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COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels,
C(2008)

Draft

COMMISSION RECOMMENDATION

of [...]

on regulated access to Next Generation Access Networks (NGA)

This is a draft document which does not necessarily represent the official position of the European Commission.

Draft

COMMISSION RECOMMENDATION

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on regulated access to Next Generation Access Networks (NGA)

(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive)¹, and in particular Article 19(1) thereof,

Having regard to the opinion of the Communications Committee,

Whereas:

- (1) The development and upgrading of high-speed networks based wholly or partly on fibre optical cable is a desirable development which will enable the provision of innovative and better broadband services. Broadband is a key Community objective for the further development of the European economy and there is therefore a need to make the transition to fibre-based access networks in an efficient but timely manner. National Regulatory Authorities (NRAs) are developing regulatory responses to some of the questions raised by this transition. Already some NRAs have adopted a very specific set of obligations concerning ~~infrastructure sharing~~ civil infrastructure access (specifying processes for duct access, surveying, ordering with a complete reference offer in place), while others have specified only very general obligations to grant access without specifying details. Equally some NRAs are in the process of specifying other forms of access including Optical Distribution Frame access (ODF-access/fibre unbundling) and/or wholesale broadband access whilst others have concluded in similar circumstances that such access is unnecessary. It is therefore important to provide guidance in this context, and to prevent undesirable divergences of regulatory approaches which could harm competition and undermine the development of the electronic communications single market.
- (2) According to the Commission Recommendation 2003/311/EC of 17 December 2007 on relevant product and service markets within the electronic communications sector

¹ OJ L 108, 24.4.2002. Directive as amended by Regulation (EC) No 717/2007 (OJ L 171, 29.6.2007, p. 32).

susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services², NRAs should, in defining relevant markets appropriate to national circumstances according to Article 15(3) of the Framework Directive, analyse the product and service markets identified in the Annex to that Recommendation. This Annex identifies inter alia markets "4. Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location" and "5. Wholesale broadband access" (hereinafter referred to as "Market 4" and "Market 5" respectively).

- (3) There are a number of possible scenarios for future Next Generation Access (NGA) network roll-out, and competitive outcomes ~~are likely to~~ vary both between and within Member States. Fibre roll-out will, at least in the short and medium term, have limited geographic coverage. ~~In addition, fibre will often be deployed in parallel with the copper circuits in the network of the Significant Market Power (SMP) operator ("overlay").~~ ~~[IG1] Geographic variations in network competition may be more pronounced as a result of these factors and should be incorporated in the NRA's analysis.~~ ~~[IG2] Since network roll-out is only commencing, caution should be exercised in prejudging the extent to which there will be network competition or any changes in the geographic intensity of competition. FTTx developments may necessitate a review of the geographical scope of market 5 in cases where such markets have been segmented on the basis of competition from LLU.~~ ~~[IG3]~~
- (4) The overall objective of this Recommendation is to foster the application of consistent regulatory remedies to SMP operators throughout the EU in Markets 4 and 5 regarding access to "NGA" networks or in other markets pertaining to NGA that NRAs may identify as not being effectively competitive. Such a consistent approach is required in order to provide regulatory certainty to investors and foster investment and innovation for the benefit of all parties involved.
- (5) Mandatory access conditions including, if applicable, price controls should reflect the characteristics of different assets ~~(existing or new ducts, for example)~~ ~~[IG4]~~ of the concerned electronic communications networks and services providers, such as asset lifetimes and levels of risk in terms of uncertainty of demand and technological obsolescence. Article 12(2)(c) of Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities, requires NRAs to take into account the initial investment by the facility owner, bearing in mind the risks involved in making the investment, when imposing access obligations. Access conditions should thus in some cases reflect historic costs and in other cases the value associated with the new investment. When an NRA calculates the costs of access to new infrastructure elements mandated under the Access Directive³, it is appropriate to allow a reasonable return on the capital employed which should incorporate, as appropriate, a project-specific risk premium. The adoption of a risk premium is without prejudice to the continued application of the non discrimination principle, i.e. the same wholesale price including risk premium must apply for the alternative operators and for the SMP operators' downstream operations.

² OJ L 344, 28.12.2007.

³ OJ L 108/7 24.04.2002.

