to 10km, with generalised use envisaged in the medium term, but above all in areas of lower population density<sup>48,49</sup>.

In any case, at this time, the wireless networks appear more suitable for broadband access over the “last metre” rather than “the last mile”.

**Question 4:** How do you see, in general terms, the competitive situation in terms of the access network in Portugal?

**Question 5:** How do you see the evolution of other access networks, including the coaxial cable network? Do you foresee this network (also) evolving to NGA, supported in fibre optic?

## 2.2 The traditional access network

Historically, the copper access networks were developed to support narrowband services, specifically voice services, and also with less demanding requisites in terms of QoS and bandwidth. Despite this, high levels of investment were needed for the extension of

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<sup>44</sup> High Speed Download Packet Access networks are evolving towards greater speeds, even up to 14 Mbps. However, HSDPA base stations need to be installed at reduced distance from the user (less than two hundred and fifty metres to reach a speed of around 1 Mbps) and for use shared between various users.

<sup>45</sup> With the “share” of spectrum on the coaxial cable access network.

<sup>46</sup> Even though, on the cable distribution networks, *RF Overlay* solutions allow the support of all type of video service (analogue, digital, HDTV and VoD).

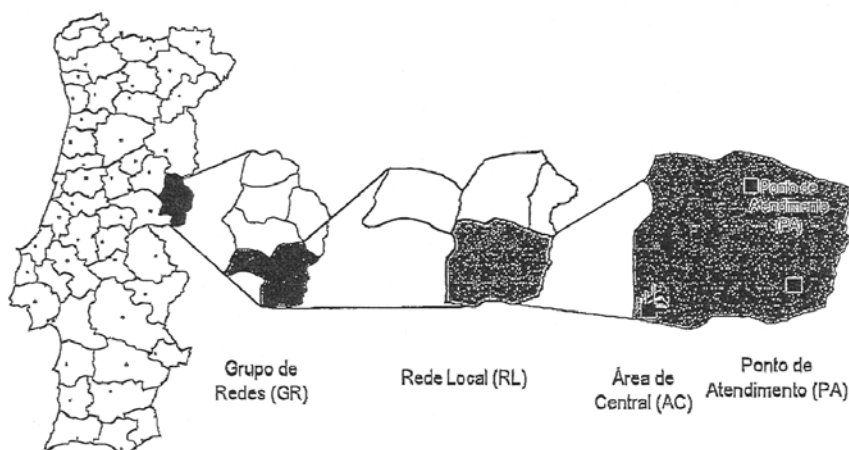
<sup>47</sup> See in this respect the consultation process on the frequency usage rights reserved for BWA, launched on 6 November 2007, at <http://www.anacom.pt/template15.jsp?categoryId=258131>

<sup>48</sup> In the European Union local wireless access is more widespread, above all in the Czech Republic (where Wi-Fi represents over a third of broadband accesses), in Slovakia (15% of broadband accesses), Ireland (15.5% of broadband accesses), Lithuania (with a “pre- WiMAX” network covering 70% of the population) and Estonia (with “WiMAX” network covering 60% of the territory). See OECD (2008), “Developments in Fibre Technologies and Investment” (Ref DSTI/ICCCP/CISP(2007)4/Final).

<sup>49</sup> See European Commission (2008). Progress report on the Single European Market of Electronic Communications in 2007 (13th Implementation Report).

capillarity to levels nearing 100% coverage of the population. Figure 2 provides a map with a model and concepts for the current public switched telephone network of PT Comunicações.

**Figure 2.** Model and concepts used by the switched telephone network of PT Comunicações (source: PT Comunicações).



In Portugal, there are 1853 exchange areas and around 2800 attendance points on the network PT Comunicações, according to data provided by the company.

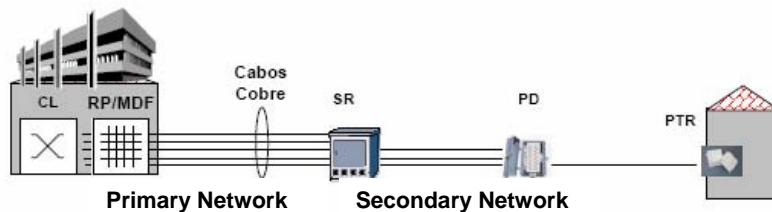
With respect to the access network – see General model in figure 3 -, there is currently a predominance of copper pairs (around 90%), especially in the residential segment, connected to main distribution frames (MDF) in the traditional local units of traffic aggregation on switching circuits. There is also a high number of remote units (RU) connected to the local exchange via fibre optic<sup>50</sup>, fundamentally in non-urban zones (or with areas of elevated coverage), where the copper cable lengths are greater, which requires that in these situations the MDFs have to be “moved” in the direction of the final customer<sup>51</sup>.

<sup>50</sup> In the majority of situations, access/traffic aggregation will be effectively performed in a remote switching unit, also located in a building (normally smaller) and connected to a local exchange via fibre optic transmission.

<sup>51</sup> The connection to the local exchange is still sometimes made using “specialised” RUs connected to local switching exchanges with voice multiplexers and/or data TDM

This evolution in terms of MDF/RU took place naturally as a result of the expansion of the access network, essentially in the 80s and 90s, while the concept of “Attendance Point”<sup>52</sup> was introduced more recently on the PT Comunicações network, with the effects (on the OLL) discussed in later sections.

**Figure 3.** General model of the access network in Portugal (source: PT Comunicações, Presentation of Access Networks to support Next Generation Services”, ICP-ANACOM Seminar, 09.10.2006)<sup>53</sup>.



More recently, different xDSL technologies have been used on the copper access network, including HDSL or SHDSL for terminal segments of rented circuits and ADSL<sup>54</sup> for broadband access. As such, on the PT Comunicações network, the majority of broadband accesses are also supported on copper pairs connected to DSLAMs<sup>55</sup>, which in turn are connected to the core network with fibre optic (e.g. Ethernet).

Accordingly, in Portugal, the current retail offers of broadband, voice and IP-TV are supported on the current architectures of the copper network, with the use of ADSL and ADSL2+ from MDFs and with a potential ADSL coverage for nearly 100% of lines, but (currently) less for ADSL2+.

The alternative operators have, in respect of the OLL, developed specific and innovative offers, especially in terms of “triple-play”. However, currently, these operators are co-installed in around two hundred MDFs of PT Comunicações, belonging, in the majority of situations, to exchanges located in urban centres (and, principally, in the metropolitan areas of Lisbon and Porto), which corresponds to a potential coverage of around 60% of the entirety of copper loops (see Figure 4).

<sup>52</sup> According to PT Comunicações, “Attendance Point”, is the designation given to a technical node/network point belonging to a given Exchange Area (EA) and covering determined geographical areas within the EX with the capacity to support FTS and ADSL services.

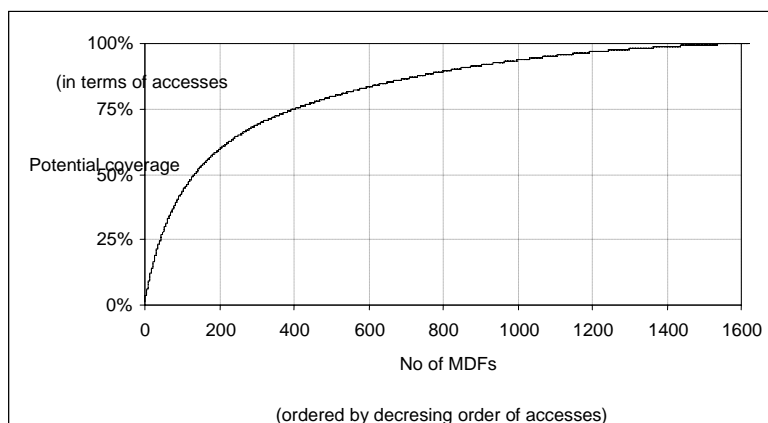
<sup>53</sup> See definition and acronyms in the Glossary.

<sup>54</sup> In its various modalities (e.g. ADSL and ADSL2+).

<sup>55</sup> “Digital Subscriber Line Access Multiplexer”.



**Figure 4.** Potential coverage in function of the number of MDFs.

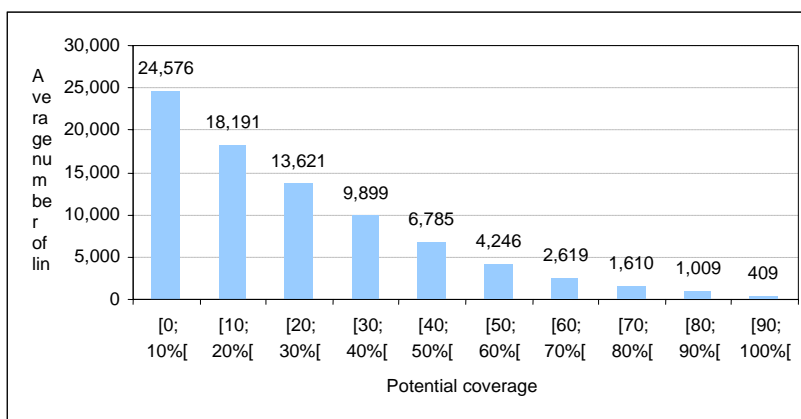


**SOURCE:** Analysis of ICP-ANACOM based on PT Comunicações data.

For example, from Figure 4 it can be concluded that an operator which wishes to increase potential coverage from 60% to 70% will have to co-install in 300 MDFs with a greater number of lines (representing an increase of a hundred MDFs compared to the 200 MDFs which provide 60% coverage).

In Figure 5 another relevant indicator is presented in terms of economic viability of OLL supported offers: the average number of lines connected to an MDF to ensure a given degree of coverage (in ascending order of connected lines).

**Figure 5.** Average number of additional MDF lines needed to ensure a given potential coverage.



**Source:** Analysis of ICP-ANACOM based on PT Comunicações data.

Despite the demands associated with OLL in terms of investment by the alternative operators, it is undeniable that this offer has contributed to an increase in competition and to the introduction of offers with greater speeds and new services such as IP-TV, thereby benefiting the final consumer<sup>56</sup>.

The alternative operators can also offer their broadband service at retail using the “Rede ADSL PT” (RAPT), wholesale offer, but with limitations imposed by the characteristics of a “*bitstream*” wholesale offer, especially in terms of classes of access (e.g. available bandwidth) and, fundamentally, in terms of managing the service itself, of associated functionalities and quality (QoS).

**Question 6:** Do you consider the current degree of coverage to be sufficient, in geographical terms, as well as in terms of diversity of OLL supported retail offers? Do you see any constraints on their increase?

**Question 7:** How do you envisage, the current reference wholesale offers in terms of the promotion of effective competition, of network development and of their coverage?

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<sup>56</sup> Since the beginning of the commercial offer of services supported by the OLL, the reference speed (i.e. the most used offer speed) of broadband products has increased from 512 Kbps to 4 Mbps, with the current maximum speed being 24 Mbps.

### 3 Evolution in the access network

In this section the aim is to identify some of main NGS architectures, so as to understand the possible evolution of the networks and the impact on regulated products. It is not an objective of this section to conduct a comprehensive analysis of all the technological aspects and all possible scenarios associated with the NGAs, nor is it the intention to restrict or impose a determined solution or technology.

For a significant number of customers not located near the exchanges, the current local copper access networks, sized initially to provide narrowband services, might not support offers of an operator which intends to provide bandwidths which significantly exceed those currently provided or the transmission of VoD services or of multiple television channels, especially if these were high definition (HDTV).

Therefore, the trend will be to move towards aggregating equipment (also designated as aggregation node, as for example, the DSLAMs) of customers, reducing the length of copper local loops (enabling the introduction of new technologies, e.g. VDSL2) and the number of customers per VDSL2 aggregation node.

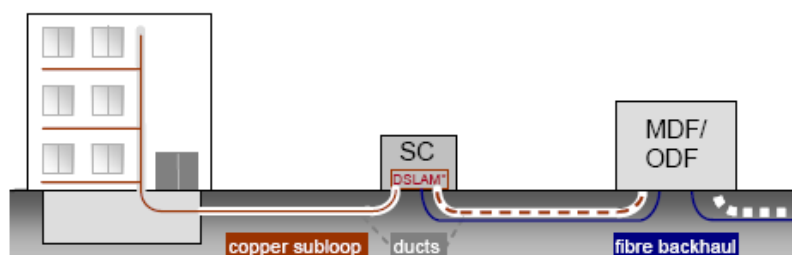
From the outset, two “extreme” types of architecture can be identified in the evolution towards NGAs:

- The installation of fibre optic from the building housing the main distribution frame to the sub distribution frame or street cabinet - (*“Fibre to the Cabinet”, FTTCab*), installed in this cabinet, or its proximity, DSLAM equipment with VDSL2<sup>57</sup> technology supported in copper infrastructure (see topology of this type of architecture in Figure 6);

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<sup>57</sup> This “first step” will allow, on the one hand, access to a point of access network that is closer to the customer, but allowing the spreading (potentially) of the costs incurred, both in terms of the street cabinet and the fibre optic, over a relatively high number of customers – although considerably less than the potential number of clients per MDF. On the other hand, the extension of the fibre optic to the street cabinet allows the suppression of the primary copper distribution network (from the MDF/CL), but may incur high costs due to the large number of existing street cabinets.

**Figure 6.** Diagram illustrating the FTTCab topology (Source: ERG).



- The installation of access solutions supported totally in fibre optic - (“Fibre to the Home”, FTTH<sup>58</sup>).

Between these two “extreme” solutions, which may not be definitive scenarios and may not be mutually exclusive, intermediate FTTx solutions may be developed, known as FTTN (Fibre To The Node), FTTC (Fibre To The Curb) and FTTB (Fibre To The Building<sup>59</sup>).

In practice, any operator (including the incumbent operator, alternative fixed network operators and cable distribution networks) may opt to install hybrid solutions, implementing FTTH on part of the network (e.g. in urban areas and FTTCab in other situations with DSLAM VDSL2), or by phasing the development of the network over time, starting with FTTCab and finishing with FTTH solutions.

The big differences between the two extreme scenarios, FTTCab and FTTH, therefore derive from the degree to which fibre optic is rolled out in the access network, which is extended, in the last scenario, to the final customer, and the bandwidth available to customers. Conceptually, if an FTTCab solution can support speeds of up to 50 Mbps<sup>60</sup> (with VDSL2, but only for short distances in copper, less than a few hundred metres – to a maximum of 300m), for higher speeds, or for longer loops<sup>61</sup>, the solution appears to be to extend fibre optic to the building or even the home of the customer.

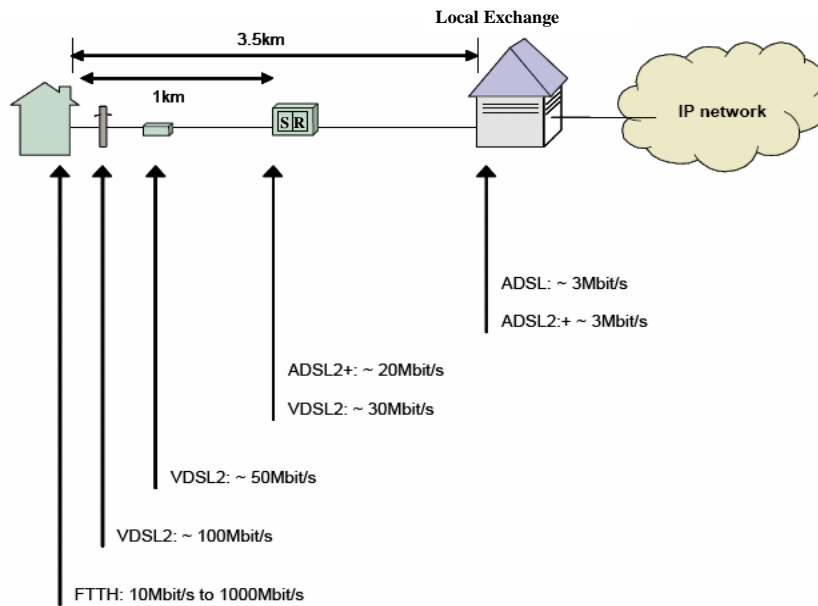
<sup>58</sup> “Fibre to the Home”. This currently occurs in Greenfield situations, that is new housing developments or even in large refurbishment of buildings (for example, of office buildings).

<sup>59</sup> Conceptually, an FTTN type solution will be closer to the FTTCab model described above and an FTTB solution will be closer to an “all-fibre”/FTTH model, as can be seen in figure 7.

<sup>60</sup> It is possible to achieve higher speeds (e.g. 100 Mbps with VDSL2), but in this case we will be close to an FTTB solution and not an FTTCab solution.

<sup>61</sup> For longer loops, with distances up to a thousand metres, VDSL2 technology may provide up to 25 Mbps, but these speeds are already available in current ADSL2+ solutions from local exchanges.,

**Figure 7.** The potentials of technology in function of distance to the customer (source: OVUM).

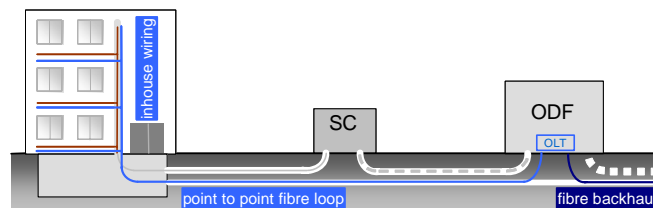


The FTTH (and FTTB) architectures can have various configurations:

- point to point;
- point to multipoint (known as PON<sup>62</sup>).

In the point to point configuration, there is a fibre optic connection dedicated to each user, from the OLT<sup>63</sup> situated at the level of the Optical Distribution Frame – ODF.

