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The ERG, with the valuable contribution by stakeholders within the consultation process, identified Local loop unbundling - LLU - (market 4 – WLA) and wholesale broadband access - Bitstream - (market 5 – WLA) as key areas where harmonisation might significantly help deliver benefits of a single electronic communications market.

In these areas the ERG recently published a draft Common Positions on underlying regulatory principles and on remedies imposed in case of SMP finding in the relevant market[1] based on the general guidance on choice of SMP remedies given in revised ERG Common Position on Remedies[2]. The design of common position within the ERG proved that "one size does not fit all" and that implementing strategies may be slightly different to take account of national circumstances.

In such a context, in order to complement ERG Common Position on regulatory remedies and deliver clear and concrete input towards harmonisation, the WLA WBA Project Team has been mandated by the ERG to "provide practical examples of regulatory practices developing guidance for the choice of remedies" [3].

The present Best Practices document reports the conclusions of the work done by the WLA/WBA PT between December 2006 and October 2007. This work aimed at "*analysing different regulatory models in place for different items, identifying those who best achieve the aim of effective and proportionate regulation [according to national specificities], suggesting them as best practice across ERG members*" [3]. It was based on the shared experiences of NRAs regarding the applied regulatory tools each one has developed to deal successfully with its own concrete issues. Focus has been put on consistency rather than uniformity so as to take into consideration national circumstances.

[1] *ERG (06) 69 and ERG (06) 70*

[2] *ERG(06)33*

[3] *ERG/IRG Work Program 2007, ERG (07) 01*

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Following the Project Requirement Document, three main topics relating to wholesale offers have been identified:

- Operational: Quality of Service;
- Functional: Migration and Richness of Reference Offers;
- Economic: Pricing issues.

In order to retrieve the relevant information needed to identify practices and routines implemented across ERG member states, four questionnaires (one for each topic plus one for national background) have been sent to each NRA.

These feedbacks from the NRAs were essential to meet ERG aim at conducting a thorough evidence-based analysis of each country in order to identify best practices.

This evidence-based analysis consisted in assessing the impacts of broadband regulation on the market in terms of investments, penetration, competitive levels and innovation, taking into account national circumstances (network topology, alternative to copper pair, stage of competition…). This analysis especially capitalised on the experience acquired by NRAs following the huge broadband market evolution that occurred since 2003 especially in the markets where xDSL based broadband saw high growth rate and significant LLU based competition occurred.

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As mentioned above, it is important to stress that the present report clearly relates to the existing Common Positions (06) 69 and (06) 70, the following table specifies the relevant sections of the Common Positions to which each Best Practice relates.

ERG Common Positions **ERG (06) 69 & ERG (06) 70**	**ERG Best Practices** **On Regulatory Regimes in Wholesale Unbundled Access and Bitstream Access**
Level Playing Field Reasonable quality of access product	Best Practice 1 : Implementing SLA & KPI in WLA & WBA Reference Offers Best Practice 2 : The minimal set of timers for SLA Best Practice 2a : SLA conditions on delivery time Best Practice 2b : SLA conditions on delivery precision Best Practice 2c : SLA on Facilities delivery time Best Practice 2d : SLA on Fault Clearance time
Reasonable quality of access product	Best Practice 3a : Compensation rules Best Practice 3b : Forecast
Reasonable quality of access product	Best Practice 4a : KPIs : the minimal set to be implemented Best Practice 4b : KPI : Periodicity, Comparison criteria, Publication
Assurance of efficient and convenient switching processes	Best Practice 5 : Bulk Migration process conditions Best Practice 6 : Ground Number Portability synchronisation
Assurance of backhaul from the point of delivery to a reasonable point of handover to the alternative provider	Best Practice 7 : Passive connectivity solutions
Assurance of co-location at the MDF and other associated facilities	Best Practice 8 : Collocation of equipments
Fair and coherent access pricing	Best Practice 10 : WLA & WBA Price Consistency Best Practice 11 : WLA - WBA Economic Space Best Practice 12 : Practical Scheme for WLA WBA economic space monitoring