- (6) NRAs need to ensure that there is an appropriate migration path put in place which allows alternative operators to adapt to the new network developments. In particular, information should be shared in a timely fashion where alternative operators have undertaken investments to connect to the local loop of the SMP operator. SMP obligations are not undone by network topology changes as such and SMP operators may need to design elements of their new networks with third party access seekers in mind or else maintain their existing access offers longer than anticipated.
- (7) The existing regulatory framework requires NRAs to promote competition in electronic communications networks and services and encourage efficient investment in infrastructure. ~~places emphasis on the role of network infrastructure competition~~^[IG5]. The purpose of imposing access obligations regarding NGA is to ensure a level playing field for competitors including those investing in core networks on the corresponding for the provision of electronic communications ~~retail markets~~ services. In a Fibre to the Home (FTTH) context, ~~this objective can in principle be achieved subject to economies of density and scale as long as equivalent access is provided by the SMP operator to the relevant passive elements of its legacy network. However, technological~~^[IG6] practical constraints or economic feasibility may limit the extent to which ~~infrastructures such~~ duplication is possible. In addition, duplication of infrastructure should be avoided where it is impractical or undesirable, such as in-building wiring.
- (8) Where operators deploy fibre networks, the use of concentration points is generally a crucial element of the network topology. Concentration points are the first point at which individual end-user connections are brought to a single point in the network. Access to such concentration points can be crucial for the viability of ~~network~~ competition. In this regard, NRAs should ~~seek that negotiated agreements are reached~~^[IG7] ensure that the concentration point between SMP operator and alternative operators enables effective competition.
- (9) In a Fibre to the Node (FTTN) roll-out, all existing SMP obligations in relation to Market 4 should not be undone by changes to the existing network structure or topology. As fibre replaces copper, the traditional architecture of the copper access network changes. Where competitors have equipment collocated at the SMP operator's sites, they will need a reasonable transition period to decide on their investment and business strategy to cope with the changes. Accordingly before an SMP operator removes existing infrastructure to realize cost savings, NRAs should ensure competitors can continue to provide services by means of a proper migration path. NRAs should ensure that appropriate transitional arrangements are in place, with a view to enabling alternative operators to adjust their business strategies to the changed network structure.
- (10) NRAs should ensure that the cable distributors (e.g. in street cabinets) and other locations housing passive and active equipment themselves ~~itself~~ facilitates competitive access and that all necessary ancillary services (e.g. power supply, co-location) are available in the reference offer with appropriate pricing provisions. Sub-loop unbundling together with backhaul products including dark fibre (and where relevant copper) backhaul and duct access should also be adequately specified in revised reference offers to allow continuity of existing competitive offerings.

- (11) ~~NGAs~~ NRAs should consider in relation to market 5 whether, in view of the product, demand and supply-side characteristics, consumer and business-oriented wholesale broadband access are in the same relevant market. As regards consumer wholesale broadband access, ~~where SMP is~~ ~~continues to be~~ found on Market 5, there should be consistency concerning the remedies that are imposed. Virtual access remedies may evolve from current bitstream products to something which is more flexible and which better reflects the technical capabilities of the new networks including allowing the provision of triple play services. Furthermore where unbundling of next generation access networks at the MDF site is not feasible, consideration should be given to making a replacement ‘virtual loop’ service available from the MDF in addition to any complementary regional bitstream for rural competition and market entry. For business-grade bitstream, quality of service and resilience may be more relevant, and availability at regional connection points may be necessary to enable the whole territory to be covered.
- (11a) The product market that makes up Market 5 as defined in the Recommendation on Relevant Markets is unlikely to change as a result of a change to the network technology. However, NGAs are likely to allow the development of new retail services ~~outside the defined Market 5 to~~^[IG9] evolve. Recital 7 of the Recommendation on Relevant Markets states that "newly emerging markets should not be subject to inappropriate obligations, even if there is a first mover advantage in accordance with Directive 2002/21/EC. Newly emerging markets are considered to comprise products of services where due to their novelty, it is very difficult to predict demand conditions or market entry and supply conditions and consequently difficult to apply the three criteria test." Development of a new retail service does not necessarily give rise to a new wholesale market.^[IG10] If a distinct wholesale market does arise, NRAs should assess whether the three criteria test can be effectively applied to it.
- (12) The application of the principles of this Recommendation is without prejudice to the duty of the Member States and of undertakings to comply fully with the Community competition rules.
- (13) This Recommendation is without prejudice to further measures that Member States adopt pursuant to the objectives of Article 12 of the Framework Directive to foster infrastructure sharing,

HEREBY RECOMMENDS:

General Principles

- (1) This Recommendation concerns regulatory remedies imposed on operators designated by their national regulatory authority as having SMP as a result of a market analysis concerning access to NGAs carried out in accordance with Article 16 of Directive 2002/21/EC.
- (2) NGAs are access networks which have been substantially upgraded either wholly or in part, using existing local access infrastructures and technologies and/or using new optical fibre infrastructures, and which are capable of delivering broadband access services with bandwidths significantly above those currently widely available.

