European Policy on Local Loop Unbundling

Competition Law Landscape and Implementation Issues

Pierre-André BUIGUES(*)
European Commission, Directorate General for Competition, Brussels

■ Introduction

One of the main aims of the "eEurope" initiative, which was approved at the special European Council in Lisbon on 23 and 24 March, 2000 was to promote cheaper Internet access by introducing competition on telecom incumbents' local loop. While access in the form of interconnection was already a mandatory requirement under the existing regulatory framework, local loop unbundling had until then only been made mandatory in a few European countries such Germany, Denmark and Finland. To this end, a key measure consisted in requiring incumbents to offer their competitors access to the final segment of telephone wire linking the network with the subscriber (what is called "local loop unbundling") (1).

Duplicating the former network monopolies' local loops is, certainly in the short term, not economically viable for new entrants since it would involve major new civil engineering projects (2). This is less true only for certain large business customers, which are being connected on fibre optic rings rolled out by new entrants. Except in the few areas where cable TV networks are being upgraded to provide voice telephony and high-speed Internet access, in addition to the provision of television programmes, incumbent telephone operators remain de facto monopolies for the provision of the local loop to residential customers and small-to-medium-sized-enterprises (SMEs). Incumbent operators are extending their dominant position to the new emerging high-speed services based on Digital Subscriber Line (DSL)

(*)The views expressed are those of the author and are not attributable to the Commission.
(1) The term "unbundling" is used because today such access is only provided via "interconnection" agreements which, in addition to access to the telephone wire and acquisition of a service provided by the incumbent operator, involve "call termination".
(2) Estimates of the cost to replicate local loop infrastructure begin at 1,000 euros per line, on average.
technology. While incumbent operators have recently begun to market ADSL broadband services to their own customers, local loop access for competitors wishing to offer similar services has in many cases been delayed or denied (3). Naturally, incumbents are reluctant to facilitate access to their networks as it would allow new entrants to market services that are likely to directly rival their own.

The only means for new entrants to compete with incumbents on high-speed services to residential users and SMEs is to obtain access to the local loop, a fact which requires incumbents to allow competitors to install their own equipment on both sides of the loop. Allowing competition on the local loop would put a great deal of downward pressure on tariffs for high-speed voice and data services, and substantially reduce the cost of Internet access.

The paper is structured in the following way. The first part presents economists’ views on unbundling the local loop, particularly with respect to the political choice to apply mandatory ULL throughout the EU and to the pricing issue. The second part presents European policy on local loop unbundling and the various official documents presented by the Commission, Communications, Recommendations and Regulation. Lastly, the third section focuses on the implementation issue.

## Economics of Unbundling the Local Loop

### The debate in Europe

In a recent paper on “The Economics of Local Loop Unbundling” prepared for the European Commission as an independent expert paper (J. GUAL & P. SEABRIGHT, May 2000), the authors discussed this issue from an economic standpoint. For them, competition in the local loop may become effective only if competitors are able to have access to existing networks rather than being obliged to build their own. Here, the authors distinguish two basic economic issues:

(3) New entrants have requested the relevant national competition authorities to delay the launch of the ADSL services by Telefonica, Telecom Italia, British Telecom and France Telecom until they commit to providing some form of unbundled access to their networks to allow for competing offers.
"The first is that, given the networks are in place, access to these networks should be available to the operator that would make most efficient use of them; we call this the static problem. The second issue is that investment in future networks should be encouraged by the promise of prices that enable a proper return, including a return to risk-taking. We call this the dynamic problem".

Moreover, the local loop unbundling also has to take into account the fact that rebalancing of tariffs has not been achieved in a large number of Member States. The main problem is that when incumbent operators price line rental below cost, even efficient entrants, who have access to the network at prices that correctly reflect resource costs, may be unable to offer customer services in a profitable manner unless they have an equivalent source of funds for cross-subsidy.