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Objective	Rationale	Best Implementation Practices

QUALITY OF SERVICE

Quality of Service (QoS) associated with wholesale access products is the key operational issue and is particularly crucial for process industrialisation.
On one hand this has a direct impact on the service provided to the end user (QoS is one of the major source of concern for end users point of view as reflected by number of related complaints reported by several countries), on the other hand it is a key factor for process optimisation and rationalisation for operators.
A player with SMP has the potential to leverage this into downstream retail markets, by providing a different QoS to different wholesale customers. This could have a material impact on competition in retail markets, ultimately to the detriment of retail customers.
There should be reasonable certainty that entrants will be able to compete on a level playing field. This implies that measures are in place to provide an effective deterrent to obstructive and foot-dragging behaviour.
Hence, there should be assurance that access products will be of reasonable quality and that service levels (delivery times, cut-off period, repair times …) will be reasonable and comparable with that provided to SMP player's own business. Different levels of service should be available, to reflect differences in customer demand.
A mere non-discrimination obligation may help to provide such assurance. Where this approach is judged not sufficient, NRA may need to specify additional ex-ante controls on the wholesale products quality of service such as:
(a) Requirement to set reasonable time frames through a Service Level Agreement (SLA) at least sufficient to allow effective competition in the downstream markets with the SMP operator's retail offers. This requirement is consistent with article 9 of the Access directive (transparency);
(b) Requirement to pay appropriate compensation for service below the level agreed. This compensation should be of a sufficient level to create an incentive for the SMP-player to comply to the service level agreed as it will often prove unsatisfactory to deal with each new QoS problem by enforcement or dispute settlement ;
(c) Requirement to publish Key Performance Indicators (KPI) which allows identifying where potential discrimination exists. This set of KPI could be set so as to ensure non discriminatory behaviour by the SMP-player in comparison with its own retail downstream arm. This requirement is consistent with article 10 of the Access directive (non-discrimination).

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Objective	Rationale	Best Implementation Practices
1. Service Level Agreement and Key Performance Index	Service level and quality problems on WLA and WBA generated multiple NRAs interventions in all ERG member states and are still an issue in many of them. This situation generates uncertainty and lack of visibility for stakeholders and may hinder the development of competition and investment in the broadband market, ultimately to consumers' detriment. As already stated by the ERG[4], these foot dragging behaviours should be avoided by (a) Ensuring appropriate SLA with compensation as part of Reference Offers, and (b) Implementing relevant KPI. The most critical issues NRAs tackle with lead to identify a minimal scope of SLA and KPI on access delivery, fault clearance, and facilities provision.	**Best Practice 1** **Implementing SLA & KPI in WLA & WBA Reference Offers** It is best practice for NRAs to ensure SLA provisions including detailed compensation mechanisms/models as part of WLA and WBA Reference Offers. Similarly, it is a best practice for NRAs to ensure that relevant KPIs are implemented and monitored taking into account specified minimal scope and conditions. When identifying relevant scope for SLA and KPI, , the evaluation of the regulatory practices across member states shows that the minimal set of timers include: - Access delivery times; - Fault clearance times; - Facilities provision times.

[4] See ERG 06 (33) Revised ERG Common Position on the approach to Appropriate remedies in the ECNS regulatory framework

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Objective	Rationale	Best Implementation Practices
1.1. SLA on line delivery: the minimal set of timers (WLA & WBA)	Examining different access provision processes in ERG member states in the light of the encountered implementation difficulties, shows that the minimal critical timers for service provisioning are validation time delivery time, and delivery precision defined as below. - Validation time: time between receipt of a line order and sending of order acceptance or refusal; - Delivery time: time between receipt of line installation request and sending of done message provided the service is working (see next timer); - Delivery precision: once the SMP player has sent the done message the service must be working.	**Best Practice 2** **The minimal set of timers for SLA** It is best practice for NRAs to take into account a minimal set of timers to assess the service level on WLA access / WBA line delivery namely validation time, delivery time, and delivery precision: once the SMP player has sent the done message the service must be working
1.1.1. SLA conditions on delivery time (WLA & WBA) **Definition: time between receipt of LLU installation**	Definition: time between receipt of LLU installation request and sending of done message provided the service is working. Countries having a maximum delivery time of 7	**Best Practice 2a** **SLA conditions on delivery time** It is best practice for NRAs to subject to SLA delivery times for the provision of WLA