- (3) In undertaking market reviews according to Article 16 of Directive 2002/21/EC, NRAs should define the geographic scope of the market in relation to competitive conditions existing or reasonably foreseen within the period of the market analysis. NGA networks do not per se affect the geographic scope of the market unless infrastructure competition increases as a consequence of NGA developments to an extent that it justifies a review of the boundaries of the market definition. ~~examine the need to define geographic markets taking into account the competitive conditions created at both a national and sub-national level by the progressive roll out of NGA networks and the status of infrastructure competition.~~ Where geographic markets or remedies have been identified that depend on access products which may become redundant due to FTTx developments, such segmentations or remedies should be reviewed.^[IG11]
- (4) Where NRAs find that one or more operators have SMP in Market 4 (including shared or fully unbundled access), they should mandate access to new and existing ducts (with associated measures and processes necessary to ensure access is effective), civil engineering works and other elements which are not active including dark fibre, necessary for the roll out of competing infrastructure, and in particular of fibre, street cabinets or an optical equivalent. Building on their experience in developing procedures for local loop unbundling (LLU), NRAs should put in place the necessary business processes concerning ordering and work access to such facilities. Existing SMP obligations in relation to Market 4 will continue and should not be undone by changes to the existing network structure or topology. SMP operators should therefore be required to ensure that when they roll out new ducts or distribution/concentration points or install fibre, ~~other civil engineering works and other elements which are not active,~~ sufficient space is allowed as appropriate for other operators to make use of these facilities and architectures are designed so as to effectively enable access.
- (5) Where NRAs mandate access to existing network infrastructure (inter alia ducts and ancillary services), price controls on reference offers should be based on the existing physical capacity, the extent of depreciation of the existing facilities plus the operating costs of an efficient operator. If applicable, the usage price of a duct should be corrected for the relevant amount already paid by the access seeker for renting the local loop (which includes the same duct). The economic terms for such access are set out in Annex I.
- (6) Where NRAs mandate access to new infrastructure elements ~~(inter alia ducts and ancillary services~~ which incur additional risk as compared with the operations of typical utilities and telecom companies), price controls on reference offers should incorporate a project-specific risk premium to reflect any investment risk incurred by the operator. The economic terms for such access are set out in Annex I.
- (7) When analysing Market 5 in an NGA context, NRAs should ensure that the market definition is technologically neutral and includes ~~maintain their current product market definition including~~^[IG12] any chain substitutes.

- (8) A consistent regulatory approach should apply over successive review periods to any access remedies and price obligations placed on SMP operators as a result of reviews of Markets 4 or 5.

Transparency

- (9) SMP operators should be mandated to make reference offers for all relevant inputs consistent with the provisions of this Recommendation in accordance with Annex III of the Recommendation [IG13]. The reference offers should be put in place within six months of the imposition of this obligation unless NGA deployments are already envisaged in which case urgent measures may be required. Inter alia, such reference offers should set out conditions for access to ducts, other civil engineering works and other elements which are not active such as copper and fibre sub loops and full loops, dark fibre (and where relevant copper) backhaul, in-building wiring, fibre subloops and full loops ~~necessary for the roll-out of competing infrastructure and in particular of fibre~~. In this context, the SMP operators should provide information regarding, in particular, duct location and capacity with processes for collection and distribution of such information as specified by the NRA according to market needs. NRAs should specify in the reference offer appropriate ex ante price controls on all necessary inputs referred to above in this article. The price controls for the usage of ducts, other civil engineering works and other elements which are not active, should be based on the methodology set out in Annex I.
- (10) NRAs should require the SMP operators to provide interested parties with appropriate information concerning its future network modification plans to the extent necessary for planning and coordination of the access seeker's investments and NRAs should define the format and level of detail of such information.
- (11) NRAs should in accordance with article 12 Framework Directive facilitate and encourage build-and-share projects [IG14] ~~between SMP operators and other alternative providers~~ at the time of new investments to replace or establish cables, ducts and other facilities. Infrastructure sharing arrangements are without prejudice to any SMP obligations or requirements that may result from an assessment of such arrangements under competition law. [IG15]
- (12) NRAs should promote fibre deployments wherever new electronic communications networks are set to be built rather than copper-based deployments. NRAs should revise regulatory obligations where appropriate to avoid the unintended effect of forcing operators to deploy copper in addition to fibre.