In their conclusion, the authors present their views on the price at which local loop access should be made available to those competing with the incumbent who has constructed the network. For them "efficiency-based pricing guarantees that the infrastructure is used by the most efficient operators. Fixed costs are recovered in the most efficient way." The relevant cost of access is therefore an estimate of the long run marginal cost of access. LRIC (Long Range Incremental Cost) methodologies provide an approximation of these costs.

The authors postulate that the main benefits from unbundling are likely to come not from more competitive provision of traditional voice telephony services, but rather from provision of high-bandwidth services. Indeed, investment in new infrastructures is almost entirely for high-bandwidth purposes, since copper pairs are already present in sufficient capacity in most places to be able to provide traditional voice telephony.

Chris DOYLE (2000), in a recent article "Local Loop Unbundling and Regulatory Risk", takes a different view. The author raises the point of the difficulties involved in obtaining a clear economic evaluation of the benefits and costs to mandated ULL, but recognises that "there does appear to be a case in its favour." He concludes that what are less certain are the appropriate pricing principles to apply to ULL, and the extent to which ULL should be mandated geographically. For Doyle there appears to be no reason to support mandated ULL in densely populated urban areas, as competition among infrastructure providers is already emerging.

"While policy makers have championed ULL as a way to promote competition at the local level in telecommunications, applying mandated ULL across the whole of a country may be inappropriate and socially damaging."
An essential factor is the possibility for technological alternatives to compete with the local loop. Depending on the assumptions made, ULL will have to be mandated for a shorter or longer period of time. Doyle therefore raises the issue of policy makers’ difficulty in deciding how long mandatory ULL should last.

Finally, in a paper entitled "Competition in EC Telecommunications – Cross Subsidisation, Access and Predatory Pricing", P. NICOLAIDES & R. POLMANS (1999) underline the fact that setting of prices charged to competitors for access to the network is crucial in determining whether or not effective competition will emerge. The general principle on pricing access is "cost orientation", in other words services must be priced on a stand-alone basis and in such a way that prices are line with costs. The authors argue, however, that even if cost orientation appears to be reasonable, this principle has a number of flaws. Incumbents will be tempted to charge for all costs and to inflate costs and charges. More importantly still, cost orientation imposes a very heavy information-related burden on regulators. The existence of asymmetric information between regulators and incumbents is a primary obstacle. For the authors, the problem of pricing could be solved in one of two ways: via an either structural or institutional solution.

"It would appear, therefore, that more drastic, structural and/or institutional solutions may have to be considered. The breaking up of the dominant incumbents would at minimum enable price and cost comparisons. Then there will be less need to adhere to pricing rules".

Therefore, according to NICOLAIDES & POLMANS, if competition does not develop at a satisfactory pace, then the solution would not necessarily be to tighten pricing or costing rules but, rather, to consider more radical, and probably structural, approaches to the problem of strengthening competition and to preventing incumbent operators from abusing their dominance.

Without entering into an overly detailed discussion on the economics of unbundling, which the format of the present paper does not allow, we would like to emphasise an important dimension of the discussion on the economic rationale for local loop unbundling. Purely efficiency-related considerations may be biased for several reasons. Efficiency based models suppose that efficiency can always be measured in terms of prices/costs and ignore service quality considerations as well as innovative aspects. There exist clearly positive arguments relating to market dynamic that reveal the benefits of introducing competition in a previously monopolistic market. So, while
efficiency considerations are certainly important in this discussion, they should be examined cautiously.

The debate in the US

Access to the local loop in the US is governed by the general network access principles of Section 251(d)(2), *Telecommunications Act 1996*.

*In determining what network elements should be made available of this section, the Commission [Federal Communications Commission] shall consider, at a minimum, whether

(A) access to such network elements as are proprietary in nature is necessary; and;

(B) the failure to provide access to such network elements would impair the ability of the telecommunications carrier seeking access to provide the services that it sees to offer*. (Bold highlights added).

The Federal Communications Commission (FCC) in its 1996 Local Competition First Report and Order (4) defined a "necessary" unbundling as being any technically feasible one.