**Figure 8.** Diagram illustrating the FTTH point to point configuration (Source: ERG).

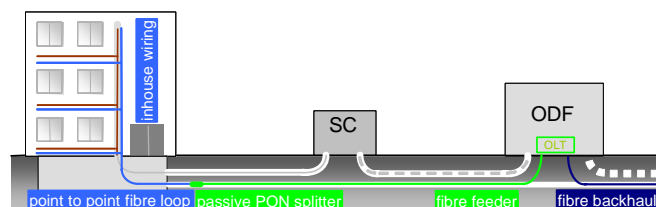


<sup>62</sup> "Passive Optical Network".

<sup>63</sup> "Optical Line Terminal Unit".

In the point to multipoint configuration a single fibre optic is installed between the OLT and an intermediate point where a passive splitter<sup>64</sup> is installed, and up to 64<sup>65</sup> dedicated fibre optics are installed from this point to each user.

**Figure 9.** Diagram illustrating the FTTH point to multipoint configuration (Source: ERG).



It is noted that in the FTTB/FTTH solutions, street cabinets are also needed to accommodate the ODF and/or “splitters”, although far fewer than is needed in a FTTCab solution (or with respect to the current network).

- Question 8:** How do you foresee the evolution in retail demand for services (new services or similar services with greater bandwidth)? Do you see relevant limitations in terms of increasing bandwidth that enables the provision of these services to final consumers?
- Question 9:** What type of technical solutions (e.g. point to point or point to multipoint) and what type of development in terms of extension of the fibre optic network (FTTx) do you consider to be more viable in function of evolution of retail offers, density and location of area served, as well as the topology of existing network?
- Question 10:** As a network operator and provider of advanced services, do you expect to advance with the implementation of these solutions based on NGA? If so, with what solution(s), in what timeframe and with what geographical extension?
- Question 11:** What technical restraints do you see in respect of coverage configuration choice and architecture for the various scenarios and solutions?

<sup>64</sup> Optic Multiplexer – passive equipment which allows the “insertion” or “removal” of wave length (i.e. communication channels) in a fibre optic.

<sup>65</sup> In the future it is expected that capacity may be expanded to 128 (or more) individual fibre optics.

There is also a variety of issues that the operators must take into account in the development of future NGA solutions, such as the equipment of the user - CPE<sup>66</sup> – and more technical issues at a network level, as for example, the compression technologies used and protocols or systems of QoS control. However these issues go beyond the scope of the present consultation.

### 3.1 Evolution in Europe

In general terms, Europe already appears to have a variety of planned or implemented NGA solutions<sup>67</sup>.

For example, in Holland, Italy and Germany, the incumbent operators have announced their intention to migrate their networks to NGA, with the dissemination of fibre optic in the primary network as far as the street cabinets. Even while opting for a common solution (FTTCab), the implementation is distinct in the various countries:

- In Germany, DT intends to make a phased investment in a limited part of the territory, intending to maintain the MDFs.
- In Holland, the coverage of VDSL2 will be for the entirety of the national territory, with KPN intending to dismantle the most part of main distribution frames and a swathe of infrastructure and buildings which house this equipment (around 1,400)
- In Italy, the incumbent operator is to adopt FTTH solutions in specific cases, adopting, in a general and gradual fashion, VDSL2 or G-PON (FTTB) solutions.

Other countries are in the most part opting for FTTB/FTTH solutions. This is the case, for example, of France where the incumbent operator (FT) proposed, in 2008, to extend fibre optic to around 1 million homes, in 10 cities, projecting further growth in 2009 and 2010, with the aim of developing convergent offers and fixed and mobile broadband access, seeking also to respond to the products of the competition (particularly those provided in Paris by Iliad-Free<sup>68</sup> and Neuf-Cegetel) and more recently in municipalities (e.g. Bordeaux, Nancy, Hauts-de-Seine, Seine Maritime, the Loire Region).

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<sup>66</sup> Even though the prices will tend to fall with the widespread adoption of these technologies.

<sup>67</sup> In other regions of the world (North America or Asia – Japan and Korea) there are already a significant number of consumer served by NGA

<sup>68</sup> Two of FT's main competitors will invest a total of 450 million euros between 2007 and 2009 in Paris, Lyon, Pau, Valenciennes and Montpellier, with a forecast of 250 thousand (Neuf-Cegetel) and 500 thousand (Iliad-Free) customers. Overall Iliad-Free aims to install fibre optic in 4 million households by 2012, using a point to point FTTH solution (with an estimated cost of 1,500 euros per house).

This does not mean, however, that FT will exclude the implementation of VDSL in rural areas, where for now it will advance with triple play offers with distribution of TV and VoD via satellite – DTH.

Also in France, Numericable (operator of cable distribution networks) is also developing its network, based on FTTx solutions, so that it might compete with the fixed network operators. At the end of 2007 its network already covered two million houses (which compares with FT's 146 thousand and the 120 thousand of Neuf-Cegetel)<sup>69</sup>.

While sketchy, this information allows it be seen that, even within the same country, there have been different implementations of NGA, depending on the specific conditions of each area.

In the United Kingdom, in February 2008, Openreach began a trial implementation of fibre optic access in the Ebbsfleet Valley region in Kent (installing FTTH in 10 thousand households) and from August 2008, will provide residential customers with broadband based on fibre optic and with a speed of 100 Mbps<sup>70</sup>.

In Spain, Telefónica is developing a pilot with VDSL2, the information on which is reserved to CMT and the operators.

The different approaches appear to arise, on the one hand, from the competition conditions in each country – for example in Holland there is strong competitive pressure from the operators of cable distribution networks, especially with respect to broadband products – and the demand for new services (and for more revenue by operators) and, on the other hand, conditions on the ground – greater or lower costs in the construction of infrastructure (lack of access to conduits, for example) or the existence of limitations on the access network (e.g. long loops)<sup>71</sup>.

A more detailed identification of these cases can be found in **Annex 1**.

### **3.2 Evolution in Portugal**

In Portugal, in the architecture of the access network there is currently an almost total predominance of the exclusive use of copper in the loops in use, connected to the main Attendance Points (PA) and with MDFs. Indeed the number of hybrid loops or loops wholly in fibre optic represents under 5% of the total loops.

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<sup>69</sup> According to IDATE data.

<sup>70</sup> An “equivalent” wholesale product will also be offered.

<sup>71</sup> Or, to the contrary, to the advantages of a given copper access network which is very capillary, with short loops, allowing wide coverage with ADSL2+ (current technology).



According to PT Comunicações, the creation of new PAs depends on the development of the network, resulting, in particular, from (i) issues of a demographic nature, (ii) urban development, and (iii) actions associated with the availability and quality of services, and taking into account the expected increase in the needs of traffic in broadband access<sup>72</sup>. To this purpose, the objective of creating new PAs may be to “reduce the length” of the loops, in order to improve the provision of broadband services. An increase in demand in a determined area may lead to saturation on the primary copper distribution network and, while it is neither technically nor economically viable to broaden the copper network, it makes sense to “decentralise” the access point, connecting them to the exchange of origin through fibre optic.

In this respect, PT Comunicações has embarked on some evolution on the network access, with a greater dissemination of the designated PAs (secondary) and the displacement of loops from the exchanges and between various PAs being of note. For this purpose, for 2007 and 2008, PT Comunicações has forecast the creation of some 100 new secondary PAs affecting some hundreds of thousands of loops in use (with FTS).

Such evolution might change the decision originally reached by operators on the viability of co-installation in a determined MDF to be altered, given the reduction in the number of loops associated with that MDF.

In this context, it appears necessary that the OSPs be provided with more information on the access network and on current development, particularly with respect to the creation of new PAs<sup>73</sup>. For this purpose the OLL beneficiary operators will not receive enough information for them to reach an understanding of the effective impact of the new PAs, or which allows them to plan, in an informed and consistent way, the development of their own networks and offers.

Accordingly, it is considered more appropriate that, in a phase of transition to NGAs, that PT Comunicações should inform operators, with reasonable notice, about expected

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<sup>72</sup> The creation of new PAs may result, for example, from the need to guarantee general broadband access, within the scope of the protocol which PT Comunicações made with MOPTC on 26 June 2006 (which aims to define procedures for the funding of the investment needed to satisfy the requests for access to broadband in less accessible zones), or from the need to ensure higher speeds, particularly for the support of IP-TV products.

<sup>73</sup> This imbalance is even more evident when it is seen that, under the ORALL, operators must provide PT Comunicações with extensive six month plans (2 six month periods) forecasting demand for all the exchanges where they are present or where they intend to be co-installed.

alterations to the network, particularly arising from the introduction of new PAs and/or MDF on their access network, as well as any more structural changes<sup>74, 75</sup>.

**Question 12:** Do you consider that there is sufficient information available on the access network (including PAs and hybrid or fibre optic loops) and on their short term evolution (in terms of network structure technologies and number of access points, etc.)? And what impacts do you see that this evolution will have on current offers?

In light of the current state of development of access infrastructure in Portugal, it is reasonable to assume that provision of retail products (at least) of the operators are supported by the OLL in the short and medium term. It is recognised therefore that the displacement of (more than) 10% of loops of a determined PA with co-installed operator constitutes a substantial alteration of the conditions which form the basis of the investment plans of the operators in that same PA.

If it is a fact that PT Comunicações should be able to develop an access network in accordance with its needs and plans of efficient investment, the equally efficient investments already made by operators on the OLL should also be provided for, otherwise these might be adversely affected, incurring the risk that efficient operators exit the market.

From the outset, a basic measure which could be taken to minimise the impact of these alterations, which could become structural and affect a large percentage of loops of a given exchange, is to extend the period of advance notice that PT Comunicações gives to the beneficiaries in proportion to this percentage. For example, one could set out a rule of the type<sup>76</sup>:

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<sup>74</sup> It is further considered that PT Comunicações should, similarly to that done with respect to the MDF, provide operators, under the scope of the SI ORALL, with information on the number of accesses connected to each of principal and secondary PAs, as well as on the number of fibre optic or hybrid loops.

<sup>75</sup> Illustration is made in this respect of the commitment arrived at in Holland through an agreement (supplied by the regulator) between KPN and the principal alternative operators. This involves KPD bearing the costs which these operators have in terms of migration from MDFs to the street cabinets, due to the *All IP* network modernisation plan of this incumbent operator.

<sup>76</sup> The obligations of PT Comunicações with respect to the sending of information is set out in the ORALL.

Advance notice of PT Comunicações of a minimum of<sup>77</sup>:

- 12 months, where less than 5% of the total loops are affected;
- 18 months, where less than 10% of the total loops are affected;
- 24 months, where more than 10% of the total loops are affected;
- 36 months, where more than 50% of the total loops are affected or where the actual exchange/MDF is dismantled.

**Question 13:** Do you agree with the rule proposed, especially with the different periods of advance notice of structural alterations to the access network of the incumbent operator? Do you consider other measures to be necessary? Which measures?

In November 2006, PT Comunicações stated that it was still evaluating the “*migration to a next generation convergent network architecture consubstantiated in the gradual introduction of access platforms which will be simultaneously aggregation nodes, Ethernet and multiservice access*”. The main factors associated with this migration are, according to the operator, the dimension, the complexity, the dynamic and the cost.

The scarcity of information on the strategy of the incumbent operator with regard to the evolution of the access network does not allow ICP-ANACOM to identify, from the outset and with the necessary detail or reliability, what the possible impact of this evolution might be – especially on wholesale access products. Even so it is envisaged that PT Comunicações and ZON Multimédia might prioritise, in the short term, the development of the current network infrastructure, in copper and coaxial cable, for the development of “triple-play” products (voice, data and video).

Moreover in June 2007, PT Comunicações launched a “triple-play” offer called Meo, whereas it was later stated that this offer would be present in exchanges (of the copper network) which supported at least 8 Mbps and that the rate of Meo installation may be slow for a mass market product. It further communicated, more recently, that it had launched an offer of satellite television services (DTH) and presented a proposal in respect of the tender of Digital Terrestrial Television (DTT)

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<sup>77</sup> It appears clear that, irrespective of whether or not prior notice is given, any loop already unbundled for an operator co-installed in a given exchange should not be displaced without the possibility of alternative access being ascertained; otherwise the final customer might lose the service of this operator or the operator will have to be co-installed in the new PA(s), even where not desirable, assuming also that this is viable, which may not be the case given the type of installation in which they are implemented.

## **4 The technical and economic impact of evolution towards NGA**

### **4.1 Investments**

The regulators seek to incentivise efficient investment which provides the most return and greatest benefit possible for society – operators and consumers, and not investment which may, even in the future, lead, in particular, to less competition or higher prices (for identical services) for consumers. In all cases, decisions to invest in NGA must be made by the investor (operators or other undertaking); while it falls to the regulator to ensure that its activity promotes efficient investment while maintaining desired levels of competition.

As previously stated, the evolution in the fibre optic network besides the core, coming closer to the end customer, might have implications for the investment of the operators already involved in offers supported in the unbundling of loops, including particularly investments made in the co-installation of the MDFs of the incumbent operator.

Additionally, these operators may be confronted with the need to make new investments if they have to connect (co-install) in a large number of points (either street cabinets or building cabinets of new urban developments) which is far in excess of the current number of MDFs in local exchanges. It is also possible that these investments are unprofitable, given the number of customers connected to these points.

In the case of the fixed network, besides the cost of the copper cables themselves, the most part of the investment in local access networks occurs in the support infrastructure, that is in the works of civil engineering associated with the opening of trenches for the installation of conduits and the placing of posts (“aerial infrastructure”) in rural zones. These types of activities may represent up to around 2/3 of the total amount of investment.

In this context, the possibility of using the vast network of existing conduits (including the network of conduits of other public and private entities), for the expansion of fibre optic in the direction of the end user takes on special relevancy. It is noted that, in this respect, the scale (of infrastructure) continues to be a critical factor for return on investment, whether for the incumbent operator, or for the other operators, particularly in light of the future development of the NGAs

## 4.2 FTTCab and FTTH/B solutions and the impact on the OLL

Taking into account the scenarios for the evolution of the NGAs discussed in section 3, analysis is made in this section of the impact of FTTCab and FTTH/B solutions on the development of the OLL.

### 4.2.1 The FTTCab scenario

The extension of fibre optic to the street cabinet allows the suppression of the primary copper distribution network (from the MDF/local exchange), but could involve significant costs due to the high level of cabinets to be connected and adapted. The number of these cabinets is, necessarily, far in excess of the number of MDFs, whereby the investments to be made in the installation of fibre optic from the core network to the street cabinets will be weighty, especially if new infrastructure needs to be constructed, that is new conduits and associated civil engineering works<sup>78</sup>.

It is noted that the cost of installing an optic connection in a street cabinet could total some twelve thousand euros<sup>79</sup> and that its rental could reach around 20 thousand euros per year (for capacities up to 1 Gbps), depending on distance.

Taking into account that the first point of access to the network, in this scenario, will be a street cabinet, it is necessary to have detailed information on its characteristics (dimensions, capacity, etc), their total number and their geographical distribution and average distances to the final user<sup>80</sup>. On the other hand, the technical and operational implications of access to the local sub-loop need to be identified, in particular in terms of co-installation conditions (in the cabinet itself and outside), in terms of the proliferation of street cabinets and of signal transport to the cabinet.

For this purpose, access by the alternative operators to the local sub-loop, that is, to the level of street cabinets, could presuppose the installation of a new cabinet in parallel to the existing one with the inherent duplication of costs, or as an alternative, the possibility of sharing the existing street cabinet, which in any case may have to be reformulated and expanded.

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<sup>78</sup> According to PT Comunicações, there are more than twelve thousand street cabinets for around two thousand MDFs in this operator's network.

<sup>79</sup> According to OVUM ("FTTCab: an investment assessment", of December 2006), the fibre optic connection could cost 60 thousand dollars.

<sup>80</sup> This information was compiled within the scope of the study on the impact of the next generation networks (NGN) on the economics of the business, costs structure, network topology and operator products.

In the eventuality that an operator has to install its own cabinet, account must be made, in addition to its cost and the need for a connection (*backhaul*) to the network, of administrative and legal issues, specifically issues of territorial planning and the need for permission from the municipalities. These bodies have shown growing concern about the occupation of public space (e.g. pavements, where street cabinets are normally installed, already existing alongside energy cabinets and cable television distribution cabinets), whereby it is seen that it will be increasingly difficult in this respect for an operator that wants to develop an FTTCab type solution which implies the installation of a high number of street cabinets<sup>81</sup>.

Additionally, the installation and use of street cabinets involves a large investment and operation costs for an operator which decides to advance with a solution of this nature on a large scale, with the further difficulty that, currently each street cabinet supports on average fewer than a thousand accesses. That is to say, in a scenario of a 50% penetration rate in served areas, the cost born by the operator for each street cabinet (including the fibre optic connection) will have to be recovered through the service provided to not more than 500 customers.

In a situation which allows other operators to access the street cabinet, the costs will not be recovered by the entire 500 customers served, but only those served by the operator concerned. This situation differs significantly from the current situation given that at the moment the operators are co-installed at MDF level, serving several thousand customers. This represents a potential customer base far greater than that associated with a street cabinet, allowing the costs of investment and operation to be more easily spread.

**Question 14:** From an economic standpoint and in view of foreseeable costs (e.g. fibre optic connection and adaptation or installation of street cabinets), do you consider an FTTCab solution to be viable just in larger capacity street cabinets and/or cabinets in large urban centre or, possibly, at a more general level?

**Question 15:** From a technical economic standpoint, do you favour a solution in which the street cabinets are individual (per operator) or a shared solution? Under what terms?

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<sup>81</sup> It is expected that it will be increasingly difficult to obtain municipal licences for additional subsoil works and to place street cabinets in the public space.