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Objective	Rationale	Best Implementation Practices
request and sending of done message provided the service is working	working days for providing full LLU are able to cope with significant access delivery volumes Countries having a maximum delivery time for Shared LLU of 7 working days are able to cope with significant SLLU adds. Maximum delivery time for WBA (xDSL line) shall be subject to SLA as well, under the same conditions applied to WLA. Under the non discrimination obligation, average delivery time of any wholesale product should be at most equal to the average delivery time (mdt) of each of the SMP downstream products: mdt WLA and/or WBA ≤ mdt Retail (SMP player)	access and WBA lines. It is best practice for NRAs to set maximum delivery times at most at the level of SMP downstream products delivery time e.g. WLA and/or WBA ≤ SMP Retail offers (see KPI for non discrimination obligation verification). Experience/findings across member states and benchmarking show(s) that line delivery time is possible within 7 working days.
1.1.2. SLA conditions on delivery precision (WLA & WBA) **Definition: Once the SMP player has sent the done message the service must be working.**	A SLA on delivery precision is required in order to avoid the SMP abuse of the SLA on delivery time by sending a done message without having delivered a working service. Furthermore a wrong information given by the SMP to competitors and consequently to the end-user can have detrimental effects on their reputation.	**Best Practice 2b** **SLA conditions on delivery precision** It is best practice for NRAs to subject to SLA delivery precision with at least the following condition: - In case a done message is sent and the service requested is not operational compensations are due by the SMP

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Objective	Rationale	Best Implementation Practices
		player; - Such compensations are over and above any amount of compensation to be paid due to line delivery delays.
1.1.3. SLA on facilities delivery time (WLA) **Definition: time between receipt of facility (collocation, tie cables, backhaul delivery …) service order and delivery of the requested service.**	Facilities provisioning was a very contentious issue in the majority of ERG members and is still a pending issue in many countries. Delayed delivery of facilities have detrimental impacts on competitors by preventing them : - From ensuring a quick roll-out and wide-spreading of their service; - From extending in a timely manner their broadband capacities by ordering supplementary facilities (e.g. collocation, tie cables…) on already unbundled sites. Indeed competitors ability to meet customer's demand in due time is all the more important as the service is already commercially launched: • Any delay in facilities provisioning has direct impacts on customers' acquisition; • New prospects will blame the	**Best Practice 2c** **SLA on Facilities delivery time** It is best practice for NRAs to subject to SLA LLU related facilities (e.g. collocation, tie cables installation/upgrade, backhaul …) provision time. In addition, given the specificities of the tie cables related issues, best practices for NRAs include to pay special attention to tie cables delivery time.

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Objective	Rationale	Best Implementation Practices
	operator for any delay in service provisioning. Special attention is to be paid by NRAs on tie cables related issues. Indeed, due to their inherent limited capacity, tie cables are subject to more dynamic extensions.	
1.1.4. SLA conditions on fault clearance time (WLA & WBA) **Definition: time between the receipt of a fault report and sending of clearance message provided the service is repaired.**	Different levels of SLA on fault clearance should be available to reflect differences in customer demand: - Standard SLA: this level of SLA reflects mass market demand. It should be included in the WLA access and WBA line with no additional fee. SLA should be at least equivalent to the service level offered by the SMP operator on the retail market. - Premium SLA: this level of SLA reflects business market demand. It should be available on demand and subject to additional fee. Different levels of premium SLA can be available depending on SMP player capabilities. However the levels must at least be equivalent to those in place for SMP player downstream	**Best Practice 2d** **SLA on Fault Clearance time** It is best practice for NRAs to subject to SLA WLA access and WBA line fault clearance delay to SLA. Best practices point to the availability of different levels of SLA on fault clearance should be available: - Standard SLA: to accommodate least of expectations, - Premium SLA: to accommodate extended expectations. In this sense, it is best practice for NRAs to specify the different levels of SLA to be at least equivalent to those in place for SMP