Its interpretation of "impairment" was equally broad: there was a duty to unbundle when a telecommunications carrier seeking to offer a service would suffer the slightest impairment of its ability to do so.

The Court directed the FCC to consider use of limiting principles in its test to determine when a network element should be subject to mandatory unbundling. The limiting principles were to be derived from other areas of anti-trust law and were to include, notably, use of market power analysis and the essential facilities doctrine.

J. HAUSSMAN & J.G. SIDAK, in a recent article "A Consumer Welfare Approach to the Mandatory Unbundling of Telecommunications Networks", presented their answer to that request (5). This paper proposes an interpretation of the Essential Facilities doctrine and Market Power analysis as a basis for US policy in relation to mandatory unbundling of telecommunications networks (including local loop).

---


(5) Jerry HAUSMAN, MacDonald Professor of Economics, Massachusetts Institute of Technology and J. Gregory SIDAK, FK Weyerhaeuser Fellow in Law and Economics, American Enterprise Institute for Public Policy Research.
It argues that the FCC should adopt a competition-based standard that exists when determining when there should be mandatory unbundling. Consumer welfare is thus accounted for; the value to the consumer of innovation and the introduction of new services not undermined.

The authors warn that there are negative implications of introducing mandatory unbundling, namely a reduced supply of alternative infrastructures and diminished provision of new services. They suggest limiting the application of mandatory unbundling to situations where sunk costs are high, limiting ex ante regulation only to when it is really required.

For the authors, unbundling of a network element should be mandatory if, and only if, a certain number of conditions are fulfilled. In particular:
- it is technically feasible to provide to the network services purchaser unbundled access to the relevant network in the relevant geographic market;
- it is impractical and unreasonable for the network services purchaser to duplicate the network element through any alternative source of supply;
- the network is controlled by a network services supplier that is a monopolist in the supply of a telecommunications service to end users for the relevant geographic market; and
- the network services supplier can exercise market power in the provision of telecommunications services to end users in the relevant geographic market by restricting access to the network.

Where there is a proprietary network element based on Intellectual Property, the standard should provide for unbundling only where competition will be impossible in the absence of unbundling.

However, initial results of the American experience should temper our enthusiasm over the intrinsic virtues of ULL, in terms of its ability to foster a truly competitive environment, and calls for additional attention to be given to the conditions applied to unbundling. New entrants have succeeded in capturing roughly 25% of the United States' DSL services market (6). This position is tentative, however, and could be jeopardised in the near future. One of the two main players, NorthPoint, filed for bankruptcy in early 2001 while COVAD, the other key player on the US market has also been destabilised: the company will remain unable to post profits in the near future, and the price of its shares recently dropped from $70 to $3.50,

(6) Source: IDATE, 2000 the year of DSL's first steps, available on www.idate.fr
reflecting the market’s increasing doubts about its long term viability and its ability to seriously challenge the incumbents’ position.

These highly tentative results after four years of ULL in the United States call for caution and increased attention to be given not to the issue of access per se, for which we now have an EC Regulation, but to the conditions applied to access.

■ European Policy on Local Loop Unbundling

Communication

In April 2000, the Commission issued a communiqué on local loop unbundling entitled “Unbundled Access to the Local Loop: Enabling the competitive provision of a full range of electronic communication services including broadband multimedia and high speed Internet” (JO, C272, 23 September 2000). In this Communiqué, the Commission examined the incentive effects of local loop unbundling on increased competition and economic efficiency. The argument presented was that local loop unbundling can encourage the development of a more competitive market for voice telephony and high-speed services by allowing new entrants to upgrade the incumbents’ local loops, in addition to enabling them to market broadband services directly to users. The Communiqué therefore establishes:

"the framework for any mandated access to local loops of incumbents, and accompanying pricing controls, against a standard of promoting economic efficiency, enabling wider competition and maximising consumer and user welfare”.