FTTH (Fibre to the Home)

- (13) Where more than one operators deploys FTTH, NRAs should, where such deployments are the responsibility of operators, [IG16] facilitate mandate cooperation regarding the roll-out and sharing of access to [IG17] NGA

infrastructure within buildings in order to enable end-users to have competitive choice.

- (14) Where alternative operators have access to ducts, other civil engineering works and other elements which are not active such as dark fibre backhaul and ~~deploy their own roll out fibre networks to the building or to the vicinity of a concentration point outside~~ the building, the NRAs should analyse carefully the SMP operator's network architecture and determine where the concentration point of the terminating segment of the access network, including inside-building wiring, should be for the purpose of granting access. In making such a determination NRAs should take into account the fact that multiple physical access deployments may be impractical or ~~undesirable~~^[IG18] ~~within buildings~~ and that any concentration point will need to host a sufficient number of end-user connections. Physical access to the fibre sub-loops should be mandated as a remedy in Market 4 at ~~the~~^[IG19] ~~SMP operator's~~ concentration points determined by the NRA. In this context, NRAs should consider whether specific interfaces are required to ensure efficient access. Such access should be provided according to the principle of equivalence as set out in Annex II.
- (15) Where SMP operators deploy fibre to the home, NRAs should impose further physical access obligations (access to ~~unlit fibre~~fibre local loops or subloops) beyond access to ducts, other civil engineering works and other elements which are not active, ~~except~~ where ~~access to this infrastructure~~fibre local loops or subloops is technically or physically impossible or where ~~there it is not economically viable for a~~ sufficient number of operators to ensure effective competition in the absence of such remedies. ^[IG20] In such circumstances, where the SMP operator has deployed a fibre network, access should be granted at the concentration point which allows access to unbundled fibres where it is economically viable. Directive 2002/19/EC, Annex II sets a minimum list of conditions that must be part of the reference offer for LLU. The existing LLU reference offer should be complemented to take account of such changes. Where a full revision of the reference offer will take more than 6 months or if fibre deployments are imminent, NRA should put in place interim measures as appropriate.

FTTN (Fibre to the Node)

- (16) Existing SMP obligations in relation to Market 4 will continue and should not be undone by changes to the existing network structure or topology. Where an SMP operator intends to replace part of its existing copper access network with fibre, NRAs should ~~seek to ensure that an agreement is reached between the SMP operator and access seekers within a specified deadline~~ ~~or ensure~~^[IG21] an appropriate migration path from the prevailing access remedies to access under the new network structure. In determining the specific obligations such as the timing and technical functionalities to be maintained over copper during the transition period, the NRA should explicitly assess the implications for competition of decommissioning the copper network.

- (17) Where an SMP operator deploys FTTN, SMP operators should be required to make a reference offer for sub-loop unbundling and NRAs should impose appropriate ex ante price controls on all inputs, including ducts, other civil engineering works and other elements which are not active such as dark fibre backhaul, which are necessary to ensure effective competition, so that the remedy is viable.
- (18) NRAs should ensure that co-location can take place ~~either preferably~~ at the street cabinet itself cable distribution/concentration point (e.g. street cabinet, manhole, building cellar) or nearby ~~the street cabinet~~ (distant co-location), and that access seekers have adequate access to power supply and other necessary enablers of co-location. NRAs should take, where necessary, measures pertaining to the adequate size of the infrastructures housing the cable distribution/concentration point and active equipment locations street cabinets—in advance of the NGA deployment as well as appropriate cost allocation-sharing arrangements.
- (19) Access measures, such as sub-loop unbundling, should be supplemented by appropriate ancillary remedies ensuring their effectiveness and viability, such as non-discriminatory access to facilities for co-location, or in their absence virtual co-location.
- (20) NRAs should ensure that access to sub-loops is supplemented by appropriate backhaul measures. NRAs should enable mandatory access to ducts, dark fibre backhaul, and street cabinets and sharing of civil works to enable infrastructure-based competition. Such access should be provided according to the principle of equivalence as set out in Annex II.
- (21) NRAs should ensure that equipment installed ~~the~~ ^[IG22] ~~launch of new services~~ by the SMP operator on its NGA does not create harmful interference with the broadband services offered by alternative operators making use of unbundled loops.
- (22) Access products should be designed so as to facilitate migration from FTTN to FTTH for all parties.