#### 4.2.2 The FTTH/B scenario

From the outset it is more probable that both the FTTB and FTTH solutions will mostly be employed for new projects and installed in densely population areas (and in blocks of flats rather than isolated houses), so as to allow the costs of each connection to be shared more widely, or with higher ARPU potential. For example, there are operators which consider that there needs to be a minimum of 30 customers (per apartment block) to justify the installation of a fibre optic solution. According to JPMorgan<sup>82</sup> the estimated average cost of connecting a house with FTTH ranges from between one thousand and two thousand euros.

Despite that fact that, in theory, an FTTH/FTTB type solution is associated with a higher level of investment than an FTTCab solution, it may constitute a simpler solution, given that there is no need to install active equipment on the distribution network. For this purpose, fibre optic solutions, whether point to point or point to multipoint, use only passive optic component on the access network (optical distribution frame – ODF – or splitters).

Furthermore, where an FTTCab type solution is not economically or technically viable, the operators themselves may opt, depending on the characteristics of the area being served (particularly in terms of concentration of potential customers and ease of access to conduits or to columns mounted in buildings), for a wholly fibre access, i.e. an FTTH solution, which translates to a longer term solution with potentially higher return, given the bandwidth supported.

However, it is noted that currently, with FTTH, the optic equipment (electro) to be installed in the homes of customers may also have a high price, which however will surely fall with widespread use. Such equipment can also be multi-unit (including, for example, an optical receptor, gateway, and a set-top box), which can have an impact on the option of the operator, while also taking into account the response of the customer with respect to the need to acquire or rent and “supply” (with energy) a large amount of equipment for the “same service” supplied by an operator and delivered through a single “wire”.

**Question 16:** From an economic standpoint and depending on the expected costs (e.g. fibre optic connection to the home and possible adaptation of buildings to receive fibre optic), do you consider the development of fibre optic to be viable outside densely populated zones or new construction?

With respect to any regulatory intervention in scenarios of NGA investment, and where this is necessary in order to accomplish the objective of reconciling investment in NGA and the

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<sup>82</sup> JP Morgan (2006) “The Fibre Battle”.

maintenance of competition in the market, it may be technically viable to advance with the unbundling of fibre optic to the exchange (ODF) level or at the level of the splitter (street cabinet or inside buildings).

For point to point FTTH solutions, any unbundling of fibre optic might occur in a similar way to the current solution, with the operator accessing an individual fibre optic on the ODF. Any unbundling with point to multipoint solutions (PON) (as a rule, the solution favoured by incumbent operators) is technically much more complex, especially with regard to the “unbundling of a wave length” at the level of the exchange or unbundling of the individual fibre optic at the last splitter of the PON. Such an unbundling solution requires, from the outset, appropriate network planning developed jointly by all the operators, including the incumbent operator, including conditions of co-installation and specific characteristics of diverse splitters.

Finally, in the case of FTTB/H solutions, consideration must be made of the possible difficulties in the access to buildings (space for the installation of a DSLAM or equivalent equipment in the common parts of the building<sup>83</sup>, respective connection to the general distributor of the building and connection to the electricity network to supply the DSLAM) and to the individual property of each customer (involving access to the duct system of the building for the installation of fibre optic and installation of new “optic plugs” inside the property).

New or very recent buildings, with more sophisticated support infrastructure, are already better prepared to receive the equipment and cables necessary for the installation of FTTB/H<sup>84</sup> solutions. However, the vast majority of older buildings are not so conveniently prepared. It may be difficult to identify the most appropriate location for the installation of the necessary equipment or in the passing of fibre optic through the interior ducts or even in the conduit providing access to the building from the public road.

Furthermore, certain resistance may be encountered at an administrative and legal level with respect to property, as well as on the part of certain condominiums less open to structural alterations in their buildings, difficulties which could lead to delays and permission being granted by the condominiums.

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<sup>83</sup> Preferentially at the general distributor of the building.

<sup>84</sup> In Portugal, in the formats defined by the ITED regime. See <http://www.anacom.pt/template2.jsp?categoryId=1402>.



**Question 17:** What technical, administrative or legal challenges might hinder or limit the development of FTTCab or FTTH/B solutions? Identify any measure that might mitigate these problems?

**Question 18:** What type of regulatory intervention do you consider necessary and appropriate to enable such solutions, while also being compatible with the objectives of regulation pursuant to national and community regulation?

**Question 19:** In what circumstances do you consider there are grounds for the imposition of obligations of fibre optic unbundling, in its various modalities (e.gg. the entire fibre, wave length, etc.)?

It may be added that in certain countries, developments in this respect have been seen, as summarised below:

- Ireland: in response to the practice of certain real-estate companies entering into exclusivity contracts for the provision of electronic communication services to future residents and to the fact that these companies fall outside the jurisdiction of ComReg, a legislative amendment gave this body the powers to impose rules on the sharing of infrastructure on suppliers<sup>85</sup>.
- United Kingdom: in April 2008, OFCOM launched a public consultation<sup>86</sup>, with the aim, *inter alia*, of sounding out the market as to the technical standards for access to new constructions which may help providers to offer better services.
- USA: the FCC, concerned about preventing local fibre optic monopolies, imposed a ban in 2008 (with retroactive effects) on clauses of exclusivity for the provision of television services in contracts made between the operators of cable distribution operators and “condominium” owners.
- France: a number of legislative measure which have been recently set out for:
  - o Imposition of obligation of all new build with more than fifty abodes to have pre-cabling (with costs estimated at around 400 euros per household);
  - o Creation of a “fibre optic right of access” in line with the “right to aerial”;
  - o Implementation of a standard agreement between co-owners and operators;

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<sup>85</sup> NGA of Ireland.

<sup>86</sup> See “Next Generation New Build – Promoting higher speed broadband in new build housing developments” at <http://www.ofcom.org.uk/consult/condocs/newbuild/condoc.pdf>.

- Review of the regulations of installation and access to buildings, favouring the sharing of cables installed on premises.

See in this respect, section 6.2.2.

### **4.3 The transition to NGA – (two) parallel networks**

Currently, the “interconnection” point of the copper access networks with the transport network of the operators is situated at the level of the Local Exchange/MDF. With the NGAs and the expansion of fibre optic to the access network, up to the street cabinets in the FTTCab model or to the home in the FTTH/B model, the primary copper distribution network (and secondary in FTTH/B) is replaced and the customer loops may be significantly longer, resulting in a possible reduction in the number of necessary core network nodes.

The current copper “interconnection”, as well as the current unbundled loops, will only be maintained if the current distribution infrastructure is maintained, even where the customers (of the incumbent operator) have been transferred to the new network. Furthermore, the operators, despite maintaining their active customers using the current solutions, would stand at competitive disadvantage in comparison to the incumbent operator, which would transfer its customers to the new VDSL (or fibre optic) access network, with greater capacity, enabling the provision of innovative and better quality services. This based is on the presumption that there are no viable alternatives (in terms of cost and the period of investment) whereby alternative operators may invest in NGA.

Therefore, and taking into account that certain technological options at the level of the core network could lead to a reduction in the number of network nodes of the incumbent operator, there might be an “emptying” of the actual exchanges where the operators are co-installed.

Another factor which needs to be taken into account is the need, as an alternative, for the incumbent operator to maintain two access networks in parallel operation, which could imply increased costs, specifically in terms of the copper distribution network, with significant operational costs<sup>87</sup>. As such, during the transition phase, which will be quite lengthy due to the need for the amortization of the cost of the assets (e.g. ADSL and ADSL2+ equipment), it will be necessary to keep the lines of the copper network and associated services which have not yet migrated to NGA. Only after reaching a given

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<sup>87</sup> Above the costs of operation and maintenance of fibre optic networks, which represent, in this respect, requirements that are more favourable than copper networks

critical number of active loops connected to the MDF, subsequent to which it is not economically viable to maintain this infrastructure, does it make sense to advance with its dismantling.

**Question 20:** Do you consider it necessary, from a technical and functional point of view, to operate the current PSTN/ADSL (as of the exchange) and FTTx solutions (VDSL or fibre optic) in a given geographical zone in parallel? If so, for how long and under what conditions?

#### **4.4 Access to the network**

In the United Kingdom, the choice of a functional separation model has led to the setting up of “*OpenReach*”, which is a corporate unit that is functionally separate from BT.

The access to the infrastructure managed by “*OpenReach*” is provided according to the concept of product equivalency. That is, both BT and alternative operators use the same processes and the same information systems for the provision of retail services supported by “*OpenReach*” managed products.

This range of products managed by “*OpenReach*” includes, for example, access to the local loop.

Certain European regulators (e.g. in Italy, Sweden and Poland) are setting out the development of functional separation models similar to that imposed by OFCOM, considering that this option guarantees non-discriminatory treatment of different operators. Other regulators (e.g. in Holland and France) have already shown that this is not the most suitable option, in view of the market situation). Other regulators (e.g. in Spain) have not ruled out the possibility of an imposition of this type being set out, considering however that this is premature.

It is noted that the EC, in respect of review of the current regulatory framework, is setting out the possibility that regulators might impose an obligation of functional separation, with very specific conditions<sup>88</sup>.

In this framework of NGA evolution, there might also be the opportunity to question the current paradigm through the appearance of alternative NGA networks in competition or through the appearance of an operator of a network with national coverage, in respect of which various operators compete, in line with the “*OpenReach model*” in the United Kingdom.

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<sup>88</sup> See [http://ec.europa.eu/information\\_society/policy/ecomm/library/proposals/index\\_en.htm](http://ec.europa.eu/information_society/policy/ecomm/library/proposals/index_en.htm).

In Portugal, as previously stated, Sonaecom has already announced an investment of 240 million euros over three years in an NGA which, it is claimed, will be open to access by other operators, and will cover a million houses and a quarter of the Portuguese population.

**Question 21:** Do you consider that in Portugal there are conditions for the development of competing NGAs? With what degree of geographical coverage?

**Question 22:** Do you consider it suitable, in view of the state of the development of the markets and the characteristics of the access network, for there to be a single network supporting the products of all operators? What impact in terms of incentive for investment might be envisaged?

**Question 23:** What considerations are raised by a possible imposition of functional separation on the network of the incumbent operator?

#### **4.5 Economic analysis of the impact of NGA on Portugal**

ICP-ANACOM is assessing the various possible scenarios for the evolution to NGA in Portugal, in particular the potential implication in terms of operator business plans and network costs. This study is underway in its own accord and, under its scope, the operators have been called on to make their contribution<sup>89</sup>.

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<sup>89</sup> See Determination of I CP-ANACOM of 10 October on the "Consultation for a study of next generation networks (NGN)" at <http://www.anacom.pt/template31.jsp?categoryId=255622>.

## 5 NRA in the context of relevant markets

### 5.1 The scope of market analysis (markets 4 and 5)

Regulation 2887/2000 of 18 December 2000, maintained transitorily in force by the current regulatory framework<sup>90</sup>, on unbundled access to the local loop<sup>91</sup>, states that:

*“the provision of new loops with high capacity optical fibre directly to major users is a specific market that is developing under competitive conditions with new investments. This Regulation therefore addresses access to metallic local loops, without prejudice to national obligations regarding other types of access to local infrastructures”.*

That is, it envisaged the use of optic loops only for high capacity products and to a restricted number of users (“major users”, in the corporate market) and not for products equivalent to those supported on the copper loop. The EC did not there consider both types of loop as part of the same relevant market.

In respect of the current regulatory framework of electronic communication networks and services, Recommendation 2003/311/EC, meanwhile revoked, on relevant product and service markets<sup>92</sup> states that:

*“The fact that an obligation is applied to an SMP undertaking with regard to a specific type of infrastructure (e.g., metallic local loops) does not imply that a parallel obligation will be applied when networks and infrastructure are upgraded, for example to deliver (or be capable of delivering) new services. Where new types of infrastructure are used to provide existing services, any regulatory intervention (in respect of that new type of infrastructure) would depend on a revised market analysis. Indeed, encouraging efficient investment in infrastructure and promoting innovation are explicit objectives for regulators. (...)”*

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<sup>90</sup> It is noted that the revocation of Regulation (EC) no 2887/2000 will only be effective with the 2006 Review process, in accordance with the proposal in article 4 of the Directive of the European Parliament and of the Council with amends the Framework, Access and Authorisation Directives.

<sup>91</sup> See Regulation in force in previous regulatory framework available at [http://www.anacom.pt/streaming/RegulamentoPT.pdf?categoryId=46082&contentId=24037&field=ATTACHED\\_FILE](http://www.anacom.pt/streaming/RegulamentoPT.pdf?categoryId=46082&contentId=24037&field=ATTACHED_FILE).

<sup>92</sup> See the statement of Motives of Recommendation 2003/311/EC of 11 February, with respect to relevant product and service markets in the electronic communication sector subject to ex-ante regulation at [http://ec.europa.eu/information\\_society/policy/ecomm/doc/library/recomm\\_guidelines/relevant\\_markets/pt1\\_2003\\_497.pdf](http://ec.europa.eu/information_society/policy/ecomm/doc/library/recomm_guidelines/relevant_markets/pt1_2003_497.pdf).

The definition of local loop contained in the Access Directive is broader. According to point e) of article 1, the local loop is defined as being the physical circuit (not necessarily metallic) connecting the network termination point at the subscriber's premises to the main distribution frame or equivalent facility in the fixed public telephone network. In contrast to the said Recommendation, the EC does not restrict the local loop to twisted metal pairs, which is more in line with the principle of technological neutrality and the actual technological development.

Comment [isarey1]: não é artigo 2?

On 17 December 2007, the EC published the revision of the Recommendation on relevant markets<sup>93</sup>.

The position of the EC with regard to fibre optic networks appears to have shifted since 2000, whereby it considered in 2003 that the alternative infrastructure to copper networks (including fibre optic supports) are not sufficiently generalised to be included in the relevant markets (provision of unbundled access to the local loop and the wholesale provision of broadband access).

In the Recommendation now in force, specifically in the case of the market of unbundled access to the local loop, the explicit reference to the metallic copper loops has been dropped.

For this purpose, the list of markets proposed by the EC included, at a wholesale level, the “wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location<sup>94</sup>” (previously market 11), as well as the market of “wholesale broadband access<sup>95</sup>” (previously market 12).

In the Recommendation now in force, the EC accepts that the wholesale broadband access market and the market for the wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location may remain distinct or merge into a single market. The EC concluded that, while these two markets are associated with the same retail market, it makes sense, depending on the development of the networks and the particular conditions of supply and demand in the Member States, for the NGA to analyse them in conjunction, assessing subsequently the impact that access in regulated

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<sup>93</sup> See Recommendation 2007/879/EC, of 17 December, at

[http://ec.europa.eu/information\\_society/policy/ecomm/doc/library/proposals/879/l\\_34420071228pt00650069.pdf](http://ec.europa.eu/information_society/policy/ecomm/doc/library/proposals/879/l_34420071228pt00650069.pdf).

<sup>94</sup> The EC states that the local loop market is equivalent to local physical access of local access with basis in infrastructure with the aim of providing retail broadband services.

<sup>95</sup> “This market comprises non-physical or virtual network access including ‘bit-stream’ access at a fixed location. This market is situated downstream from the physical access covered by market 4 listed above, in that wholesale broadband access can be constructed using this input combined with other elements”.

infrastructure and the impact that network access (non physical) might have on the markets further down on the vertical value chain associated with these wholesale markets.

Additionally, and with respect to the future evolution towards NGA, the EC took the position that the probable greater efficiency of these networks in supporting the current services (regulated) will constitute reason enough to remove the obligation imposed on these same services, if there is no change to competitive conditions.

On the other hand, the EC recognises that in certain Member States, because of conditions of competition, of the developments in terms of new networks and technologies or because of other specifications, the NRAs may, based on a case by case assessment make a decision on the inclusion of other products, in this case fibre optic access (to support broadband access services), in the relevant markets under analysis or even propose a new relevant product market with respect to this type of solution for access to the end user.

It was this, for example, that the EC defended in respect of various notification of market analysis, particularly in one of the most debated cases: that of Germany<sup>96</sup>, presented in Annex 2.

## **5.2 The positions of the regulators and the potentially imposed obligations with respect to the NGAs**

In a number of countries, consultations have already been carried out on NGA, while in some cases decisions on this issue have been taken, some inserted in the market analyses.

Generally the regulators have the view that the development of NGAs brings a mixture of regulatory opportunities and challenges, due to the impact that it might have on the competition situation and in the development itself (of regulation) of the access networks in various countries.

In very brief and non-exhaustive terms, a description is made, in the following points of the approaches taken by the European regulators towards the issue being assessed.

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<sup>96</sup> In this case the EC stated, for example that "(...) *to the extent that fibreglass connections can be used to offer wholesale unbundled access to local loops and sub-loops for the purpose of providing broadband and voice services, like metallic loops and sub-loops, they may [...], on the basis of specific national circumstances, form part of market 11.*"

## *United Kingdom*

OFCOM *Policy Statement* of March 2006<sup>97</sup> sets out the guidelines of NGN regulation as the promotion of competition, efficiency of action and regulatory predictability and the incentives for investment. This is on top of safeguarding the interests of users (manifesting a preference for co-regulation with the industry), maintaining a high quality of service, taking precautions against disruption during the migration period and promoting transparency in the comparison between products offered as a package.

In April 2006 OFCOM set up the NGNUK to act as a co-ordination forum in which key investors in NGN infrastructure and services will discuss, research, consider and, where possible, agree the direction for NGNs in the United Kingdom and communicate such direction to other players in the telecommunications industry and the general public.

Through the consultation of 26 September 2007<sup>98</sup>, OFCOM identified that it would be a challenge to ensure the effective development of NGAs, establishing the ideal conditions for efficient investment within a suitable timeframe for the operators.