Even if the incumbents’ ‘local loop access’ is not the only technical infrastructure enabling the provision of retail services to end-users, since other alternatives do exist, such as upgraded cable TV networks, wireless local loop or fibre optic networks, none of these technological alternatives are deemed equivalent, not as yet in any case. The incumbents’ local loop network is currently being developed nation-wide in all Member States. The bottleneck issue encountered in providing access to local network does therefore not impede new entrants from developing local networks in densely populated urban zones, but they will not be able to compete on a nation-wide scale since the incumbents’ market share for local calls is well above 90% in nearly all the Member States. Moreover, given the investment
required to carry out a nation-wide duplication of the incumbents' local network, the barriers to entry for any competitor are far too high. Incumbents' refusal to give new entrants access to their local loop would therefore, in the short to medium term, eliminate their ability to compete on the nation-wide market for local calls. The Communiqué sets out the application of the competition rules, in particular Article 82, to the refusal of access to the local loop and other forms of possible abuse of dominant position.

I. Refusal to deal: under a certain set of conditions, denial of access to the local loop may constitute a violation of Article 82, namely if:
- no objective reasons to refuse access,
- sufficient capacity available,
- requesting party ready to pay a non-discriminatory price,
- refusal of access to limit emergence of new services.

II. Discrimination where the incumbent is already providing local loop access to at least one operator.

III. Limitation of production, markets or technical development to the prejudice of consumers.

The Communiqué then presents the dominant operators' duties regarding conditions of access and pricing. Lastly, it presents the application of sector-specific rules, namely the Open Network Provision directives concerning the harmonisation of conditions for open and efficient access to public telecommunications network.

The Recommendation

Initially, the Commission opted for a 'soft law' approach that consisted of a Recommendation (OJ, L156, 23 June 2000) to the Member States, which was adopted in May 2000. This Recommendation is now clearly outdated (see below). It did, however, serve to clarify the type of standards which incumbents should apply to their unbundling offers. The main elements to be included in their reference offers were enumerated in an Annex to the Recommendation, and have been maintained in the Regulation approved since then.
Regulation

In order to avoid the situation wherein unbundling of the local loop would not be universally available by the deadline fixed by the recommendation/communiqué of 24 April 2000, the Commission subsequently adopted on Regulation mandating local loop unbundling (OJ, L336, 30 December 2000). Regulators had indeed requested 'hard law' in order to avoid incumbents challenging the rulings mandating ULL in national Courts. The Regulation was promptly adopted with the new 'Amsterdam' procedure, allowing for adoption of directives after a single reading. Moreover, a 'regulation' could be used directly as a legal instrument, not requiring further implementation measures by Member States.

The Regulation mandates unbundled access to the metallic local loops of network operators that have been designated by their national regulatory authorities as having significant market power (SMP) in the fixed public telephone network supply market under the relevant Community provisions. The Regulation also presents the approach to be adopted for the costing and pricing rules.

Costing and pricing rules for local loops and related facilities should be transparent, non-discriminatory and objective. Pricing rules should ensure that the local loop provider is able to cover its appropriate costs in this regard plus a reasonable return. Pricing rules for local loops should foster fair and sustainable competition and ensure that there is no distortion of competition, in particular no margin squeeze between the cost of wholesale and retail services of the notified operator. The offer should be sufficiently unbundled so that the beneficiary does not have to pay for network elements or facilities which are not necessary to the supply of its services, and must contain a description of the component offerings, associated terms and conditions, including charges.

Although commercial negotiation is the preferred method for reaching agreement on technical and pricing issues for local loop access, experience shows that in most cases regulatory intervention is necessary due to imbalance in negotiating power between the new entrant and the notified operator, and to lack of other alternatives. In certain cases, the national telecommunications regulatory authority may, in accordance with Community Law, intervene at its own initiative in order to ensure fair competition, economic efficiency and maximum benefit for end-users.
Problems of ULL Implementation in Europe (5)

Unbundling cannot take place overnight. Preparatory work on the incumbents' exchanges require several months or more, as do procedures relating to access, the definition of contractual agreements between incumbents and new entrants and regulators' approval of established prices.