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Objective	Rationale	Best Implementation Practices
	services.	player downstream services. In terms of fault clearance process, benchmark results show that it is a good practice to achieve a reasonable target of : - Standard SLA: fault clearance in less than 2 working days; - Premium SLA: fault clearance in less than 8 working hours.
1.2. Compensation on failure to fulfill the agreed SLA (WLA & WBA)	The need for compensations on failure to provide the agreed level of service has extensively been pointed out by ERG[5] Practical experiences on failures to provide the agreed SLA strengthen this need. Indeed: - Service level and quality was very contentious in the majority of ERG members and is still a pending issue in many countries; - Multiple NRAs interventions on service level and quality were needed in all ERG	**Best Practice 3a** **Compensation rules** It is best practice for NRAs to subject to compensation payments by the SMP player all SLA indices/timers, including the ones mentioned before. Practical experience indicates that it is proportionate to apply compensation amounts for all cases where the SMP does not comply with the agreed service level

[5] See ERG 06 (33) remedies common position "*[…] NRAs may find it appropriate to oblige the SMP player to make compensation payments to reflect any failure to provide the agreed level of service. This can be justified as a reasonableness condition as it would be common commercial practice in a competitive market. Financial incentives are often an effective means of providing assurance that there will be few discrimination problems in practice."*
See ERG 06 (70) *"This compensation should be of a sufficient level to create an incentive for the SMP-player to comply to the service level agreed*".

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Objective	Rationale	Best Implementation Practices
	member states; - These NRAs interventions were needed whatever the stage of development of LLU even in countries where LLUs was introduced in the beginning of 2000. Such a situation generates uncertainty and lack of visibility for the stakeholders and may hinder the development of competition and investment in the broadband market. Therefore imposing an effective compensation obligation, e.g. on a 100% basis, associated with the appropriate set of service levels is proportionate. Forecasts can be useful if they allow the SMP to allocate, in an efficient and timely manner, the necessary resources and safeguard the SMP from unreasonable requests. Forecasts conditions vary widely across ERG member states where forecasts on service delivery are required by the SMP player. Forecasts conditions may lead the SMP operator to abuse the compensation rules. Hence, if forecasts are put in place: - Period Granularity (geographic and time) of forecasts must be reasonable; - Tolerance threshold, If applicable, should	**Best Practice 3b** **Forecast** If forecasts are put in place, it is best practice for NRAs to ensure reasonable related conditions in order to avoid SMP player abusing the compensations rules. As far as WLA Access / WBA line forecasts conditions are concerned, experience and

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Objective	Rationale	Best Implementation Practices
	be consistent: • With the scope of service (access/line, facilities …): operators have much more certainty in facilities forecasts than access orders forecasts; • With market development phase: a starting up market is more volatile than a mature market. - Geographic granularity should depend on SMP production workforce organisation. Such an organisation is commonly based, in ERG member states, on a subdivision of the territory into management areas. Hence in the case of WLA, geographic granularity should be based on a management area (regional) basis and not on a per MDF basis. According to ERG member states experience, forecasts conditions should not be more detailed than the following level: - Period: Quarter; - Time granularity : month; - Geographic granularity: SMP	benchmarking show that the following basic parameters act as good examples to be included: - Period: Quarter; - Time granularity : month; - Geographic granularity: SMP management areas (regional); - Tolerance: 30% and more for a starting up market.