The same regulator presents certain basic principles for their regulatory approach which will apply where dominance is identified in the supply of NGA supported services, including:

- Definition of clear and transparent regulatory principles, allowing operators to take an informed decision and ensuring that regulatory policy does not inhibit efficient and timely investment;
- Promotion of competition in terms of infrastructure where this may be effective and sustainable, bringing the networks of the alternative operators closer to the end user;
- The use of various regulatory solutions for different products and, where appropriate, in different geographical areas.

However, and although the investments in NGA could come to constitute a constraint, OFCOM considered, in view of the risks involved and the uncertainty in respect of demand for services, that a simple application of current regulation to NGAs would not be appropriate. Furthermore, while there are no insurmountable barriers created by these networks, OFCOM advocates a more hands-off approach, based on competition law and the promotion of interoperability, although it does not consider a policy of “regulatory holidays” to be appropriate, especially due to the risk that this might constitute an incorrect

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<sup>97</sup> See <http://www.ofcom.org.uk/consult/condocs/nxgnfc/statement/>.

<sup>98</sup> See <http://www.ofcom.org.uk/consult/condocs/nga/>.



incentive (e.g. the incumbent operator might invest inefficiently in a given technology solely because it is not regulated) and may bring uncertainty to the market.

In the same document OFCOM discusses possible specific obligation for access which consist essentially of the provision of: (a) WBA<sup>99</sup> for FTTH architectures and (b) SLU<sup>100</sup>, with respective backhaul in the case of FTTCab.

The conclusions of this consultation have not yet been published.

In February 2008, the Government of the United Kingdom<sup>101</sup> started an investigation into barriers to NGN investment and into the measures which the Government could take in order to surmount these barriers, both in terms of infrastructure and the content which will be provided over it<sup>102</sup>. Among the specific points of the investigation, the Government intends to assess whether (a) community and national statutory framework has given Ofcom the necessary powers to provide regulatory certainty for investors and sufficiently incentivise new investment and (b) it is possible to advance to FTTB, without having FTTCab as an intermediate step.

More recently in April 2008 OFCOM launched another public consultation<sup>103</sup> with the aim of sounding out the market on: (a) how to ensure appropriate, efficient and open investment in new buildings; (b) the technical standards governing access to buildings which may incentivise providers to offer better services (c) how to promote competition, guarantee the interests of consumers and ensure appropriate regulatory conditions.

### *Ireland*

The Irish regulator has manifested a series of guiding regulatory principles, which it envisages will remain relevant with the introduction of NGAs<sup>104</sup>:

- Technological Neutrality – regulatory measures imposed irrespective of the technology uses:
- Non discrimination

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<sup>99</sup> "Wholesale Broadband Access"

<sup>100</sup> "Subloop Unbundling" .

<sup>101</sup> "Department for Business, Enterprise and Regulatory Reform". See

<http://www.gnn.gov.uk/environment/fullDetail.asp?ReleaseID=354760&NewsAreaID=2&NavigatedFromDepartment=True>.

<sup>103</sup> See <http://www.ofcom.org.uk/consult/condocs/newbuild/summary/>.

<sup>104</sup> See ComReg public consultation, "Regulatory Aspects of Next Generation Networks" of 8 July 2007 at [http://www.comreg.ie/fileupload/publications/PR080707\\_71186522.pdf](http://www.comreg.ie/fileupload/publications/PR080707_71186522.pdf).

- Promotion of competition in terms of infrastructure – promotion of competition and efficient investment to the benefit of the consumer, which should be maximised with competition between access platforms (where this is not possible ComReg will continue to encourage competition at the level of services); and
- Promotion of efficient investment – non conceding “regulatory holidays”, but ensuring the incentives to invest are not distorted and taking, as part of its remit, the associated risk into consideration, as for example in the determination of the regulated price of access.

ComReg has one of the main objectives of its remit the provision of regulatory certainty, especially in terms of the continuity of current regulated products and in terms of the nature of future new obligations, so as not to cause impairment to the operators who make investments in the meantime. In this respect ComReg is attempting to maintain the current obligations of access, ensuring that the recent progress of the OLL in Ireland is not impaired.

Any proposals for structural alterations to the access network, including the dismantling or displacement of exchanges or eligibility of loop for the OLL, will have to be notified approximately three to five years in advance. On the other hand, any future wholesale products supported by NGNs will have to include effective procedures for migration from current products (OLL, “*bitstream*”, rented circuits and voice).

### *Germany*

In the first round of market analysis and following comments from the EC, the German regulator amended, in December 2005, the notification made, to include VDSL within the scope of market 12<sup>105</sup>. With respect to the obligations, BNetzA imposed obligations on DT with respect to access, non discrimination, transparency, separation of accounts and price controls, while the EC, in its commentary to this decision, stated that, as soon as VDSL products became available, access to VDSL infrastructure should be imposed automatically.

In the decision which set out the definition of obligations with respect to market 11, despite the comments of the EC, BNetzA maintained the decision to remove existing obligation with respect to loop constituted entirely in fibre optic<sup>106</sup>, that is the obligation of DT to grant

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<sup>105</sup> In October 2005, a BNetzA notified the draft decision on market 12. In this decision BNetzA did not include VDSL products.

<sup>106</sup> BNetzA affirmed that it intended to remove these obligations, given that these fibre optic connections had not been included in market 11, but did not present any analysis of substitutability between the copper loops and fibre optic loops or between these and hybrid loops (copper / fibre optic), which continue to be regulated.

access to its network of (loops in) fibre optic, considering that it will a competitive market segment (having been regulated until that time under German law). In Annex 2 a more detailed analysis is made of this case.

### *Spain*

Following a public consultation launched on 10 May 2007<sup>107</sup>, on 17 January 2008 the Spanish regulator adopted a decision on guidelines governing the regulatory approach to NGAs<sup>108</sup>, with the objective of incentivising technological innovation competition and the development of fibre optic infrastructure. Accordingly, the CMT reported that it would begin an analysis of relevant markets concerned from a geographical approach in order to determine the level of competition in each territory and, if appropriate, to impose different obligations.

CMT took the position that there were no grounds for any deregulation with respect to the OLL, given that the incumbent operator (Telefónica) should not have the power to withdraw access to the local loop, avoiding discontinuity of the network (copper) and deactivation of exchanges where the operators are currently co-installed. In this respect, the obligation will be imposed on this operator whereby it shall inform the co-installed OSPs, with reasonable prior notice, of its plans to alter the network and local exchanges, which information shall be included in the reference offer.

On the other hand, the CMT was of the position that to extend the current obligations of the OLL to fibre optic could act as a disincentive for investment in this new infrastructure. Furthermore, considering that there was a high level of technical complexity involved in the unbundling of fibre optic, it did not envisage the imposition of access obligations with respect to FTTH solutions.

However, where there is copper segment in the connection to the client, the CMT is of the position that the current obligations should be maintained, given that the copper network constitutes a competitive advantage for Telefónica and the CMT intends to guarantee the preservation of the business model chosen by OSPs that unbundle loops.

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<sup>107</sup> See

[http://www.cmt.es/cmt\\_ptl\\_ext/SelectOption.do?tipo=pdf&detalles=090027198004cae8&nav=ult\\_resoluciones&xt\\_búsqueda="acceso%20de%20nueva%20generacion"&cod\\_area=-1&ver\\_todo=1&area\\_txt=resoluciones&seccion=ultimas\\_resoluciones&pagina=1&buscador\\_resoluciones=y](http://www.cmt.es/cmt_ptl_ext/SelectOption.do?tipo=pdf&detalles=090027198004cae8&nav=ult_resoluciones&xt_búsqueda=)

<sup>108</sup> See

[http://www.cmt.es/cmt\\_ptl\\_ext/SelectOption.do?tipo=pdf&detalles=0900271980051d3c&nav=ult\\_resoluciones&xt\\_búsqueda="acceso%20de%20nueva%20generacion"&cod\\_area=-1&ver\\_todo=1&area\\_txt=resoluciones&seccion=ultimas\\_resoluciones&pagina=1&buscador\\_resoluciones=y](http://www.cmt.es/cmt_ptl_ext/SelectOption.do?tipo=pdf&detalles=0900271980051d3c&nav=ult_resoluciones&xt_búsqueda=)

As far as access to infrastructure is concerned (e.g. posts, conduits, and permanent manholes) the CMT is of position that it is reasonable to impose obligations on operators with SMP with respect to transparency and discrimination, as well as the negotiation of commercial agreements with operators.

### *Belgium*

In a public consultation launched on 3 January 2008, the BIPT considered that transparency in the information on the developments of the network of the incumbent operator (Belgacom) has great importance in ensuring competition in the markets and that lack of such transparency might lead to a situation “de facto”, with no possibility for regulatory intervention<sup>109</sup>.

In this respect, the BIPT placed in public consultation its position that Belgacom should present its plans, per region over a 5-year period, to develop NGAs (network structure, technology, number of distribution frames, etc.). It considered this period necessary so that the OSPs can plan their own investments and so that the regulator can obtain a prior view of alterations with possible impact on the conditions of competition in the market.

In specific issues, such as the deactivation of points of access to the loop or sub-loop, the BIPT judged that warning should be given of this possibility insofar as the technological developments, in terms of the access network (NGA) can oblige. Therefore, the regulator proposed the following additional transparency measure: in the event that Belgacom decides to close down a site for access to the copper pair, if an OLL offer still applies to that location, Belgacom has to leave this point open for at least five years; otherwise Belgacom may close it down one year after the announcement.<sup>110</sup>

The results of the consultation have not yet been published.

### *France*

In France, the discussion on NGA has focused on the access to passive infrastructure, including conduits and buildings in order to incentivise the development of FTTH solutions.

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<sup>109</sup> See <http://www.bipt.be/ShowDoc.aspx?objectID=2593&lang=en>.

<sup>110</sup> BIPT notes that the scenario in which a distribution frame closedown is announced 5 years in advance involves risks as this could be an incentive to Belgacom to announce the largest possible number of closedowns in order to prevent the alternative operators from investing in the OLL.

In this respect the French Government published an action plan in November 2006 for the development of FTTH, which includes a set of 15 measures with the objective of having 4 million fibre optic users by 2012<sup>111</sup>. These measures include the following:

- Support the initiatives of local authorities which provide for the development of high speed networks:
- Strengthen R&D associated with applications in order to give impetus to demand for broadband services;
- Impose access to conduits of FT, other operators and local authorities;
- Analyse the access conditions to other infrastructure (e.g. sewerage and rainwater pipes and gas and electricity infrastructure);
- Analyse the impact of the geographic segmentation of the relevant markets depending on the existence of alternative infrastructure;
- Improve access and provide for the sharing of infrastructure inside buildings;
- Encourage local authorities to facilitate the installation of conduits.

Subsequent to this action plan, in July 2007 ARCEP published two public consultations, one related to access to conduits<sup>112</sup>; the other related to the sharing of infrastructure inside buildings<sup>113</sup>.

The main result of these consultations is the position of ARCEP that the conduits of FT constitute essential infrastructure whereby access to these conduits by alternative operators should be guaranteed so that these operators might be able to invest in NGA<sup>114</sup>.

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<sup>111</sup> See <http://www.industrie.gouv.fr/portail/secteurs/planTHD.pdf>.

<sup>112</sup> See [http://www.arcep.fr/uploads/tx\\_gspublication/consult-ftth-fourreaux-juillet07.pdf](http://www.arcep.fr/uploads/tx_gspublication/consult-ftth-fourreaux-juillet07.pdf).

<sup>113</sup> See [http://www.arcep.fr/uploads/tx\\_gspublication/consult-ftth-mutualisation-immeuble-juillet07.pdf](http://www.arcep.fr/uploads/tx_gspublication/consult-ftth-mutualisation-immeuble-juillet07.pdf).

<sup>114</sup> See results of the public consultation at [http://www.arcep.fr/index.php?id=8571&tx\\_gsactualite\\_pi1%5buid%5d=985&tx\\_gsactualite\\_pi1%5bbackID%5d=1&cHash=4d1ec21014](http://www.arcep.fr/index.php?id=8571&tx_gsactualite_pi1%5buid%5d=985&tx_gsactualite_pi1%5bbackID%5d=1&cHash=4d1ec21014).

**Question 24:** What considerations are raised by the stated positions – although preliminary – taken by the NGAs, which appear to give priority, with respect to NGAs and in view of the alternative of applying immediate impositions of access to fibre optic loops, to the need to guarantee

- (a) greater transparency of information on the evolution of the network of the incumbent operator
- (b) access already conceded for a reasonable period of time;
- (c) the maintenance of access to the local loop only in the cases of loops in copper pair (possibly to the level of street cabinets); and
- (d) access to conduits and backhaul for connection between street cabinets and the infrastructure of alternative operators?

**Question 25:** Do you consider that the current ORAC is sufficient for the development of NGAs by alternative operators? In which ways can improvement be made?

### 5.3 The common position of the ERG

Following the 2007 work programme, at its 21<sup>st</sup> plenary meeting the ERG decided to formulate a common position with respect to the regulatory approach to NGA. In this respect the ERG launched a public consultation on the regulatory principles regarding NGA. This consultation closed on 11 June 2007<sup>115</sup>.

The EC, on its part, asked the ERG for an Opinion on the same issue of the regulatory approach to NGAs

On 3 October 2007, the ERG published the final document, simultaneously defining the common position of the ERG and the opinion on the regulatory approach to next generation access networks<sup>116</sup>.

In this document the ERG analysed the impact of NGA developments within the scope of regulation and to what measure the principles and regulatory approach might have to be adopted in order to ensure both transparency and visibility for operators.

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<sup>115</sup> See [http://www.erg.eu.int/doc/whatsnew/erg\\_nga\\_news\\_release.pdf](http://www.erg.eu.int/doc/whatsnew/erg_nga_news_release.pdf).

<sup>116</sup> That is, the opinion of the ERG on the regulatory principles to apply to Next Generation Access and also the Common Position of the ERG. See ERG document "ERG (07) 16 Rev 2 ERG Opinion on Regulatory Principles of Next Generation Access" at [http://erg.eu.int/doc/publications/erg07\\_16rev2\\_opinion\\_on\\_nga.pdf](http://erg.eu.int/doc/publications/erg07_16rev2_opinion_on_nga.pdf).

The main principles of the ERG Common position – which should be taken into account by the National Regulatory Authorities in their analyses and approaches to NGA – are as follows:

1. The principles underlying the current regulatory framework remain appropriate to deal with present and future developments of NGAs  
 The ERG considers that the current regulatory framework remains appropriate and allows regulators to deal with the regulatory challenges of NGA implementation, provided that certain adjustments are made.  
 As a first step the ERG considers that an amendment should be made to the Recommendation on relevant markets to allow NGAs to include broadband access in the access markets 1 and 2 where appropriate<sup>117</sup>.
2. Provided that the conditions of completion are not altered with the development of NGAs, there is no opportunity, per se, to alter or eliminate the regulation of current services.  
 For the ERG, the principle of promoting effective and sustainable competition in terms of infrastructure remains appropriate, with the aim of bringing the networks of alternative operators closer to the end user.  
 However the ERG is of the position that the regulators might have to adjust the access products (wholesale) to place them in the hierarchy of the “ladder of investment” in the NGAs, which will potentially lead to the positioning of the operators<sup>118</sup>.
3. Investments in NGA should strengthen the importance of the economies of scale, reducing the degree of replication of networks  
 According to the ERG, investments in NGG will probably strengthen the (already significant) importance of economies of scale and scope which characterise access networks, arising also from the probable increase in the costs of investment “per line” to the degree that fibre optic close to the premises of the users will present (further) difficulties in terms of replication and the maintenance of entry barriers.
4. At the same time and additionally, the economies of the NGAs will be different depending on the technologies of the country or region, whereby there cannot be a “one-size-fits all” solution in the regulatory approach.  
 According to the ERG, it can be expected that the operators will use different technologies in the development of the NGAs to offer their services, depending on various parameters (such as the length of cables, the quality and topology of the current network) and the particular characteristics of each region (e.g. population density) and market. The economics of NGAs will therefore have variations depending on the different technologies and geographic locations,

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<sup>117</sup> It should be noted that the common position of the ERG precedes the publication of the revision of the Recommendation on relevant markets whereby references are made to markets which are found in the Recommendation, in the meanwhile revoked.

<sup>118</sup> For example, if operators with SMP reconfigure or intend to eliminate MDFs in an FTTCab scenario, the operators could “climb the investment ladder”, investing in fibre optic up to the street cabinet or to the home of their customer, or, as an alternative, remain in the closest MDF or aggregation point, using the broadband wholesale offer.

The NGAs, on making their market analyses will have to take account of the specifications of the country and the market.

that is intra and inter Member States, there is no one size fits all solution.

The existence of different technologies in different areas throughout a national territory may, according to the ERG, justify different competitive conditions and, as a consequence, the definition of geographic markets or geographic differentiation in the obligations to be imposed<sup>119</sup>.

According to the ERG, regulators should encourage efficient investment in NGAs, promoting competition through the imposition, where necessary, of a range of appropriate obligations and ensuring visibility. It is necessary to ensure that the owner of a non-replicable network resource is able to derive an appropriate rate of return for their investment (e.g. through the establishment of fair and reasonable prices).

According to the ERG, in order that the regulators might present clear indications with respect to the regulatory environment, they need to be aware, in transparent form, of the intentions of the operators which intend to invest in NGA. The necessary information can be sought directly from the operators, in accordance with article 5 of the Framework Directive.

The ERG envisages a number of regulatory implications, especially in respect of access markets to the local loop<sup>120</sup> and the wholesale supply of broadband access, fundamentally for the respective wholesale offers<sup>121</sup>. The ERG also gives relevance to technical and implementation issues, especially with regard to the need for access to conduits (e.g. of the incumbent operator) and access to street cabinets.