Wholesale Broadband Access (including bitstream access and other forms of virtual access)

- (22a) NRAs should determine whether separate markets exist for consumer and business-grade wholesale broadband access in view of the product, supply and demand characteristics.
- (23) Where SMP is found on Market 5, wholesale broadband access remedies — in the context of the deployment of both FTTH and FTTN — should be maintained for the existing services and chain substitutes which constitute Market 5. Unless there are clear indications of a break in the chain of substitution as compared to current product markets, ~~services provided over NGA networks~~ NGA deployments should be considered as incremental upgrades to existing facilities and therefore not treated as new markets. If a break in the chain of substitution occurs for market 5, NRAs should assess whether the distinct market can be assessed against and meets the 3 criteria

~~test. NRAs should Wholesale access obligations should relate only to wholesale markets which have passed the 3 criteria test to avoid undermining newly emerging retail markets, whilst preventing leverage and foreclosure of retail markets~~^[IG23]~~Inappropriate wholesale obligations should not be imposed where, based on clear and adequate justification, an NRA finds that a service provided over NGA networks constitutes a newly emerging retail market.~~

- (24) When mandating wholesale broadband access, NRAs should mandate the provision of those wholesale products that best reflect the technological and commercial capabilities inherent in the new infrastructure including higher speeds and triple play capabilities so as to enable alternative operators to compete effectively. NRAs should ensure that the pricing of wholesale broadband access products based on fibre for Market 5, and more broadly in cases where the relevant wholesale inputs satisfy the three criteria test, is consistent with the prices charged for physical access products and that the margin between the prices allows a fair return for an efficient operator to facilitate investment in infrastructure where efficient.
- (24a) When considering wholesale broadband access supplied to consumers and small businesses, in circumstances in which unbundled access to the NGA is not technically feasible at the MDF site, NRAs should consider mandating an alternative ‘virtual loop’ at the MDF site, in addition to any regional handover points for wholesale broadband access necessary to ensure competition across the whole territory.
- (24b) Wholesale broadband access supplied to businesses may necessitate higher product and servicing specifications and should be available at regional and where applicable national points to access to enable multiple sites to be covered effectively.

- (25) This Recommendation is addressed to the Member States.

Done at Brussels, [...]

For the Commission

[...]

Member of the Commission

Annex I

Pricing principles for duct usage and the usage of other civil engineering works and other elements which are not active.

Price controls should be based on the principles and specific rules set out below.

1. General principles

~~All usage prices for ducts, other civil engineering works and other elements which are not active, should be based on a volume measure for physical capacity used (such as m^3).~~

Usage prices for ducts, other civil engineering works and other elements which are not active including dark fibre, should ~~not be bound by the principle of geographic averaging in the presence of substantial cost differences between various areas~~ be priced consistently with other downstream products for which they are an input. The linkage between the prices of facilities and other downstream products should be clearly indicated in separated accounts of SMP operators.

Costs should be allocated fairly and consistently amongst the various wholesale and retail products which rely on such inputs so as to avoid double counting.:-

2. Pricing of existing ducts, other civil engineering works and other elements which are not active

The usage price for existing ducts, other civil engineering works and other elements which are not active, should where possible be based on ~~cost estimates contained in the regulatory accounts of the SMP operator. These cost estimates should be~~ historical costs minus depreciation, or, where this information is not available, current costs minus depreciation with asset lifetimes assessed in accordance with the actual lifetimes of relevant facilities, which may differ from those assumed in accounting records. Where these are not yet included, a proportionate share of the common costs of an efficient operator should be added to these cost estimates.

53. Pricing of ~~physical access alternatives~~ unbundled facilities (normally from a concentration point to the home)

Where access to [IG24] ~~alternative~~ physical remedies such as mandated access to unlit fibre (passive access) is imposed on an SMP operator, access pricing should be cost-based and consistent with prices for relevant upstream inputs and include, where appropriate a project-specific risk premium ~~in the costs of capital for the investment risk incurred by the operator in~~ accordance with paragraph 68.