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Objective	Rationale	Best Implementation Practices
	management areas (regional); - Tolerance: at least 30% and at least 40% for a starting up market.	
1.3. Key Performance Indicators **1.3.1. KPIs: The minimal set (WLA & WBA)**	The need for formulation and publication of appropriate key performance indicators (KPI) has extensively been pointed out by ERG"[6] NRAs feedback on KPI implementation across ERG member states shows that the current minimal set of KPI needed to monitor the application of the non discrimination obligation and the effectiveness of SLA and allow the identification of any persistent or new problems is the following: - Ordering • Number of orders completed, mainly to allow countries where WLA/WBA is in the starting up phase to monitor the load on the ordering system;	**Best Practice 4a** **KPIs : the minimal set to be implemented** It is best practice for NRAs to implement the following minimal set of KPIs for WLA/WBA and similar downstream product of the SMP. Benchmark analysis shows that the following criteria may be considered: - Ordering • Number of orders completed; • % of orders rejected after having successfully passed the administrative validation step.

[6] See ERG 06 (33): Revised ERG Common Position on the approach to Appropriate remedies in the ECNS regulatory framework *"One effective means of direct verification of non-discrimination is the formulation and publication of appropriate key performance indicators (KPI). […] KPIs are in particular likely to be necessary for the verification of service level agreements. […] A sensible degree of disaggregation will be appropriate, both to guard against subtle forms of discrimination and to allow unforeseen problems to come to light.*

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Objective	Rationale	Best Implementation Practices
	• Percentage of orders rejected after having successfully passed the administrative validation phase. Administrative validation includes order formatting (requested data and associated format …) and detection of erroneous data (wrong address, wrong telephone number ...). - Delivery • Average delivery time; • Percentage of lines delivered at or before the committed date; • Delivery precision: Percentage of fault reported in the 30 days following service delivery. - Fault repair • Average number of fault under SMP player responsibility reported per line and per year; • Average laps of time for fault clearance;	- Delivery • Average delivery time; • % of delivery at or before the committed date; • Delivery precision e.g. percentage of fault reported in the 30 days following service delivery. - Fault repair • Percentage of fault under SMP player responsibility reported per line and per year; • Average laps of time for fault clearance; • % of fault cleared at or before the committed date.

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Objective	Rationale	Best Implementation Practices
	• Percentage of fault cleared at or before the committed date.	
1.3.2. KPI: Periodicity, Comparison criteria (WBA & WBA)	KPI calculation periodicity should be short enough in order to guarantee a high level of responsiveness in case of inappropriate functioning. A periodicity of a year or a quarter is not sufficient to ensure the needed responsiveness. A one month periodicity is a fair trade-off between implementation costs and responsiveness. In order to monitor the application of the non discrimination obligation and provide transparency on the quality of the offered service, SMP players should provide for each KPI the equivalent level of performance provided to its downstream services including retail level. The comparison criteria should at least include the following : - For WLA: WBA and Retail; - For WBA: Retail. KPI should be publicly available in order to provide the optimum level of transparency and	**Best Practice 4b** **KPI : Periodicity, Comparison criteria, Publication** When implementing KPIs it is best practice for NRAs to ensure the following conditions: - Periodicity: monthly; - Comparison criteria for WLA & WBA : WBA + Retail; - Availability: Public.

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Objective	Rationale	Best Implementation Practices
	"*to provide confidence to market players in the efficacy of a non-discrimination remedy."*[7] Furthermore public availability allows operators, competitors as well as the SMP player, to communicate in a transparent way towards their customers.	

MIGRATION PROCESSES AND REFERENCE OFFERS RICHNESS

Two main functional issues are essential to allow new entrants to progressively extend their own network closer to the customer:
- Appropriate migration processes that allow them to pass from one wholesale access product having a given number of access/interconnection points to another wholesale access product requiring more access/interconnection points ;
- Completeness of reference offers that allow them at least to offer the same service as the incumbent and richness that render them able to differentiate their services from that of the incumbent retail arm and even to be the first mover by offering new and innovating services.

Mere non-discrimination and access obligations may help to cope with these issues. Where this approach is judged not sufficient to ensure fair competition conditions and certainty for new entrants, NRA may need to specify additional ex-ante controls on the wholesale products concerning migration processes as well as reference offers completeness and richness.

As far as migration is concerned, the main processes that are crucial to allow new entrants to climb the ladder of investment are the following:
- Migration from resale to wholesale access products permits to kick off the process of climbing the ladder of investment ;
- Migration from bitstream to LLU permits to keep on moving to the next rung.