In this context the ERG proposes:

- Flexibility in the Recommendation on relevant markets with respect to the inclusion of broadband access in the former markets 1 and 2, where there are grounds based on a sustainability test which takes account of prevalent national conditions<sup>122</sup>;
- the expansion of the scope of the former market 11, to include fibre optic loops;

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<sup>119</sup> Not for there to be a restriction in terms of prices, including a single price for the whole national territory.

<sup>120</sup> For example, with the possibility of the gradual "elimination" of MDFs or the possible inclusion of the optic loop in the definition of the market, which may lead to the extension of loop unbundling to include optic networks.

<sup>121</sup> For example, with the need to reassess the scope of bitstream offers.

<sup>122</sup> It is noted, as previously stated, that the position of the ERG preceded the publication of the revision of the Recommendation on relevant markets.



- the obligation of co-installation next to or within the street cabinets, as well as of connection to them, whereby, for this purpose, the obligation of conduit access could be envisaged, in respect of the of market 11.

The ERG identifies a number of regulatory challenges and obligations in respect of the FTTCab scenario:

- The unbundling of the local (sub)loop might take place at the level of the street cabinet, where there are greater barriers to co-installation and to the connection to the networks of the operators;
- It may be necessary to impose complementary products such as backhaul services<sup>123</sup> on the distribution network (between the street cabinet and the node of the operator) or the access to conduits<sup>124</sup>,

and in respect of the FTTH/B scenario:

- Access to the conduits is fundamental and may be imposed as an obligation of the former market 11 or as a separate market<sup>125</sup>;
- In an FTTB scenario, the local loop consists of a copper line which ends in the entrance of the building (where the fibre optic ends) and its unbundling can take place at this point in the building (or nearby);
- In an FTTH/B scenario, the local loop consists of fibre optic from the ODF until the home of each final customer. The possibility of unbundling this type of loop will depend on the type of topology, point to point or point to multipoint (PON). In the first case, any unbundling of the optic loop could be made in a similar way to the copper loop. Meanwhile in the cases of PON, the unbundling may constitute a much more complex challenge in technical terms<sup>126</sup>;
- The biggest barriers are the civil engineering costs<sup>127</sup> (horizontal barrier) and cabling in buildings (vertical barrier).

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<sup>123</sup> (i) As a complementary service of the old market 11; (ii) as a terminal segment of wholesale rented circuits (old market 13); or (iii) definition of an market for backhaul”.

<sup>124</sup> The sharing of and access to conduits can be imposed with a complementary service of market 11.

<sup>125</sup> (i) With respect to ex-ante regulation, as a complementary service of the old market 11; (ii) as an obligation a new (additional) market of access to conduits; or (iii) with respect to the imposition of symmetric regulation on all operators based on article 12 of the Access Directive..

<sup>126</sup> Not to be at the level of the last splitter (closest to the final customer) the individual fibre optic of each client can be accessed

<sup>127</sup> Construction of basic infrastructure and installation of fibre optic

In a scenario of imposition of access to conduits, the ERG further considers that a modification of article 12 of the Framework Directive might strengthen the powers of the Regulators, with respect to the imposition of symmetric regulation on the sharing of infrastructure such as conduits or cabling inside buildings (i.e. operators without SMP in the access markets)

On the other hand, it is the position of the ERG that the former market 12 (new market 5) already includes all the types of wholesale access products, whereby it does not see a need for alteration to the coverage of this market.

**Question 26:** How do you see the inclusion of fibre optic loops in the (new) relevant market 4? Do you consider that, in the development of fibre optic loops, the same of type of constraints are identified as in the copper network? What regulatory implications result, in terms of obligations (currently imposed with respect to copper loops), particularly unbundling (complete or shared)?

**Question 27:** Is it appropriate to consider, with respect to NGAs, a definition of markets segmented geographically within the Country or any geographical differentiation of regulatory obligations? How?

**Question 28:** What implications do you foresee for the regulatory measures proposed by the ERG in each one of the FTTCab and FTTH scenarios? What concrete measures do you propose for their implementation?

**Question 29:** What alternative measures should be considered?

#### **5.4 A geographic approach**

Recently there has been a focus (e.g. by Telefónica and by the regulator of Spain, the United Kingdom and Austria) on the possibility of having different regulatory approaches taking into account the differences in respect of the supply and demand for electronic communication services (e.g. with broadband access) in geographic terms.

Also in Ireland, Eircom reported its plans for migration to NGN (*core IP*) and the installation of access fibre optic in selected urban areas. For the Irish regulator, this represented a great challenge in terms of the promotion of competition, given the importance of economies of scale and in view of the incumbent operator having dominance in various markets. Meanwhile, it is envisaged that, at least initially, these new services would be

made available only in “economically viable” areas, being in fact the areas where there is currently most competition.

In any case, the Irish regulator considers that, wherever it is technically and economically viable competition between network platforms should be promoted, that is efficient investment in the infrastructure itself, which could effectively provide a large degree of benefit to consumers. The challenge appears to be to find the optimal level of access network (an asset, which by its nature is difficult to replicate) where competition between platforms is sustainable and should be incentivised.

## **6 The regulatory situation in Portugal**

For European regulators and for ICP-ANACOM in particular, one of most important and complex questions is the development of a clear, transparent and consistent regulatory approach to the developments in the access network, which are currently taking shape. Such an approach needs to promote efficient investment without putting at risk the objectives of competition.

From ICP-ANACOM's standpoint, there are fundamental areas which merit its attention and in respect of which a consistent and coherent regulatory approach needs to be defined, while seeking to maintain and to further stimulate the current competitive environment which to a large degree governs the development of the OLL and at the same time creating conditions which incentivise the development of NGAs. It is, therefore important to analyse, among other questions:

- How should the current local loop unbundling offer evolve so as to accommodate the alterations on the access network, while at the same time guaranteeing that the investments already made by the beneficiaries are not adversely affected?
- How can the level of competition at the level of network infrastructure be stimulated (and defended)?
- Should different conditions (physical and/or competition) in different geographical areas imply different regulation in these areas?

On the other hand, the promotion of competition through the encouragement of development of FTTCab or FTTH/ B type solutions could be a delicate process, both from a practical point of view and from a commercial point of view (business model of the operators)

### **6.1 The role of the State and regulator**

Historically, demand, investment and the development of services and infrastructure in rural areas has fallen significantly short of that in urban areas, while it is in urban areas, characterised by greater population density, greater purchasing power and by the existence of corporate customers, where operators normally obtain a greater and faster return on their investments.

This imbalance in the development of the market is a structural problem which is also prevalent at a European level (see for example the communication of Commissioner

Vivianne Reding in Brussels on 14 May 2007<sup>128</sup>), whereby it falls to the Governments (and regional and local administrations) and to regulators to seek to reduce these “barriers” between the info-included and the info-excluded, particularly through the promotion of competition at an infrastructure and access network level, especially in the less developed areas of the various countries, and through the guarantee that there is no discrimination in the provision of products and services at both a wholesale and retail level.

In the Portuguese case, there are already a series of projects in place<sup>129,130</sup> for the development of alternative networks in different regions of the country, with the support of public or semi-public bodies. These projects have as their primary aim the provision of broadband services in zones not currently covered by the traditional operators. These networks, managed by public bodies, public municipal or inter-municipal companies, or with a majority of public capital are open to any undertaking that is interested and duly licensed for the provision to end users of electronic communication services provided over the developed infrastructure.

Projects of this type, possibly public-private partnerships (PPP)<sup>131</sup>, could meet the demand for electronic communication service in more remote and less economically developed areas and promote the social cohesion and info-inclusion of citizens residing in such areas. The local and regional authorities (or locally publically financed private bodies) could support, in accordance with current laws and specific rules, local investment projects – for example making use of current networks linked to Municipal Service and their possible connection to operators in the market -, while the regulator shall guarantee that there are no inappropriate incentives or distortions to competition in the provision of services to consumers, also taking into account the role of the operators in the NGA investments.

Moreover, where there is public investment – or as an alternative the allocation of subsidies to operators who invest in networks – in predominantly rural and peripheral areas,

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<sup>128</sup> See [http://ec.europa.eu/commission\\_barroso/reding/docs/speeches/brussels\\_20070514.pdf](http://ec.europa.eu/commission_barroso/reding/docs/speeches/brussels_20070514.pdf).

<sup>129</sup> See website of UMIC on broadband “Community networks” at [http://www.unic.pt/index.php?option=com\\_content&task=view&id=28&Itemid=187](http://www.unic.pt/index.php?option=com_content&task=view&id=28&Itemid=187).

<sup>130</sup> See the “Évora Digital District” project at <http://www.evoradistritodigital.pt>.

<sup>131</sup> Public private partnerships, PPPs, are commonly understood as agreements between the government and private sector bodies with the purpose of supplying public infrastructure, community equipment and related services. In national legislation (Decree Law 86/2003 of 26 April, as amended by Decree-Law no 141/2006 of 27 July) PPP is taken to mean “*the contract or the union of contracts, whereby private undertakings, designated as private partners, are obliged, over the long term, with respect to a public partner, to ensure the development of an activity directed at the satisfaction of collective need, and in which the financing and responsibility for investment and operation is incumbent, in all or in part, on the private partner*”

particularly in fibre optic, this investment should be evaluated taking the following into particular account:

- The financing model for the investment (taking particular account of the Community rules with respect to so called State aid);
- Whether the networks are open, that is, whether they provide for non-discriminatory access;
- Whether the undertakings (public) also intend to offer their own services over these networks;
- Whether alternative infrastructure exists in these zones; and
- Whether these investments constitute competition, and possible unfair competition. to the investments and products of the operators of electronic communications which invest in infrastructure and services in the same areas, and whether, from this perspective they should be used exclusively as networks open to the provision of services by third parties, whereby the promoters of such networks are prohibited from providing electronic communication services.

The promotion of investment in less favoured or remote areas can be achieved through legislative alterations or through the action of public bodies. This provides a way of guaranteeing easier and non-discriminatory access to basic infrastructure supporting communication networks especially access to various types of conduits – that is, to the conduits of utilities such as EDP, GDP, Galp, Brisa or Refer, of the municipal councils, to the metropolitan networks – and to spaces for the (co)installation of the equipment necessary for the operation of the networks of the operators<sup>132</sup>. It is noted that if these undertakings use their infrastructure for the support of publically available electronic communication services, they thereby become subject, under law, to regulation by ICP-ANACOM.

In this respect Decree-Law no 68/2005<sup>133</sup> of 15 March 2005 establishes the legal regime for the construction, management and access to infrastructures installed in the public domain

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<sup>132</sup> It must be taken into account however that private companies and other undertakings which are not operators are subject to other sectoral regulation (e.g. ERSE, IRAR) and horizontal regulation in terms of competition (AdC).

<sup>133</sup> See <http://www.anacom.eu/template20.jsp?categoryId=232962&contentId=451181>

of the State, for the storage of electronic communications networks<sup>134</sup>. The principal objectives of this Decree-Law are:

- “i) To promote the optimization of public resources application and its economic efficiency, also contributing towards minimizing environmental impacts and the level of discomfort of citizens and entities due to repeated works in the same place;*
- ii) To create an integrated approach that enhances the use of the strong synergies that exist between these two types of investment, reducing the level of initial investment necessary to the implementation of electronic communications infrastructures and thereby contributing towards the development of a competitive and sustained national electronic communications market;*
- iii) To contribute towards providing the territory with infrastructures that enable the reduction of regional asymmetries and the consequent risk of future info-exclusion, in particular as regards the populations living in the interior areas of the country.”*

There could be grounds for the refinement of the respective rules, also keeping in mind the possibility of extension, through additional legislation, of the principles set forth therein with respect to the regional and local administration and respective public domains<sup>135</sup>.

Furthermore, emphasis should be given to the importance that the municipalities could have in the development of NGA, from a perspective of administrative streamlining (although naturally without prejudice to their responsibilities in terms of territorial planning),

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<sup>134</sup> “Applicable to the State’s direct administration, to public institutes and other legal persons governed by public law with jurisdiction over the public domain of the State, namely over road, rail, airport, inland waterways and port infrastructures, water supply and sanitation infrastructures and gas-transmission and electricity transmission infrastructures, as regards the construction, management and access to infrastructures installed in the public domain of the State, for the storage of electronic communications networks. (...) Local and regional administration shall be excluded from the scope of application of the present statutory instrument”.

<sup>135</sup> It is noted that Law no 5/2004 contains provisions designed to ensure access to the public domain (article 24), the sharing of facilities, whether or not the owners are undertakings providing electronic communications networks and services (article 25 paragraph 2) and non discrimination in the provision of access to ducts, masts, other installations of entities under the tutelage, supervision or superintendence of bodies of the State, Autonomous Regions or local authorities which pursue administrative functions, whether or not commercial by nature, including public undertakings, majority public-owned undertakings, or concessionaires (article 26 paragraph 5 et seq.), which can cover the municipal domain.

making procedures, particularly those related to the rights of way<sup>136</sup>, more harmonised, speedy, open and non-discriminatory and less onerous for operators.

Additionally, with respect to the municipal domain, as is public knowledge, the scheme for municipal fees for rights of way (TMDP) has been shown to be inefficient. This could therefore, taking into account the constraints that gave rise to the creation of the TMDP, be seen as an opportunity to effect a change to this scheme.

Another aspect that is relevant to the discussion on the geographical impact of the NGAs , regards issues arising from the extension of this type of network to the Autonomous Regions of Madeira and the Azores. This includes the way in which these Autonomous Regions are connected to the mainland and so to other countries. In fact, it is fundamental to identify any potential restrictions that might impair national cohesion in a determinant manner.

**Question 30:** Do you consider the current initiatives to provide network investment to be sufficient? What other regulatory initiatives or initiatives of the State do you consider could create a greater incentive to the development of the NGAs, promoting greater territorial coverage and info-inclusion?

**Question 31:** Are you of the position that networks promoted with recourse to public funds should function as open networks and exclusively for the provision of electronic communication services by third parties or, to the contrary, should be operated without restriction, as a way of promoting additional competition?

**Question 32:** In this respect, how can a suitable incentive for investment and innovation be guaranteed, which, at the same time promotes competition without distortion and without endangering the sustainability of the operators which have invested in the development of the networks and in the OLL?

**Question 33:** Do you see constraints in the access to basic support infrastructure, including that of entities which are not operators of communication networks? What are they? What measures could be conceived to surmount them?

**Question 34:** Do you consider it opportune to set out an alteration to the scheme for municipal fees for rights of way, and if so in what form?

<sup>136</sup> With respect to the state and regional domain, Law no 5/2004 established an exemption to the collection of fees or other charges from undertakings providing publicly available electronic communications networks and services (see article 106, paragraph 4)



**Question 35:** Do you see particular problems in the implementation of HGA in the Autonomous Regions of the Azores and Madeira? If so, what, and what is the best way of resolving them?

In summary, it is judged that all the conditions should be created and strong incentive given to the market so that, in the future, there are broadband access networks with a broad coverage throughout the national territory, including those zones that are currently less privileged and more remote.

## **6.2 The evolution of the reference wholesale offers**

In accordance with the regulatory principles in force, specifically the principle of technological neutrality, the relevant markets which are subject to the imposition of ex ante obligations are normally defined by product and service and not according to technology. In view of the current uncertainty with respect to investment in NGA and, fundamentally as to the types of services which will be offered and as to actual demand at a retail level, it is not possible to ensure from the outset with any certainty that there will be substantial alterations in the short term with respect to relevant markets (wholesale).

However, without prejudice to the results of future market analyses and taking into account, in particular, the current Recommendation of the EC on relevant markets, it is important from the outset to identify the short and medium term impact of the evolution to NGAs on the current wholesale reference offers associated with the access markets.

In order to provide the market with as much visibility and transparency as possible, it seems especially important from the outset to discuss possible amendments to the ORAC and ORALL wholesale products, at the level of passive access<sup>137</sup>, or RAPT<sup>138</sup>. These have been fundamental in the promotion of completion in the electronic communication markets, which very positive results for consumers, who have a greater range of choice at their disposal, resulting in more offers, more product diversity and lower prices.

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<sup>137</sup> Direct access to basic copper or fibre optic network infrastructure (or conduits) as opposed to the active access to electronic network equipment.

<sup>138</sup> Active access to network equipment, in the particular case (indirectly) to the DSLAM and to the core network (ATM/IP).

While the proposals identified herein are dependent on market analysis<sup>139</sup>, it becomes essential at this point to gauge the positions of various agents of the market, independently from the results of such analysis.

Therefore, it also seems important to assess the importance of maintaining (even with possible improvements) the current regulated services, possibly for transitional periods so as to safeguard the investment made (in a determined regulatory context) and the resulting offers.

### **6.2.1 The ORAC and the importance of access to conduits**

In light of the above, it appears vital, from the regulatory point of view, to identify whether there are efficient and viable forms whereby the alternative operators can connect to the street cabinets of the incumbent operator or to the homes of customers (e.g. in FTTH/B), especially with respect to infrastructure supporting the fibre optic connection. There currently appears to be various possible solutions:

- Use of existing conduits, under the scope of the reference offer of access to conduits (ORAC);
- The use of other types of “conduits” such as sewerage and drainage pipes (normally the property of the Municipal councils), of the gas or electricity network;
- Provision of dark fibre by PT Comunicações or other public bodies (e.g. councils) or private undertakings (e.g. utilities);
- Alteration of the leased lines reference offer (ORCA) to respond to this type of need.

The first alternative appears less complex and onerous – if there is available capacity, particularly in the access to street cabinets and to buildings–, given the existence of the reference offer of PT Comunicações. It is noted that in areas served by the aerial network (posts), the installation of fibre optic will be fast and relatively cheap (basically at the level of labour costs and available capacity)<sup>140</sup>.