General Overview

The situation with respect to ULL varies considerably amongst the various EU member states. In a first group of countries, ULL was already mandatory and effective under national legislation before the EC Regulation came into force on 2.1.2001. These countries include Finland (1996), Denmark (1998), Germany (1998), Austria (1998), Sweden (2000) and the Netherlands (2000). However, even among this first group of countries, the situation is far from being homogeneous. In Austria, where the legislation was already passed in 1998, as it was in Germany, unbundling has proved to be much slower than in Germany and, by mid-2000, only very few lines had been unbundled. By the end of 2000, ULL had only been implemented nation-wide on a large scale in Denmark, Finland and Germany.

In a second group of countries, national legislation was adopted on recently (1999 or 2000): in these countries, ULL has been prepared at a national level through consultations and trials, and will take effect in 2001. These countries include Italy (where the trial period ended, theoretically, in late October 2000), France, the UK, Belgium and Spain. These countries would, therefore, appear ready to implement the EU Regulation, although the pace of implementation may well differ from one country to the next: in the UK, ULL had initially been planned to come into effect on 1 July, 2001, but may encounter delays in the course of the first half of the year. In France, the regulator in February 2001 announced changes to France Telecom's initial offer. All this to say that unbundling in those countries will likely to begin during or toward the end of the first half of 2001.

A third group of Member States have not yet adopted any national legislation pertaining to ULL: Luxembourg, Ireland, Greece and Portugal. While the EC Regulation naturally applies equally to these latter countries as of 2.1.2001, given the amount of preparatory work required, ULL

(5) This portion was prepared by Christophe PAVRET de LA ROCHEFORDIÈRE who is in charge of the sector Inquiry on ULL for the Directorate General for Competition
implementation might, in practice, be delayed until the second half of 2001 or even later.

The new Regulation, even once fully implemented, will not solve all of the issues which ULL may raise: indeed, incumbents have many possible ways of making life difficult for new entrants challenging their traditional monopolistic situation on the local loop. This is the famous 3D strategy: Deny, Defer, Deter. Once pure denial is clearly made impossible by the virtue of competition law or regulation, a long series of methods remains available for incumbents to dissuade entry onto the market. They relate to the conditions of unbundling, and prove that the devil is in the detail.

It is worth noting that some new operators are already pulling out of local loop activities. One of the main pan-European new entrants, KPNQwest, announced in late 2000 that it was cancelling its operations in this area. The number of operators initially interested in unbundling trials in France and the UK in 2000 have now, by early 2001, dropped considerably. As in the US, the enthusiasm that reigned in the late nineties has now faded away and been replaced by growing scepticism. This is certainly not a reason for the Commission or national authorities to reconsider ULL requirements, but demonstrates how difficult the process of ULL may and probably will be. It calls for a strict monitoring of the situation at both the national and Community levels.

The pricing issue

Pricing is a first crucial condition of access, and a potential source of abuse. While it is not disputed that access to the local loop should be provided at a reasonable price, the issue here is what a ‘reasonable’ price means. One of the key issues in a country like Germany is the price structure: while Deutsche Telekom’s retail access tariffs have not been rebalanced, which means that retail access to end-users is apparently provided below real cost, access prices to the local loop have been set according to cost orientation principles, which is in principle in line with Community policy guidelines, and what is now included in the new Regulation. The result is a distorted price structure between the upstream access and downstream retail markets. In countries like the UK or Ireland, where retail prices do not seem to have been fully rebalanced as yet, the scope for possible price squeezes between the incumbents’ upstream and downstream services remains significant.
The regulators’ role with respect to pricing is crucial: while RegTP, the German regulator, reduced the access price initially requested by Deutsche Telekom, it apparently did not consider DT’s price structure as a whole. In a recent decision, the French Authority, ART, rejected France Telecom’s claim of access price and substantially reduced it. It is worth noting, however, that the French regulator incorporated in its decision non-cost based considerations on the shared access price which may raise further questions on the appropriateness of this price imposed on France Telecom.