Migration processes inside the same wholesale access product (e.g. from a configuration with a PSTN access line provided by the incumbent to a configuration without PSTN) are also essential in order to address customers demand.

[7] ERG (06) 33 - ERG Common Position on the approach to Appropriate remedies in the ECNS regulatory framework

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Objective	Rationale	Best Implementation Practices
The major issues relating to migration are: - The availability of a single and a bulk migration processes ; - Their effectiveness and fluidity ; - The associated pricing conditions. As far as reference offers completeness and richness are concerned, wholesale products reference offers must allow competitors to offer new and innovating services and compete on a level plying field by being able to be the first mover. Special regulatory attention on LLU is needed to ensure that the related reference offer is rich enough to enable widespread adoption of broadband services by allowing households to benefit from affordable broadband connections, accessible higher bandwidth services and a better range of applications with improved service levels. Indeed, LLU as the main vehicle for platform-based competition plays a leading role in delivering attractive broadband offerings by giving new entrants significant opportunities to offer new and innovating services.		
2.1. Bulk migration	Migration from a downstream wholesale product to any upstream product is crucial to facilitate effective competition and efficient investments. Indeed, migration processes are needed to allow competitors to move to the next rung of the ladder of investment. However very few member states have implemented bulk migration processes even in countries where intermediate wholesale offers are commonly used. Such processes are only available in 5 countries out of 23 (no data for Bu, Ge, Ir, Lu, Lv, No, Sk, Tk) after NRA's	**Best Practice 5** **Bulk Migration process conditions** It is best practice for NRAs to systematically integrate bulk migration processes in reference offers and ensure that migration process provisions are adequately specified. Experience/findings show(s) that the following details act as good examples to be included at least in the Reference Offers:

[8] ERG (06) 33 - ERG Common Position on the approach to Appropriate remedies in the ECNS regulatory framework

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Objective	Rationale	Best Implementation Practices
	intervention. In many cases this lack of migration processes is due to SMP player reticence. In order to push competition and efficient investments bulk migration should be systematically integrated in reference offers. *"NRAs have, in light of an access obligation, the power to require migration processes covering migrations to or from an SMP market even if one of the access products is not within a regulated market."*[8] Project predictability is essential for the OLO to organise operations (network, IT, commercial …) resulting from the change in underlying wholesale products. Furthermore, since the migration process is initiated by the operator and completely hidden from end-users, service cut-off period must be reduced to the minimum. Otherwise migration would have significant impact on end-users' experience which will have detrimental effects on the quality of the service offered by competitors and cause damage to competitors' reputation. In order to avoid such harmful impact, SLA on migration processes should be mandated. On the basis of the bulk migration routines implemented across ERG member states, the	- Project lead-time (time to execute all the requested migrations) with corresponding volumes; - Limited cut off period if any for each migrated line: Benchmark results show that a very short cut off period, if any, for each migrated line of less than 3 hours (mass market) is best practice; - SLA on at least the above conditions. In addition, it is best practice for NRAs to implement migration process monitoring through KPIs in order to control the application of the non discrimination obligation and provide transparency on the quality of service provided.

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Objective	Rationale	Best Implementation Practices
	main migration process conditions that should at least be included in the Reference Offers are: - Project lead-time (time to execute all the requested migrations) should be specified in the RO with the corresponding volumes; - Limited cut off period if any for each migrated line : less than 3 hours (mass market); - SLA with compensations on at least on the above conditions ; - Process monitoring through KPI. Forecasts can be requested by the SMP player if they are useful to achieve the required service level by allowing the SMP player to anticipate on expected volumes. However such forecasts should be set on the same reasonable terms as those applied for service delivery (see Quality of Service section).	
2.2. Ground Number Portability synchronisation	Ground number portability synchronisation with LLU is required to ensure fair competition and efficient investments. Concretely, synchronisation consists in granting	**Best Practice 6 Ground Number Portability synchronisation**