In fact, in Portugal it is considered that the efficient use of existing infrastructure constitutes a very important aspect in the promotion of conditions of competition in the electronic communications market.

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<sup>139</sup> It is recalled that the ORAC is a wholesale offer which does not result from a process of market analysis which has justified the imposition of obligations. The ORAC is imposed on the concessionaire by Law no 5/2004.

<sup>140</sup> It is noted that the ORAC does not currently apply to posts, which would presuppose an extension to the rules of this offer.

Therefore:

- In the first place, the concession contract of the public service of telecommunications guarantees that other operators have access to the conduits covered by the basic telecommunications network<sup>141</sup>; and
- In the second place, Law no 5/2004 of 10 February enshrines the obligation of PT Comunicações to provide<sup>142</sup>, by agreement, access to conduits, posts and other installations and locations which it owns or manages as well as to provide<sup>143</sup> an offer of access to the conduits, which offer shall contain the conditions governing access and use, under the terms to be defined by ICP-ANACOM.

The imposition of this obligation of access and sharing of infrastructure<sup>144</sup> – whereby Portugal was one of the first member States to have a regulated offer of access to conduits – was recently recognised by the EC as an instrument which facilitates competition and important with respect to the analyses of relevant markets, with some European regulators now adopting and implementing this obligation.

With this offer the inefficient duplication of resources is avoided and there is minimal inconvenience caused to citizens and economic activities as a result of frequent and extensive works in the soil and subsoil with resulting disruptions to traffic and territorial planning, in addition to the resulting environmental repercussions.

However, with respect to access to conduits, and notwithstanding the above, important questions remain which require a large degree of transparency, particularly with regard to the access to information<sup>145</sup> and the coordination between the various stakeholders, incumbent operator and alternative operators, along with:

- The space available in the current conduits;
- Whether they exist in certain zones (e.g. in older areas or areas of new construction);

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<sup>141</sup> Under the terms of article 7 of the Concession Bases as approved by Decree-Law no 31/2003 of 17 February.

<sup>142</sup> under the terms of paragraph 1 of article 26.

<sup>143</sup> under the terms of paragraph 4 of article 26.

<sup>144</sup> Provided for in article 26 of Law no 5/2004.

<sup>145</sup> At the end of 2007, PT Comunicações provided beneficiaries of the ORAC with access to a database with records of its conduit network (see the Determination of ICP-ANACOM at <http://www.anacom.pt/template31.jsp?categoryId=271782>)

- The possible future additional use of posts, especially in more remote zones (and zones not covered by conduits).

In this context, in zones of new construction, it appears vital that all operators interested in offering their services in these areas effectively and clearly manifest such interest and that the development costs of the basic infrastructure may be shared and their implementation occurs only once during a reasonable period.

It is important to point out that the existence of the ORAC presents itself as an undeniable instrument in the construction of a non-discriminatory level playing field for the development of the NGAs.

In this respect, it is noted that the right of access to the public domain (municipal) is accepted under the terms of article 24 of Law no 5/2004 along with the possibility of recourse to the sharing of infrastructure under the provision of article 25, paragraph 2, while the obligation of non-discrimination is set forth in paragraph 5 of article 26 of the same Law.

In addition the proposed directive presented by the EC<sup>146</sup> sets out that the regulators may determine the sharing of resources or general property and in all cases in which the operator has obtained rights of way – and not merely in those cases where it is not possible, in a determined situation, for another operator to install its resources. The proposed regime therefore establishes the possibility of sharing being imposed in all cases – with respect to entrances to buildings, posts, antennae, conduits, manholes or street cabinets -, in a symmetric way, irrespective of the market power of the operator. As such, this could be a relevant contribution with regard to installation of electronic communications infrastructure.

**Question 36:** What type of solutions for the development of fibre optic do you consider most appropriate? Do you consider that the current ORAC will allow operators to extend fibre optic in a widespread manner, for FTTCab solutions and, possibly, for FTTH/B solutions? What changes or improvements do you consider necessary with respect to the ORAC in order to accomplish this goal?

Meanwhile, a second scenario may be set out, formulated in the offer of dark fibre by the incumbent operator or other entities possessing surplus capacity – making use of economies of scale -, principally there is no space in the conduits nor it is not possible to install new infrastructure (e.g. because of legal/municipal restrictions). An offer of dark fibre

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<sup>146</sup> Proposal to amend the Framework directive, presented by the Commission on 13 November 2007 (article 12).

could, therefore and in certain situations, complement the current offer of conduits with the added advantage of being able to contribute to a reduction in the overall level of investment, providing resources for greater coverage of the country by the NGAs<sup>147</sup>.

It is noted that this type of obligation may, in principle, only be imposed on a provider with significant market power in the relevant access market(s) and provided that it uses fibre optic in FTTCab and/or FTTH/B type solutions.

**Question 37:** In view of the existence of a conduit access offer, do you consider the creation of a dark fibre offer by the incumbent operator to be necessary and justifiable? If so, in what situations?

**Question 38:** In the event that another operator is the first to occupy the remaining capacity of the conduits in a determined geographical areas with installation of fibre network, does it make sense to oblige that operator to give access to the fibre in that geographical area? If so, under what conditions?

**Question 39:** In a scenario in which due to a lack of conduit capacity in a determined geographical area, the obligation of access to fibre is imposed (in one of the technically viable alternatives) does it make sense to impose a point to point topology due to the greater facility and diversity of modalities of access?

Finally, it is recorded that under the terms of the ORAC, the conduit routes and associated infrastructure consist of Permanent Manholes (CVP) and conduit segments (including Building Access Branches)<sup>148</sup>. That is to say, the buildings served by conduits are, from the outset, accessible to the beneficiaries of this offer and that they would want to bring the fibre optic to the customer's home<sup>149</sup>.

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<sup>147</sup> This despite the fact that the investment in fibre optic does not constitute the most relevant part of the investment associated with the type of offers covered.

<sup>148</sup> "Conduit segment which allows the connection to be made from the buildings or other installation to the Conduit network and associated infrastructure, through manholes giving access to the buildings

<sup>149</sup> Even though there is a need for a definition of the legal regime is (by legislative measure) applicable to so called Communications Infrastructure in Urban Developments( ITUR), based on principles of open and non-discriminatory access irrespective of the operator responsible for its implementation.

### 6.2.2 The ITED regime

The use of ducts inside the buildings is beyond the scope of the ORAC, being currently regulated by the ITED regime<sup>150</sup>, which constitutes a fundamental instrument for the reduction of “vertical barriers”. However most of the buildings in Portugal do not have the characteristics and capabilities introduced by this regime, whereby physical or administrative barriers to the access of customer homes might exist for operators who want to implement FTTH type solutions (as well as FTTB for the installation of DSLAM and access to the building distributor), because there are no internal ducts (or space in existing ones) or permission is not given by the condominium<sup>151</sup> for their installation or for the installation of additional cables.

It should be added that while it is possible to pass new cables, for example fibre optics, in buildings constructed according to the current version of the ITED manual, this capability may be exhausted with the installation of additional and successive cables by different operators. As a result constraints may arise in terms of competition. On the other hand, the installation of various cables in the building does not coincide with criteria of efficiency. This last issue may be reduced by the adoption of harmonised solutions, which may be discussed and identified as part of the development of a new ITED manual, which will provide for solutions of an adaptive type for buildings that are already constructed.

In any case, exclusivity agreements (and/or total occupation of infrastructure)<sup>152</sup> must be avoided, especially in respect of access to buildings, as such agreements would, from the outset, hinder other interested operators from being able to offer their products to these potential (new) customers<sup>153</sup>.

Without prejudice and in the light of other issues concerning access to buildings, such as delays or difficulties in obtaining permissions from condominium, it is the position of ICP-ANACOM that the manifestations of operators should be welcomed and supported where they express (including public expression) their availability or commitment with respect to opening up their respective networks and infrastructure to other operators.

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<sup>150</sup> ITED is the scheme governing the planning and installation of telecommunications infrastructure inside buildings and the respective connection to the public telecommunications networks. It also covers the activity of installation certification and is regulated by Decree-Law no 59/2000 of 19 April.

<sup>151</sup> Or by the Municipalities, if the building, for example, is located in a historic zone (urban)

<sup>152</sup> Even though it is possible to pass new cables (in fibre optic) inside buildings constructed under ITED, capacity could be exhausted with the installation of additional and successive cables by different operators, which also does not coincide with criteria of efficiency

<sup>153</sup> It is noted, however, that in the case of ITED, the regime set forth in Decree-Law 59/2000 of 19 April, expressly prohibits the occupation of conduits where the occupying operator does not have customers in the building

It is important to note, however, that currently there are constraints of a legal nature which are not included within the scope of specific sectoral legislation<sup>154</sup>. In fact the legal property regime governing apartments/condominiums, at times impedes access to buildings and the revamp of the respective infrastructure. Accordingly, the necessary reversal of a situation in which the majority of buildings do not have the characteristics and capabilities introduced by this new regime cannot be governed exclusively by a possible amendment to the ITED regime.

**Question 40:** Do you consider the legal and regulatory rules on access (e.g. in fibre optic) to buildings and the homes of customers by operators to be sufficient, particularly with respect to the incentives to share support infrastructure? If not, what alternative solutions do you propose, taking account of the restrictions imposed by the legal property regime governing apartments/condominiums?

**Question 41:** What technical adaptation do you consider should be made with respect to the ITED, keeping in mind the existence of older buildings?

### 6.2.3 The Reference Unbundling Offer (ORALL)

As in the previous point, emphasis should be given to the importance that the OLL has had in the development of broadband markets in Portugal, in terms of coverage and the number of accesses. This has enabled significant advances with respect to retail offers, in terms of innovation (e.g. greater bandwidths, reaching 24 Mbps, and the availability of subscription television services supported on copper pair - IP-TV) and also in terms of price (in absolute terms or through the option of migration to offers with the same price but greater bandwidth)

These recent developments have had a substantial impact on the conditions of competition, with the number of customers benefiting from offers supported on unbundled accesses already exceeding three hundred thousand. For this purpose, various operators have made recent investments from which they are now deriving return (in equipment and sales and marketing). Accordingly, it is important that these investments are now protected in a

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<sup>154</sup> According to the provisions of the legal property regime governing apartments/condominiums, set out in the Civil Code, general installations for communications constitute common areas of the building (article 1421, paragraph 1, point d)) and their administration is the responsibility of the condominium assembly and the administrator. In this respect, each member of the condominium shall have as many votes as complete units according to the percentage set out by article 1418 (article 1430) and determinations passed in the condominium assembly, except by special provision, by the majority of the votes of the invested capital (article 1432 paragraph 3).

scenario of significant alteration to the technological framework driven by NGA development and of market changes.

Therefore, a significant part of the broadband market is dependent on the OLL wholesale product, whereby the beneficiary operators have decided to invest more heavily in their own infrastructure, “scaling the investment ladder” with respect to RARP (“*bitstream*”) based offers, with the expectation of ensuring, in the medium-long term, appropriate return on these investments in the network itself and co-installation in hundreds of MDFs

Accordingly, and without prejudice to the results of a future analysis of market 4 of the Recommendation on relevant markets, consideration must be given to the need to maintain the current wholesale offer in force, with adaptations resulting from said analysis, leading to continuity in the availability of exchange and MDFs for co-installation and of loops eligible for unbundling.

In this respect, it should be emphasised that, given the importance recently acquired by unbundling and in view of the legitimate expectations of beneficiary operators and of the end users themselves, any structural alterations to the copper access network should be compatible with the fulfilment of the obligation to supply access to the local loop and local sub-loop.

Therefore, the ORALL already provides for the unbundling of the local sub-loop<sup>155</sup>, even though this solution has not yet been employed by any of the beneficiaries of this offer. Obviously, with the maintenance of the copper network as the basic infrastructure, and above all because an operator might choose to invest in FTTCab solutions, the unbundling of the local loop becomes more relevant. This is despite the fact that, for practical reasons and reasons of cost as set out above, this may not be the solution most suitable in all situations, especially for the entirety of the national territory.

Furthermore, it does not appear reasonable to assume a scenario which may lead to new barriers to competition, for example with the installation of new street cabinets or the adaptation of existing cabinets in a way that – in terms of space and/or time – other operators do not have access to said cabinet(s). That is to say, the networks must be “more open” and not “more closed”

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<sup>155</sup> By determinations of ICP-ANACOM of 28 June 2001 and 17 January 2002.



In any case, it is reasonable to assume that the ORALL can bear certain alterations, in the event that the operators decide to invest in NGA, particularly in FTTCab type solutions with recourse to the unbundling of the local sub-loop. Some aspects for analysis include:

- The scope of the offer (possible inclusion of optic loops);
- Coverage in terms of the number and location of MDFs and APs;
- Geographical differentiation (possible alteration to the obligation to offer unbundling in certain geographic areas or different requirements according to the area);
- Definition of processes of migration from current wholesale projects to future NGA products, such as the unbundling of the local sub-loop;
- Operational details with respect to the unbundling of the local sub-loop (processes, co-installation, connection to street cabinets – backhaul, etc.), implementation of procedures and quality of service requirements, potentially through the SLA;
- Effective migration of end customers (that is migration to the street cabinets or fibre optic solutions), seeking always to minimise the impact of network alterations on active services.

With respect to the possible inclusion of fibre optic within the scope of market 4, it is perhaps premature at this time to seek to set out the impact on the ORALL and possible alterations thereto.

The unbundling of the local loop, the provision of which was included within the framework of the ORALL, raises complex questions about the access to information on the network, network integrity and security and access, as well as questions related to the affectation of costs and price. In an initial phase of identification with regard to the questions, it is judged that a work group should be formed. This appears to be a practice that has been adopted during the initial phase of the fibre optic development in other countries, particularly, in France, Ireland and the United Kingdom.

**Question 42:** Do you believe that the problems identified and resolved with respect to the ORALL have analogy with those regarding access to a fibre optic network?

**Question 43:** Do you consider that specific measures are needed in order to protect the investment made with basis in the ORALL? If so why and what?

#### 6.2.4 The reference offer for the wholesale supply of broadband access (“Rede ADSL PT”)

In the decision of 24 June 2005 regarding the definition of product and geographic markets, the assessment of significant market power (SMP) and the imposition, maintenance, alteration or suppression of regulatory obligations in the wholesale broadband access market, ICP-ANACOM did not consider, at this time, that alterations to the market associated with the use of fibre had relevant impact (on either the supply side or the demand side), while recognising the large degree of potential. This translates into a common approach to most market analyses conducted by the various NGAs.

More recently, ICP-ANACOM launched a public consultation on “*Naked DSL*” with the aim of gathering the opinions of the various market players with respect to the introduction of this exclusive wholesale offer for broadband services. The regulator considers this to be important in the encouragement of competition and a greater penetration of broadband services, especially in less populated regions and in less favoured populations. In the decision of 25 July 2007, it was recommended to PT Comunicações that it present an alteration to the RAPT offer in order to include “*Naked DSL*”, in the framework of both modalities (IP and ATM aggregation) and applicable to active and non-active loops, with the intention of making this offer operational as of 01 February 2008<sup>156</sup>.

It is noted that the new “*triple-play*” offer of PT Comunicações, Meo, is supported at core network level, in new Ethernet and IP/MPLS technologies and not the ATM network, as the current RAPT wholesale offer. The new network supporting Meo, is already virtually an “All-IP”, network allowing the simultaneous provision of television (IP-TV), VoIP<sup>157</sup> and broadband access up to 8 Mbps (or 16 Mbps), competing therefore with (among others) RAPT supported services.

It is recalled that, in this respect, the new Recommendation defines in broader terms the wholesale broadband access market (new market 5) as “*compris[ing] non-physical or virtual network access including ‘bit-stream’ access at a fixed location. This market is situated downstream from the physical access covered by market 4 listed above, in that wholesale broadband access can be constructed using this input combined with other elements.*” The point of network where wholesale broadband access will be supplied will depend on the

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<sup>156</sup> A new version (27.0) of the RAPT was published on 31 October 2007, providing “*Naked DSL*” functionality and entering into force on 01 February 2008 meanwhile ICP-ANACOM is analysing the degree to which the provided offer is in line with the position set out in its decision.

<sup>157</sup> Voice service is not supported on the circuit exchange network but is on VoIP technology.

analysis of markets and, in particular, on the topology of the network and competition conditions.

Therefore, various forms of wholesale access may be included in this broad definition<sup>158</sup>, supported on any infrastructure which offers conditions equivalent to bitstream access. This approach could lead to both Meo support infrastructure and FTTCab or FTTH/B infrastructure being subject to inclusion in wholesale offer, depending, however, on the conclusions of the market analysis.

Meanwhile, and irrespective of whether or not the ORALL is maintained, it appears reasonable to assume that, at least in the short-medium term and in normal situations that technical-economic conditions will not be seen that would provide for competition at network level in a significant part of the national territory. In practice, this leaves a large citizen fringe outside the scope of the more competitive markets, particularly those citizens living in more suburban or rural areas. Obviously, in a situation in which there is widespread migration to FTTCab or FTTH access solutions, the reassertion of a monopolistic situation could become even more latent. This leads to the view that an even greater swathe of citizens on the fringe would be deprived of being able to choose between alternative offers.

In this scenario, and especially when and while the operators do not have the means or capacity to make profound investments at network level, it may be necessary to set out a complimentary wholesale bitstream offer based on efficient technology, potentially with coverage ranging from the equipment (DSLAM) to MDF level (or even so far as the street cabinet, to a regional and/or national node which guarantees, as the RAPT currently guarantees, that operators could develop distinct retail offers ( even if to a lesser degree than with the OLL) supported on the access of the incumbent operator. Another question is whether there is sufficient incentive in these less favoured regions with less intense completion for investment in NGA. This question is addressed in section 6.1

In this respect it is worth pointing to the recent decision of the CMT to oblige Telefónica to provide a wholesale bitstream offer supported on the optic loops (FTTH/GPON) only for those operators that commit themselves to investments in the access to conduits, thereby

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<sup>158</sup> The EC considers that the final consumer which uses DSL expects to access a service with high debits and that, to satisfy this demand in retail, any wholesale broadband access services supported by any DSL technology (e.g.VDSL) seem to be substituted, admitting that, in the eye of the final consumer, the exchange between these technologies does not lead to significant costs to change.

developing their own NGAs and while there are not conditions in place that would allow them to implement their network in the regions concerned<sup>159</sup>.