A comprehensive overview of monthly line rental access charges is difficult to provide at this early stage. First indications show an average line rental price close to 13 euros (a month), with a few countries on the higher side of the spectrum (UK, Ireland, Luxembourg), and a few other ones where access monthly charges are relatively cheaper (Sweden, Denmark). At the time of writing this paper, shared access prices were available only in a minority of Member States.

The co-location issue

Another common source of dispute on unbundling is co-location, i.e. the space made available by incumbents on their own exchanges for new entrants’ transmission and connection equipment. In several cases, American incumbents claimed that there was not enough space available for new entrants. The FCC has conducted tough hands-on monitoring of this issue and ordered inspections. In some cases it appeared that the old electro-mechanical switching equipment had not been removed from the exchanges, and that the new entrants’ digital equipment – which is much more compact – could thus not be installed. The FCC ordered the removal of the old equipment in order to create co-location space. Procedures of co-location – typically first come, first served – can turn out to be a nightmare, creating a potentially significant barrier of entry to late comers who would have to have their equipment housed outside the exchange, a process which involves extra costs. In the UK, a complex procedure regarding co-location, defined during the trial period, was recently cancelled given the low number of new entrants which expressed an interest in unbundled access, thus reducing the scarcity of co-location space in the initial phase. With regard to prices, definition of the new EC regulation is very highly incumbent upon regulators who have to approve and monitor co-location conditions. However, abuses may also be investigated on the basis of EC competition
rules: unmotivated refusals to co-locate may amount to refusals to deal, and/or to discrimination.

Delays

Delays are a crucial issue. Delaying tactics from incumbents may completely disorganise the new entrants’ operations and planning as they need to roll out their own upstream fibre network down to the incumbents’ points of presence. Worse, it may destroy consumer confidence in their ability to deliver services in a competitive way. In a world of scarce finance and increasing mistrust vis-à-vis e-companies, this delays profitability, bears a high financial cost and may end-up in undermining the new entrants' shareholders’ confidence as well.

The Sector Inquiry

In order to monitor the situation closely, the Commission in July 2000 launched a sector enquiry on the basis of the competition rules. This sector enquiry will take a while given the fact that, although the Regulation is gradually being implemented in all Member States, the market situation changes on an almost weekly basis. We believe that the aim of the sector enquiry, in this particular context, is not to provide us with a static picture of the situation, but rather to be used as a dynamic monitoring instrument. Because ULL is so important, a close hands-on monitoring of the situation from both angles, regulation and competition rules, is clearly required.

Conclusions

Finally, three general remarks on the unbundling of the local loop: first on the importance of tariff rebalancing, secondly on the complementary role of competition law and regulation and, finally, on the complexity of the ULL process itself.

First, the rebalancing of tariffs across the EU is not only a binding obligation for the Member States, according to the Directives’ cost orientation principles, but is also a key element for the development of local loop unbundling and therefore for the eEurope initiative. The remaining tariff
unbalances can have at least two negative effects. They may impede the emergence of genuine competition in the local loop by creating a situation of price squeezing, as line rental tariff remains lower than cost which would make the local loop unbundling very difficult. Furthermore, tariff unbalances send a false signal to new entrants, inducing them to concentrate on segments where call tariffs are kept artificially high by incumbents in order to compensate for access deficit. Phasing out the access deficit is, therefore, a pre-requisite for setting ULL access tariffs, and it is for this reason that the Commission has launched infringement proceedings relating to Germany, Italy, Spain and France.

Secondly, some confusion seems to have arisen as a result of the coming into effect of the Regulation of 2 January, 2001, as to whether competition proceedings may still be opened. Does Competition Law apply? The answer is clearly yes, without ambiguity. The Commission has repeatedly stated that competition rules apply in the telecommunications sector irrespective and independently from sector specific regulation. Competition proceedings for abuses of dominant position, for instance in the case of unfair conditions of access to the local loop, may be opened. The parallelism of competition law and regulation should not be seen as contradictory: On the contrary, we perceive them as being entirely complementary. Price distortions serve as a good example of this complementary aspect. They can be addressed both with the Regulation, which requires cost-oriented access prices, or through traditional price abuses under article 82 of the Treaty, in the case of price squeezing, for instance.