4. Pricing of ancillary services

The pricing of ancillary services (such as power supply in street cabinets) should be ~~calculated on the same basis as paragraphs 2 and 3 above as appropriate depending on whether the service exists or is new.~~

~~The access price of ancillary services should be~~ consistent with the price implied by the SMP operator's other wholesale products (e.g. local loop rental).

An access seeker should be able to assemble a composite LLU product at a price which is not higher than the wholesale price charged for LLU.

5. Costs of access supply

The NRA should in addition estimate any specific access costs, which consist of:

- a) capital expenditure to accommodate the ordering and provisioning of access to ducts and other elements;
- b) operating and maintenance costs for IT systems; and
- c) operating costs associated with wholesale product management.

These costs should be allocated on a proportionate basis.

~~36 - 6. Pricing of new ducts, other civil engineering works and other elements which are not active~~Risk adjustments ~~(Greenfield projects)~~ for new investments

In cases where the business case for profitability for new investments depends on uncertain factors such as assumptions of significantly higher ARPUs or higher underlying (wholesale and retail) market shares, NRAs should determine the usage fees price for new ducts, other civil engineering works and other elements which are not active should be based on costs plus a project-specific risk premium to be included in the costs of capital for the investment risk incurred by the operator.

The risk premium should be estimated according to the methodology set out in section 7-8 of this Annex.

Where facilities which are inputs into downstream services are granted a risk premium, under the principle of non-discrimination, the same price should be attributed to the SMP operator's downstream operations as are charged to third parties.

A risk premium should not be applied in the case of fibre backhaul from the street cabinets to the MDF or equivalent in an FTTN scenario. Such a scenario is considered in this context as a modernisation of the copper-based network, which should not encompass a higher risk remuneration than other modernisation and maintenance expenses.

7. Pricing of existing copper facilities:

The price of LLU should be set under a Network cap mechanism. In setting the network cap NRAs should identify the most appropriate cost method to be applied to incumbents to the copper existing networks, using historic costs and actual asset lifetimes where necessary in accordance with the principles in paragraph 2 to avoid any excess payments for depreciated facilities leading to an inappropriate increase of traditional wholesale prices.

8. Risk premium

The return that is allowed ex ante on equity capital to finance NGA networks should strike a balance between providing adequate incentives for companies to invest (implying a sufficiently high rate of return), while at the same time promoting efficiency and sustainable competition and maximising consumer benefits (implying a rate of return that is not excessive). In order to achieve this balance, regulated returns should compensate companies

for the relevant (i.e. project-based and non-diversifiable) risks they face when making the investment.

The return that is allowed on equity capital (hereinafter the "required rate of return") should be based on a concrete pricing model built on realistic assumptions and rigorous implementation through an objectively verifiable methodology. The Capital Asset Pricing Model (CAPM) is an adequate instrument to calibrate such required rate of return. The CAPM equates the required rate of return to the sum of the risk-free rate and a risk premium, where the latter is defined as beta times the market risk premium. Other methods could be used if they are fully justified as meeting the same quality standards.

The required rate of return should be set bearing in mind the risks involved in making the particular investment. Systematic risk, i.e. risk that cannot be diversified away, should be estimated by recourse to regulatory precedent or by direct statistical and financial comparator methods such as the equity beta from firms outside the electronic communications sector providing comparable services (e.g. media companies).

In the context of the CAPM model, the required rate of return should be derived considering the potentially high measure of systematic or beta risk associated with the investment in question. ~~One could thus expect that~~ The required rate of return (and hence weighted average cost of capital or WACC) related to undertaking NGA investments will may exceed that of typical utility and telecom companies in cases where, taking account of cost savings, profitability depends on uncertain factors such as higher ARPUs or market shares. From this perspective, note that the nominal pre-tax WACCs for fixed and mobile operators have been roughly 8 to 12% in recent years depending on the Member State.

Market developments which imply that additional investments involve a different systematic risk will lead to an adjusted rate of return (and WACC) for those further investments.

The calibration of the revenue streams that will allow companies to achieve the WACC should take into account all dimensions of the project-specific capital employed, including appropriate labour costs and building costs, the anticipated efficiency gains and the terminal value of the assets, in accordance with recital 20 of the Access Directive (2002/19/EC).