In any case, and irrespective of the point of access (local, regional or national), it appears necessary to guarantee that the beneficiaries of this offer have an appropriate backhaul product for the connection to the network, whether through leased circuits, dark fibre or a specific product yet to be created, naturally paying prices that ensure a return on the investment – and on the associated risk – made in the network supporting these offers.

It is noted, however, that any *bitstream* access at DSLAM level, and especially where such access is located in a street cabinet, would result in the beneficiary operator facing the same connection “problems” (*backhaul*) as are present in an FTTCab solution, i.e. high costs, given the greater extension and number of necessary lines. The maintenance of the solution that is currently preferred by RAPT beneficiaries, the bundling of traffic at a national level, is the one that allows lower costs in exchange for less flexibility in the management of the service by the operator and less use of its network.

**Question 44:** What alterations do you consider necessary in the broadband wholesale offer, in order to ensure a high level of coverage and capacity for differentiation? Do you consider access at the level of the DSLAM and/or Ethernet interface to be appropriate?

**Question 45:** Do you think that the retail offer supported in the (future) RAPT will be able to compete, in terms of characteristics and coverage, with the offers supported in unbundled loops? For example, should the RAPT support the offer of IP-TV services by operators?

**Question 46:** In the context of an FTTCab, what specifications do you think should be specifically considered in a possible VDSL bitstream offer?

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<sup>159</sup> See

[http://www.cmt.es/cmt\\_ptl\\_ext/SelectOption.do?tipo=pdf&detalles=090027198005d0f2&nav=busqueda\\_resoluciones](http://www.cmt.es/cmt_ptl_ext/SelectOption.do?tipo=pdf&detalles=090027198005d0f2&nav=busqueda_resoluciones).

## Annex 1

### Certain case studies at a European level of NGA evolution

A number of European case studies are presented below with respect to the evolution to NGA. These illustrate the disparity of the options which the different operators have taken and which depend on various factors, such as the topology of the existing network, the length and state of the loops and sub-loops, the geography of the country and population density.

The common aspect in the evolution to NGA is the introduction of fibre optic, while there are different solutions at the level of access network including where this fibre optic is installed.

#### Germany

In September 2005 Deutsche Telekom (DT) announced that it intended to implement VDSL and ADSL2+technology in respectively in 50 and 750 towns and cities<sup>160</sup>.

The objective of DT is the phased extension of fibre optic infrastructure up to the street cabinets<sup>161</sup>, with this development beginning in 10 of Germany's largest cities and expanding, in a second phase, to 40 other cities. This investment totals around 3 billion euros.

DT intends to maintain the existing main distribution frames and local exchanges until at least 2012.

According to DT, 10 thousand kilometres of fibre optic had been installed on the primary network by June 2006, together with the installation of external DSLAMs in 10 thousand street cabinets for the provision of VDSL services.

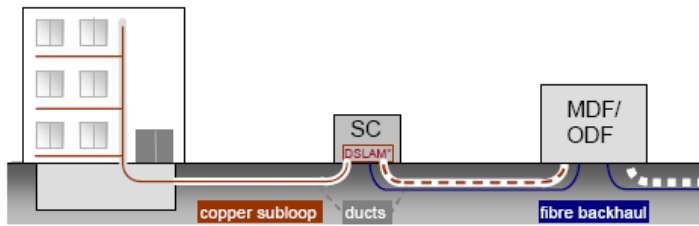
The topology of this type of network (FTTCab) is illustrated in Figure 10.

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<sup>160</sup> Reaching a total of around 10 million households in 2007.

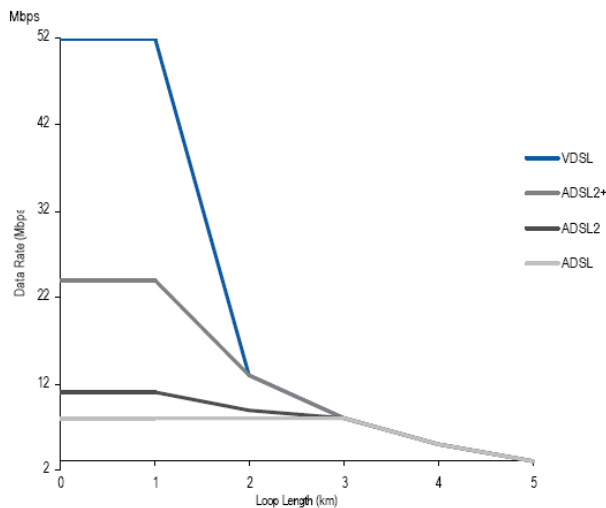
<sup>161</sup> "Fibre To The Cabinet" (FTTCab).

**Figure 10.** Diagram illustrating FTTCab (Source: ERG)



By reducing the length of the copper infrastructure (to the street cabinet instead of the main distributor frame) it is possible, in theory to reach transmission speeds of up to 50 Mbps with VDSL technology (for distances between the end user and the street cabinet of less than 1 km – see Figure 11).

**Figure 11.** Maximum transmission speeds of xDSL technology in function of the distance to the customer (source: Alcatel)



DT does not wish for this new infrastructure to be regulated, as it does not intend to grant access to this network to its competitors.

## France

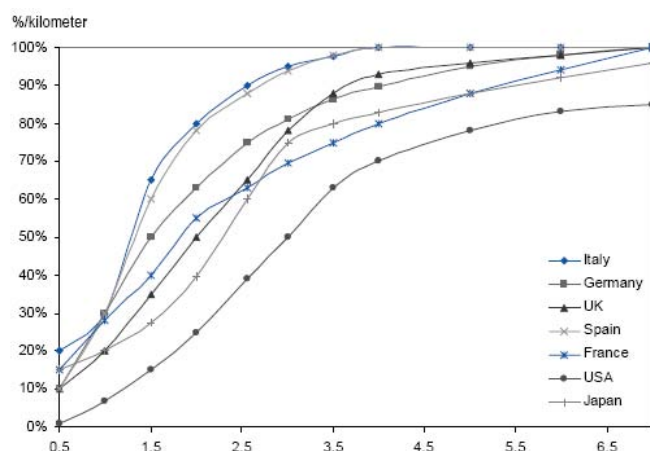
France Telecom (FT) has plans for the development of FTTH<sup>162</sup> G-PON<sup>163</sup> in Paris and in some of main French cities (including Marseilles, Lyon, Lille and Toulouse).

<sup>162</sup> "Fibre To The Home".

In France, the introduction of VDSL is not viable, given that the number of street cabinets per main distribution frame is reduced, implying that the average length of the loop from the end user to the street cabinet is high. Therefore, the introduction of VDSL in France would not lead to the maximum speeds that are theoretically envisaged for this technology, thereby limiting the benefits of VDSL.

Figure 12 shows the length of loops in various countries of the European Union, whereby it can be observed that, for example, while around 75% of the loops in Italy have a length of less than 1.5 km, in Spain only around 25% of loops reach, as a maximum, that length. This gives grounds for different approaches to the evolution to NGAs.

**Figure 12.** Length of loops in various EU Member States (Source: JP Morgan<sup>164</sup>)



## Holland

At the end of 2005, KPN announced its intention to migrate its network to an NGA. As in Germany, the plans of KPN included the roll out of fibre optic on the primary network up to the street cabinets<sup>165</sup>. However, in contrast to Germany, VDSL coverage would span the entirety of national territory<sup>166</sup>. KPN also planned to dismantle the main distributor frames and a set of infrastructure and buildings which housed this equipment (around 1400) and were no longer needed on this new network, leaving around two hundred as “metro core locations”.

<sup>163</sup> “Passive optical network”.

<sup>164</sup> “The Fibre Battle, European Equity Research”, of 4 December 2006.

<sup>165</sup> Around 28 thousand street cabinets.

<sup>166</sup> By 2010.

The investment involved totals between 1 and 1.5 billion euros.

KPN intended to offer competitors access to this new structure at the level of “*metro core locations*” (in the case of “*bitstream*”) and street cabinets (in the case of OLL).

## Italy

Telecom Italia (TI) announced that it would:

- Gradually introduce<sup>167</sup>, FTTB or FTTCab solutions, based on G-PON and VDSL technology from street cabinet to the home of the end user;
- Adopt the FTTH solution in specific cases;
- Extend ADSL2+ coverage from 51% in 2007 to 67% in 2009, achieving around 100% over the long term;
- Adopt IP technology throughout the network.

TI expects to invest around half a million euros in this project between 2007 and 2009 and 6.5 billion euros over the entire course of the project.

The network of IT consists of 145 thousand street cabinets, of which 75 thousand will be equipped with VDSL2.

## Sweden

In April 2007, the NRA of Sweden (PTS) published a document<sup>168</sup>, with the aim of setting out a strategy by which in 2010 all abodes, public bodies and businesses would be connected to broadband. In June 2007, the NRA published the document<sup>169</sup>, in which it argued for the advantages of functional separation of the incumbent operator (TeliaSonera) for the development and promotion of broadband competition.

The strategy of PTS for the development of broadband centres on three areas: (a) objectives and measures in terms of accessibility; (b) the need for a model which allow

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<sup>167</sup> Coverage will grow from around 0.2% in 2007 to 5% in 2009, corresponding to 20 major cities. Over the long term coverage should reach 65%, corresponding to 1,140 towns and cities.

<sup>168</sup> “Proposal for Swedish Broadband Strategy” – See <http://www.pts.se/en-gb/Documents/Reports/Telephony/2007/Proposed-Broadband-Strategy-for-Sweden---PTS-ER-20077/>.

<sup>169</sup> “Improved broadband competition through functional separation” – See [http://www.pts.se/upload/Rapporter/Tele/2007/EN/Improved\\_broadband\\_competition\\_through\\_functional\\_separation\\_2007\\_18.pdf](http://www.pts.se/upload/Rapporter/Tele/2007/EN/Improved_broadband_competition_through_functional_separation_2007_18.pdf).



equality of treatment between operators and (c) open network, with special focus on the access of operators to the local fibre optic networks.

The NRA recognises that there are important public interests which cannot be met solely through the private market and the promotion of competition, such as the availability through the territory of a modern and robust network with high transmission capacity. As a result the Swedish government suggested that a long term objective be set for access to broadband infrastructure (consubstantiated in a range of measures with a budget of 1.135 billion SEK, around half of which be financed using structural funds and rural development programmes) and that an effort be made to include broadband within the concept of Universal Service (US) , with respect to a review of the Universal Service Directive.

It should be noted that the concerns of the regulator with respect to the implementation of fibre networks only regard the access network, given that in transmission, a plurality of fibre optic networks has been growing.

The PTS, inspired by the United Kingdom's *Openreach*<sup>170</sup> approach, argued that the appropriate model for ensuring equal treatment between operators should rest on the functional separation of TeliaSonera. It announced, in parallel, that the conditions of migration to NGN and the phasing of the current infrastructure would be object of future appraisal.

Taking into account that the Swedish regulatory framework offers only a very limited margin for the possible regulatory imposition of functional separation (even after the review of the market analysis) and considering that the State is the main shareholder in TeliaSonera, the NRA recommended to the government that an effort be made in order that TeliaSonera enact functional separation voluntarily and that legislation be amended so as to allow the regulator to accept voluntary commitments by operators. In January 2008 the Government decided to accept of both of the regulator's proposals<sup>170</sup>, even while the incumbent operator considered that functional separation would adversely affect its predisposition to invest.

One of the independent units resulting from the functional separation intended by the regulator would cover as a minimum the OLL and associated services, including, in particular the assets which would allow fibre optic implementation (FTTCab). The other independent unit would include bitstream and associated services. In this context and on the same date, TeliaSonera set up TeliaSonera Skanova Access AB, a new subsidiary taking possession of the infrastructure of the wholesale network, with a view to better quelling the concerns of transparency and control.

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<sup>170</sup> See <http://www.sweden.gov.se/sb/d/586/a/96173>.

The PTS further intended that it be conferred with powers to impose the opening of broadband networks financed by public funds to other service providers. The NRA likewise recommended that the Government take the following guidelines into consideration when allocating funds:

- Support the implementation of broadband infrastructure in areas where this does not exist (especially in rural areas and small communities);
- Provide its support in a form that is technologically neutral;
- Guarantee that the infrastructure financed by the government is open to all service providers, especially taking into account that it would seldom be commercially feasible or desirable from a socio-economic point of view to install parallel fibre optic networks at the level of access lines.

A further measure recommended by the PTS was that the joint planning of conduits – which result in important costs reductions – be extended to energy distribution companies.

In terms of spectrum, the PTS planned, over the course of the first half of 2008, to conduct auctions for the allocation of licences for 15 frequency blocks in the 2.6 GHz band in order to provide end users with more opportunity to gain access to wireless broadband services<sup>171</sup> (in Sweden around 144 thousand households and company premises have conditions that only permit access to wireless broadband<sup>172</sup>).

It should be noted that the local fibre optic networks, which often have municipal participation, are a strong reality in this country, although these are not always open networks. In fact, according to the Swedish Association of Local Authorities and Regions<sup>173</sup>, in 2006 there were 153 local fibre optic network, of which 104 did not offer wholesale access (despite the fact that 24 of these networks without wholesale access had been financed with the public funds of the Swedish government or of the European Union).

With respect to the investments of the incumbent operator, reference is made to the project, announced in March 2008, for coverage of between 1.5 and 2 million households and company premises with very high speed broadband services over a period of five years<sup>174</sup>. Television is considered an “anchor” for this investment, but online games and household

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<sup>171</sup> See <http://www.pts.se/en-gb/News/Press-releases/2007/Public%20consultation%20of%20PTS%20draft%20auction%20rules%20for%20future%20wireless%20broadband/>.

<sup>172</sup> See <http://www.pts.se/en-gb/Documents/Reports/Internet/2008/Broadband-survey-2007---PTS-ER-20085/>.

<sup>173</sup> See “Lokala bredbandsnat i Sverige år 2006. En översiktlig beskrivning av utbredning och verksamheter”.

<sup>174</sup> See [http://www.teliasonera.com/press/pressreleases/item\\_page?prs.itemId=338043](http://www.teliasonera.com/press/pressreleases/item_page?prs.itemId=338043).

security are also appealing business areas. TeliaSonera envisages, with respect to this project, cooperation with the municipalities, property owners and housing cooperatives.

The solutions conceived for the “elective” modernisation of network are varies, encompassing fibre optic connections with speeds in excess of 100 Mbps and VDSL2 over the copper network with speeds of between 30 Mbps and 70 Mbps.

With respect to the alternative operators, note should made of Bredbandsbolaget<sup>175</sup>, the second largest provider in Sweden of broadband services (supported using Ethernet, DSL and fibre optic) and IP telephone services, VoD and television.

The Bredbandsbolaget network covers around 450 thousand households, which guarantees it 25% of the residential broadband market. Of these users, around 175 thousand use voice over IP services. Approximately 15 thousand companies make use of the services of this operator. In terms of coverage the Bredbandsbolaget network has the potential to serve more than two million residences in more than 70% of Swedish territory. This coverage is developed in direct access using FTTx technologies (in 40% of cases) and xDSL over the unbundled local loop (in 60% of cases).

An important element in the development of the coverage of the Bredbandsbolaget network is the development of partnerships (see Figure below):

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<sup>175</sup> Since July 2005, Bredbandsbolaget has been a full subsidiary of the Norwegian operator Telenor.

**Figure 13: Partnerships for extension of coverage.**

Partnership	Description
HSB	In August 1999 B2 Broadband and HSB signed an agreement to install broadband in all HSB associates. HSB is the largest association of apartment owners in Sweden
Municipality of Markaryd	In April 2005 B2 signed a 10 year agreement with the Municipality of Markaryd to offer broadband services using FTTx in 5,900 apartments.
Linköping Residents Association	In May 2005 B2 signed a 10 year agreement with the Linköping Residents Association (Stangaataden) to supply services of FTTx broadband in 14 thousand apartments in Linköping.
Akileus	In May 2005 B2 signed a 10 year agreement with the Akileus Association to supply services of FTTx broadband in 4,600 apartments in Gothenburg, Trollhattan and Borås.
Municipal Corporation of Eidar	In March 2006, the operator established a partnership with the Municipal Corporation of Eidar to supply 100 Mbps broadband services to residents of the local community.

**Source:** Ovum and Point-Topic.

Bredbandsbolaget believes in the possibility of expansion and gain in market share though the OLL with ADSL2+ e VDSL2 technologies, whereas it is estimated that 35% of all apartments in residential building with potential for FTTx are already served by an operator. This is to the extent that, for isolated residents and small companies (in less populated areas), the development of FTTB is not possible and the costs of an FTTH solution are very high. Therefore, despite having the view that FTTx is the definitive solution for residential buildings, Bredbandsbolaget sees an opportunity in the OLL for rapid entry, with low investment, to markets where it is not possible to implement fibre optic.

According to this alternative operator, FTTx is the definitive future solution, but it will continue to co-exist with cable distribution networks and the OLL for an extended period of time, also because the development of FTTx in Sweden is being delayed due to the lack of access to dark fibre in the backhaul and to the creation of “local monopolies” by community networks.