Thirdly, unbundling serves to remedy the absence of competition on the local loop. Like many behavioural remedies, it implies a complex monitoring – a large part of which has, in the EU, been deferred to Regulation Authorities – and gives rise to many possible disputes, not on the nature of the remedy itself but on its precise modalities: unbundling yes, but at which price, within which timeframe, which support services etc. The splitting of the incumbent’s retail services on the local loop from their infrastructure services would reduce the scope for cross-subsidisation which is taking place regularly through internal – artificial – transfer prices, limit price distortions, and would introduce the transparency required for revealing areas where an incumbent discriminates against its competitors via its own downstream activities.
ANNEX

Indicative list of items to be included a Reference Offer (8) for Unbundled Access to the local loop to be published by notified operators

A. Conditions for unbundled access to the local loop

1. Network elements to which access is offered:
   covering in particular the following elements
   - access to raw copper local loops (copper terminating at the local switch) and subloops (copper terminating at the remote concentrator or equivalent facility), in the case of full unbundling
   - access to non-voice frequencies of a local loop, in the case of shared access to the local loop;
   - access to space within a main distribution frame (MDF) site of the notified operator for attachment of DSL access multiplexers (DSLAMs) and similar types of equipment to the local loop of the notified operator.

2. Availability: all relevant detail regarding local network architecture, information concerning the locations of physical access sites, availability of copper pairs in specific parts of the access network.

3. Technical conditions: technical characteristics of copper pairs in the local loop; lengths, wire diameters, loading coils and bridged taps; line testing and conditioning procedures. Specifications for DSL equipment, splitters etc, with reference to relevant international standards or recommendations; spectrum limitations and electromagnetic compatibility requirements designed to prevent interference with other systems.

4. Provisioning procedures: line investigations for specific DSL technologies, ordering and provisioning procedures, usage restrictions.

B. Co-location services

5. Information on co-location sites: in particular the precise locations (9) of the notified operator's relevant sites; including switches, Main Distribution Frame (MDF), concentrators, and remote distribution points such as street cabinets, pedestals and vaults. Specification of the Web site(s) where the updated list of locations is published. Availability of alternatives when physical co-location is not available.

(8) A reference offer for unbundled local loop access includes the basic set of technical facilities, including terms and conditions, and prices, offered to market players.

(9) Availability of this information may be restricted to only interested parties to avoid concerns on public security.
6. Co-location Options at the sites identified under 5) above: the types of co-location available (e.g., shared, caged/cageless, physical, or virtual); availability of power and air-conditioning facilities at these sites; rules for subleasing of co-location space.

7. Equipment characteristics: restrictions, if any, on equipment that can be collocated.

8. Security Issues: measures put in place by notified operators to ensure the security of their locations; conditions for access by the staff of competitive operators in order to identify and repair service problems.

9. Safety Standards: (In principle safety standards used by the incumbent and its affiliates should be deemed adequate for competitive operators’ equipment).

10. Inspections: conditions for competitive operators and NRAs to inspect the locations at which physical co-location is available, or sites where co-location has been refused on grounds of lack of capacity.

C. Operational Support systems

11. Conditions for access to the notified operator’s operational support systems, information systems or databases for pre-ordering, provisioning, ordering, maintenance and repair requests and billing.

12. In principle the operational support system (OSS) elements listed should cover access to all loop qualification information, including information on whether a particular loop is capable of supporting advanced services.

D. Supply conditions

13. Timeframes: lead time for responding to requests for supply of services and facilities, as well as contractual compensation provided in case of failure to meet those time frames, service level agreements, fault resolution and escalation procedures.

14. Prices for each feature, function and facility listed above, shown separately, including one time payments and recurring rental payments.