Annex II

Application of the principle of equivalence

In order to create a level playing field among entrants and the incumbent for the provision of NGA-based services, regulation should require the incumbent to provide access to its passive infrastructure including ducts and where relevant dark fibre under the same conditions, be it internally or externally.

1. Equivalence in terms of asset information

- a) Information on available infrastructure: location of the ducts and other physical assets (e.g. manholes), available space in ducts, other civil engineering works and other elements which are not active and in street cabinets;
- b) Information on access points: network topography, available connection in street cabinets, location of concentration points and list of connected buildings.

2. Equivalence in terms of provisioning times

The NRA should require the SMP operator to put in place a system to record the provisioning time of the various passive elements needed internally by their retail arm to provide NGA services. SMP operators should ensure that the access seekers can obtain the relevant passive inputs within the same time.

3. Equivalence in terms of service management

The NRA should ensure that requests for information, operation and maintenance by the access seeker should be processed as fast as equivalent requests by the retail arm of the SMP operator.

In order to ensure equivalence in terms of service management, precise quality of service indicators should be defined together with target service levels. Such indicators should include time limits for replying to requests for information on availability of infrastructure; time limits for replying to a request for feasibility of use of ducts, other civil engineering works and other elements which are not active, manholes, street cabinets or concentration points; a measure of responsiveness to handle requests for maintenance; and the timeliness of intervention operations to be carried out by the access seeker. Regular reports should be provided to the access seekers, accompanied by appropriate compensation in case of non-compliance with the agreed service levels.

4. Service Level Agreements

The calculation of the provisioning delays and the other quality of service indicators should be performed at regular, fixed intervals. Quality of service reports shall be submitted in due time to the access seeker. The NRA should ensure that the SMP operators commit themselves to adequate compensation in case of failure to comply with target service levels.

ANNEX III

MINIMUM LIST OF ITEMS TO BE INCLUDED IN A REFERENCE OFFER FOR WHOLESALE NETWORK INFRASTRUCTURE ACCESS, INCLUDING UNBUNDLED ACCESS TO THE LOCAL LOOP AT A FIXED LOCATION TO BE PUBLISHED BY NOTIFIED OPERATORS

For the purposes of this Annex the following definitions apply:

(a) "local sub-loop" means a partial local loop connecting the network termination point to a concentration point or a specified intermediate access point in the fixed public electronic communications network;

(b) "unbundled access to the local loop" means full unbundled access to the local loop and shared access to the local loop; it does not entail a change in ownership of the local loop;

(c) "full unbundled access to the local loop" means the provision to a beneficiary of access to the local loop or local sub-loop of the notified operator [...] allowing the use of the full capacity of the network infrastructure;

(d) "shared access to the local loop" means the provision to a beneficiary of access to the local loop or local sub-loop of the notified operator, allowing the use of a specified part of the capacity of the network infrastructure such as a part of the frequency or equivalent;

A. Conditions for unbundled access to the local loop

1. Network elements to which access is offered covering in particular the following elements together with appropriate associated facilities:

(a) unbundled access to local loops (full and shared)

(b) unbundled access to local subloops (full and shared), including access to associated facilities such as street cabinet/ODF access and duct access and optical fibre for backhaul; or

in circumstances where unbundled access to local subloops is not technically or economically feasible, relevant obligations in the market for wholesale broadband access offering equivalent functionality to unbundled access to the local loop.

(d) duct access enabling the roll out of access networks and access to in-building wiring;

2. Information concerning the locations of physical access sites including street cabinets and distribution frames, availability of local loops, subloops and backhaul in specific parts of

the access network and when relevant, information concerning the locations of ducts and the availability within ducts;

3. Technical conditions related to access and use of local loops and subloops, including the technical characteristics of the twisted pair and/or optical fibre and/or equivalent, cable distributors, and associated facilities and, technical conditions related to access to ducts;

4. Ordering and provisioning procedures, usage restrictions.

B. Co-location services

1. Information on the notified operator's existing relevant sites or equipment locations and planned update thereof.

2. Co-location options at the sites indicated under point 1 (including physical co-location and, as appropriate, distant co-location and virtual co-location).

3. Equipment characteristics: restrictions, if any, on equipment that can be co-located.

4. Security issues: measures put in place by notified operators to ensure the security of their locations.

5. Access conditions for staff of competitive operators.