The Bredbandsbolaget case illustrates the results of the initiative of an alternative operator in the search for solution which provide for the differentiation of services – and consequent gains in market share. The initial FTTx network developments took place at a time when Ethernet technology was not as developed for this type of use and the operational

challenges involved in passing fibre optic were considerable and costs much higher. Bredbandsbolaget recognises that the FTTx offer will continue to exist alongside other solutions, with the offer of cable distribution networks and the offer of OLL based xDSL.

## Annex 2

### The German situation

In Germany, the issue of NGN/NGA was debated from two angles:

- In terms of the law of electronic communications;
- In terms of market analyses (particularly the former markets 11 and 12).

#### Law of electronic communications

In the first case, following the threat of DT to cancel a planned 3 billion euro investment in the VDSL network in the event that it had to grant its competitors access to this network, the German government conceded "regulatory holidays" with respect to the access to this network, despite the dominant position of DT in the broadband market. These "regulatory holidays" were realised through the publication, in February 2006, of a proposed amendment to the current law. This would establish a rule of non-regulation of new markets, preventing BNetzA from imposing access by competitors to this VDSL network<sup>176</sup>.

The EC, following repeated warnings to the German government, initiated "fast track" infringement proceedings against Germany<sup>177</sup> with the view that the German law jeopardised the competitive position of DT's existing competitors and made it much harder for new competitors to enter German markets.

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<sup>176</sup> The articles concerned are the following:

"§ 9a (Regulation of new markets)

(1) Subject to the following paragraph, new markets in principle shall not be subject to regulation according to part 2.

(2) *If facts justify the assumption that a lack of regulation will obstruct on a long-term basis the development of a sustainable competition-oriented market in the field of telecommunications services or networks, the Federal Network Agency can submit a new market, deviating from paragraph 1, according to the provisions of §§ 9, 10, 11 and 12 to regulation according to part 2. In its examination of the necessity of regulation and when imposing measures the Federal Network Agency considers in particular the objective of the promotion of efficient investments into infrastructure and the support of innovations."*

"§ 3 Nr. 12b: 'new market': a market for services or products, which do not differ only insignificantly from currently existing services or products with regard to capacity, coverage, availability to larger user groups (mass-market ability), price or quality from the perspective of a reasonable customer, and which do not only substitute these."

<sup>177</sup> See

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/237&format=HTML&aged=1&language=EN&uiLanguage=en>.

On 3 May 2007, the EC sent Germany a reasoned opinion<sup>178</sup>, entering the second stage of infringement proceedings (the last stage before referring the case to the European Court of Justice). On 27 June 2007, the EC referred the case to the European Court of Justice, given the German Government's unwillingness to amend the law to take account of the concerns of the EC<sup>179</sup>.

## Former market 12

In October 2005, BNetzA gave notice of the draft decision on the former market 12. In this decision BNetzA did not include VDSL within the scope of the relevant market given that:

- Such products were not available in Germany, and there was no expectation that they would become widely available during the period of analysis.
- There was no substitutability on the demand side, at a retail level, between VDSL and ADSL or other xDSL products, given that the first offered a far greater bandwidth and required the installation of new equipment – according to BNetzA, the high price of this product would reduce the incentive for end users to replace ADSL services with VDSL services;
- There was no substitutability on the supply side of the offer, given that VDSL services implied investments in the fibre optic infrastructure that are relevant for competing operators, who would be reluctant to replace ADSL connections with VDSL in the short term.

In November 2005, the EC decided to extend the investigation for a further period of two months. According to the EC:

- VDSL services do not differ from products offered over ADSL2+ (since these services offer the same functionality, they should not be placed in separate markets);
- The costs of switching for the operators (wholesale customers) are not relevant, given that they are indifferent to the technology supporting their services;

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<sup>178</sup> See

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/595&format=HTML&aged=1&language=EN&uiLanguage=en>.

<sup>179</sup> See

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/889&format=HTML&aged=1&language=EN&uiLanguage=en>.

- Interested parties did not have the opportunity to comment on the exclusion of VDSL from the relevant market, given that it was not envisaged in the national consultation;
- It was expected that in Germany, the development of VDSL would be rapid, in the short term, in light of the plans announced by DT to develop a fibre optic network in conjunction with VDSL.

Following the comments of the EC, in December 2005 BNetzA amended the previous notification to include VDSL within the scope of the relevant market (where it is a substitute for other bitstream services)

Taking the alteration made by BNetzA into account, the EC closed its “serious doubts” procedure noting that BNetzA should conduct a detailed analysis of the sustainability from the supply side and from the demand side before excluding a given product from the market for wholesale broadband access.

With respect to obligations, BNetzA notified the EC, in July 2006, of its intention to impose obligation on DT of access, non-discrimination, transparency, separation of accounts and control of prices<sup>180</sup>. The CE stated<sup>181</sup> that as soon as VDSL products were available, access to VDSL infrastructure should be automatically imposed.

#### **Former market 11**

In December 2004, BNetzA submitted a notification to the EC in respect of the relevant market for wholesale access to the local loop which included access to hybrid loops (copper/ fibre optic – products designated as OPAL and ISIS).

The EC did not oppose the analysis made, making the criticism however with respect to the approach of BNetzA to access to fibre optic that:

*“(...) to the extent that fibreglass connections can be used to offer wholesale unbundled access to local loops and sub-loops for the purpose of providing broadband and voice services, like metallic loops and sub-loops, they may [...], on the basis of specific national circumstances, form part of market 11.”*

According to the EC, the fact that the Recommendation defined the relevant market as consisting of loops (and sub-loops) did not inhibit national regulatory authorities from

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<sup>180</sup> With respect to the offer with IP bundling. The obligations in the offer with ATM bundling (identical to those imposed in the offer with IP bundling) were notified in January 2007

<sup>181</sup> In line with the comments made in relation to the definition of market.



identifying markets which differed from the Recommendation, in accordance with specific market circumstances<sup>182</sup> and taking into account the provisions of the Framework Directive. In this case the national regulatory authorities should apply the “three-criteria test”, in order to reach a conclusion as to whether this market would be subject to ex-ante regulation.

In the decision published in February 2005, which contained the definition of obligations, BNetzA, despite the comments of the EC, maintained its decision to remove the existing obligations with respect to the loop constituted totally in fibre optic<sup>183</sup>, that is the obligation of DT to grant access to its network of (loops in) fibre optic considering that it would a competitive “market” (despite having been regulated until that time under German law<sup>184</sup>).

Later, in March 2005, the EC published<sup>185</sup> its comments with respect to the decision of BNetzA to remove the obligation of granting access to fibre optic loops, while not making comment on the decision with respect to copper and hybrid loops. The EC questioned whether the obligation of access should be extended to fibre optic loops, with the view that such fell within the scope of the former market 11 and emphasised that, in accordance with article 27 of the Framework Directive, no regulation (obligation) may be removed without prior analysis of the market<sup>186</sup>.

Since the EC does not have powers to veto decisions with respect to the imposition of obligations, BNetzA made no change to its decision where access to the fibre optic loop was concerned and published its final decision in April 2005.

More recently, in May 2007, BNetzA notified the EC and the NRAs on the second analysis of the former market 11, maintaining, in general terms, the definition of the market.

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<sup>182</sup> In the case of Germany, connections (totally or partially) in fibre optic (“*such as newly developed fibre lines to business areas, built under competitive demand and supply conditions*”) are relevant infrastructure.

<sup>183</sup> BNetzA affirmed that it intended to remove these obligations since these fibre optic “connections” had not been included in the old market 11, but that it had not presented any analysis of substitutability between the copper loops and fibre optic loops or between these and hybrid loops (copper/fibre optic), which continue to be regulated.

<sup>184</sup> BNetzA informed the EC that fibre optic local loops were regulated, to date, based on dominant position of DT in the access market, irrespective of the technology used, whereby this obligation of access has been temporarily maintained.

<sup>185</sup> See EC document at

[http://forum.europa.eu.int/Public/irc/info/ecctf/library?l=/germany/registeredsnotifications/de20050150/de-2005-0150-publicpdf/ EN\\_1.0 &a=d](http://forum.europa.eu.int/Public/irc/info/ecctf/library?l=/germany/registeredsnotifications/de20050150/de-2005-0150-publicpdf/ EN_1.0 &a=d).

<sup>186</sup> The EC took the position that connections totally in fibre optic were developed by DT not only in specific cases where there was demand for high capacity but also a substitute of metallic loops to connect non-corporate customers. In these cases, the EC considered that the competitive conditions did not differ significantly from those with respect to metallic and hybrid loops.

In June 2007, the EC made a series of comments on the analysis made, especially with regard to (i) the relationship between the former markets 11 and 12 in the context of NGA; (ii) access in the MDF to new infrastructure; (iii) access to conduits and dark fibre; and (iv) co-installation in street cabinets.

The comments of the EC were later accepted by BNetzA.

## Glossary

**3D:** Applications with 3 dimensional graphics.

**Backhaul:** Generally a connection between a point (node) belonging to the access network and another point (node) of the core network or transport network

**CDMA/UMTS** (*Code Division Multiple Access*): Is a channel access method in communication systems. It is a technique for digital signal transmission used in cellular telephone systems, which allows the spectral space to be used more efficiently. Also known as “*spread spectrum*” it has several variants, e.g. CDMA2000, the most used, and the third generation W-CDMA standard (3G)/UMTS.

**CL** (Local Exchange or Remote Unit): Building (or, in the case of outside remote units, a street cabinet or container) where the cables (copper or fibre optic) from the access network terminate, and where switching and core network transmission equipment is located.

**CMTS** (“*Cable Modem Termination System*”): Equipment which functions as a protocol translator and allows the transport of Internet data over a coaxial cable network. In the CMTS, the digital Internet signal is converted to analogue and sent to the “cable modem” installed at the computer of the subscriber which transfers back into digital. The principal CMTS suppliers work with the open DOCSIS standard (“Data Over Cable Service Interface Specifications”).

**CPE** (“*Customer Premises Equipment*”): Communications equipment (modem, telephone, set-top-box, etc.) installed on the premises of the end consumer.

**DSLAM** (“*Digital Subscriber Line Access Multiplexer*”): Equipment which allows copper lines to support broadband Internet access. It is network equipment, normally located in the local exchange (but may also be installed in a street cabinet) whose function is to aggregate the traffic of various telephone lines which have modems that are compatible with xDSL technology and relay it through the data network (core)

**DSL or xDSL** (“*Digital Subscriber Line*”): is a family of technologies which provide a means of digital transmission of data over copper pairs, making use of the telephone network that connects the majority of residences. The typical download speeds of a DSL line vary from 128 kilobits per second (128 kbps) to around 100 Mbits/s depending on the technology implemented and offered to customers. The upload speeds are slower than download speeds for ADSL and VDSL (asymmetric transmission technologies) and are the same as SDSL or other symmetric technologies.

**DTH** (*“Direct-To-Home”*): Service of subscription television and audio signal distribution via satellite. It uses the satellite network for the direct distribution of television and audio signals to subscribers within the area of service provision.

**DTT** (Digital Terrestrial Television): is the name given to a set of digital television standards prepared to replace the analogue television systems. This system provides a capacity that is far superior to the analogue system, supporting a greater number of channels and other types of additional services. It includes specifications for a terrestrial component (DVB-T), cable (DVB-C) or satellite (DVB-S).

**ERG** (*“European Regulators Group”*): An independent group constituted by the 27 national Regulatory Authorities of the 27 Member States and set up by the EC in 2002 to provide reflection, debate and advice on the regulation of electronic communications.

**Ethernet**: Ethernet is a Local Area Network (LAN) technology based on the sending of packets and based on the standard IEEE 802.3. These LAN networks normally operate within the same building and connect nearby devices. Recent advances in technology have succeeded in increasing these distances; the current Ethernet networks can cover dozens of kilometres.

**FTS** (Fixed Telephone Service – traditional telephony service on the fixed network): Provision to the general public of direct voice transport in real time, at a fixed location allowing any user, though equipment connected to a network terminal point, to communicate with another terminal point.

**FTTx**: These are technologies which use fibre optic to supply data communication services, TV, Internet access and telephony. The fibre optic is carried to the street cabinet, pavement or as far as the premises of the customer, replacing copper or coaxial cables. The technology includes FTTN (*“Fibre To The Node”*); FTTC (*“Fibre To The Curb”*); FTTB (*“Fibre To The Building”*); FTTH (*“Fibre To The Home”*); FTTCab (*“Fibre To The Cabinet”*).

**FWA (BWA)** (*“Fixed/Broadband Wireless Access”*): is a term used to describe new wireless broadband technologies which encompasses mobile and fixed applications,

**H.323**: The standard H.323 (ITU-T – “International Telecommunication Union Telecommunication Standardization sector” recommendation) which specifies multimedia communication systems based on packets and without guarantee of Quality of Service (QoS).

**HDTV**: High Definition TeleVision.

**ITED:** ITED is the regime applicable to the planning and installation of telecommunications infrastructure in buildings and the respective connections to the public telecommunications network, as well as to the activity of installation certification. It is regulated by Decree-Law no 59/2000 of 19 April and technically supported by the ITED Manual (which covers technical solutions considered as minimums, based fundamentally in copper pair and coaxial cable technologies. Reference is also made to fibre optic technology, which will be covered in more detail in future editions) and the associated procedures<sup>187</sup>. Since 01 January 2005, it has been obligatory for all telecommunication projects in buildings to be executed in accordance with the ITED regime.

**IP** (“*Internet Protocol*”): A communication protocol between nodes (and equipment) of the network for the relay of data. The data on an IP network is switched and sent in packets (or datagrams).

**IP-TV:** Distribution of television channels (including high definition channels, HD) over IP networks.

**Local Loop:** The local loop consists of the physical circuit connecting the terminal equipment on the premises of the end user to the network infrastructure of the operator, normally to the MDF.

**MDF** (Main Distribution Frame): Infrastructure normally located in the local exchanges (and remote units), which provides the termination of copper pair cables of the distribution network and its (inter)connection to switching/aggregation equipment (e.g. switchers or DSLAM).

**MPLS** (“*Multi Protocol Label Switching*”): A technology for carrying packets based on labels (added to the IP packets) with the carriage performed based on this label and not the IP address. This allows the guarantee of QoS (Quality of Service) with the protection of critical applications. MPLS further allows the creation of Virtual Private Networks, guaranteeing a complete isolation of traffic with the creation of exclusive forwarding tables of each VPN

**Naked DSL:** *Naked DSL* is a wholesale offer modality which has the aim of enabling the provision an ADSL service to the end user without the requirement by the operator holding the local loop that the end user has to contract or (maintain) the FTS.

**NGN:** Recommendation “Y.2001 (12/2004) – *General overview of NGN*”, of UIT-T, defines NGN as: “*A packet-based network able to provide Telecommunication Services to users*”

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<sup>187</sup> See <http://www.anacom.pt/template2.jsp?categoryId=1402>.

*and able to make use of multiple broadband, QoS enabled transport technologies and in which service-related functions are independent of underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and services of their choice. It supports generalised mobility which will allow consistent and ubiquitous provision of services to users”.*

**ODF** (“*Optical Distribution Frame*”): Passive equipment where fibre optic cables terminate, equivalent to the copper main distribution frame (MDF).

**OLL** (Local Loop Offer): consists of the provision by PT Comunicações, S.A. to other operators of the local loop in twisted pairs so that they may in turn provide users with narrowband and/or broadband services.

**OLT** (“*Optical Line Terminal Unit*”): Equipment normally located in the local exchange, which is the point of connection of the access network (in fibre optic) to the core of the network. It also allows the concentration of traffic and the separation of voice and data, where necessary, for circuit switching networks (TDM) and to data networks (e.g. ATM).

**PA** (Attendance Point): the name given to a technical node/point of the network, which belongs to a given Exchange Area (EA) and which covers a determined geographic area within the EA with the capacity to support FTS and ADSL services.

**PON** (“*Passive Optical Network*”): without the use of active equipment. It is an optical point to multipoint network in which the fibre of individual users are aggregated in a passive optical splitter existing, from this aggregation point and to the OLT, it shares a single optic fibre. There are no active elements between the equipment of the operator (OLT) and the CPE installed on the premises of the end user.

**PD** (Distribution Point): point of separation between the secondary distribution network and the intermediate network of the network cables of buildings which there is no intermediate network.

**PTR** (Network Termination Point): Terminal point (extreme) of the individual installation of the final customer, where it is envisaged that connection is made to any telecommunications equipment, using a physical pair.

**QoS** (“*Quality of Service*”): Designation used for a set of parameters which characterise the performance, for example of a circuit, network or of a service.

**SIP** (“*Session Initiation Protocol*”): A standard of the Internet Engineering Task Force (IETF) (RFC 3261, 2002), for establishing calls and conferences over networks via IP. The configuration, modification or termination of the session is independent of the type of

network or application which will be used in the call; a call can employ different types of data, including audio, video and other formats.

**TDM** (*Time Division Multiplexing*): Switching and transport technology used in current circuits switching networks.

**RU** (Remote switching Unit): Equipment normally connected to the local exchange using fibre optic, which allows the connection of local loops to a remote network node (close to the customer) with concentration functions.

**VoD** (*Video on Demand*): allows a determined programme to be sent (according to a catalogue) to a customer at the desired moment and in response to an individual request. It generally involves payment, as opposed to conventional television broadcast to all customers capable of receiving it.

**VoIP** (*Voice over Internet Protocol*): A technology which allows the user to make telephone calls over a data network such as the Internet. It converts an analogue voice signal into a set of digital signals, in the form of packets with IP addressing which can be sent, specifically over an internet connection (preferably broadband)

**WiMAX** (*Worldwide Interoperability for Microwave Access*): Is a radio technology which provides broadband internet access, with a radius of coverage greater than that provided by Wi-Fi. It is considered by certain specialists as a potential substitute to DSL.