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Objective	Rationale	Best Implementation Practices
	the possibility for an access seeker to order FLLU and GNP on a single order and guaranteeing that the delivery of FLLU will be synchronised with GNP. Cut-off period which is a major end-user's concern, as voice service is also interrupted, must be reduced to the minimum. Otherwise, it would have significant impact on end-user's experience causing damage to competition and ultimately to the development of the market and the choice of customers by considerably restraining market fluidity. In order to avoid such drawbacks and ensure the effective implementation of GNP synchronisation, SLA on cut off period is needed.	It is best practice for NRAs to ensure that an appropriate and efficient process for synchronised GNP and FLLU is in place. Such a process may include the following requirements: - Possibility for the competitors to order on a single request GNP and FLLU; - FLLU line delivery must be concomitant with GNP; - Guarantee through SLA of a very limited cut off period for end-user. NB: for GNP synchronisation associated to WBA (naked DSL) see section "Stand Alone Bitstream Access".
2.3. Passive connectivity solutions	Suitable connectivity between DSLAM sites and regional handover points should be provided by the SMP player in order to allow competitors to offer a competitive nationwide intermediate service and to meet market demand, especially the increasing need for bandwidth. Indeed, new bandwidth consuming services like TV and Video on demand are now available in almost all of ERG member states. Such high	**Best Practice 7** **Passive connectivity solutions** It is best practice for NRAs to ensure that suitable access arrangements are in place so as to allow the establishment of efficient backhaul solutions. This may include duct sharing or access to dark fibre."

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Objective	Rationale	Best Implementation Practices
	levels of bandwidth are now available on unbundled copper pair in the majority of ERG member states e.g. 90% of ERG member states have implemented technologies allowing more than 16Mbits bandwidth. The only way to allow competitors to address such needs on a large scale with LLU based offers is to grant them passive connectivity facilities offers. They are the only suitable connectivity options that allow an efficient operator to push its LLU coverage to the utmost and compete on a level playing field. However such connectivity solutions should be defined according to national circumstances. **National circumstances** Passive transmission offers conditions should take account of national circumstances, particularly: - Geography and network topology constraints : country wideness and population/MDF density; - State of development and coverage of LLU based competition; - Existence of alternative fibre networks;	Detailed conditions of such passive connectivity solutions would be established according to national circumstances particularly: - Geographic and network topology constraints such as country wideness and population/MDF density; - State of development and coverage of LLU based competition - Existence of alternative fibre networks; - Availability of capacity in ducts or possibility to use existing ducts.

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Objective	Rationale	Best Implementation Practices
	- Availability of capacity in ducts or possibility to use existing ducts. Availability of a passive solution for DSLAM sites connectivity is particularly critical in countries having very large territories and where the average size of the unbundled DSLAM sites is insufficient to ensure a fair return on investment.	
2.4. Collocation of equipments (WLA)	LLU plays a leading role in delivering attractive broadband offerings by giving competitors access to higher bandwidth services and to a better range of applications with improved service levels. This will afford competitors significant opportunities to offer new and innovating services thus allowing them to be at the same equal footing as the incumbent by being able to be the first movers. However such new services can require the competitors to install their own specific equipments in the DSLAM site premises. This will allow them to be able to offer the service whatever the underlying technology and build a cost efficient network architecture capitalising on	**Best Practice 8** **Collocation of equipments** It is best practice for NRAs to ensure that innovative services can be launched by competitors without undue delay. To this end experience/findings show(s) that it is appropriate for the WLA reference offer to permit competitors to collocate any equipment that is indispensable to offer a given service (existing or new) to the customer with no technological restrictions other than in-cable spectral management or equipments interferences.

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Objective	Rationale	Best Implementation Practices
	technological evolutions. Any undue delay undergone by a competitor can dissipate its first mover advantage and impair the associated potential growth. An SMP player could abuse of his dominant position by using delaying tactics. Such abuses have led national authorities to intervene in some ERG member states in order to force the SMP player to authorise installation at the MDF of the Ethernet switches needed (for some DSLAMs) to offer a TV over DSL service.	Moreover, in case of equipment collocation refusal on technical grounds, the SMP player would need to present and motivate the reasons, namely impacts on in-cable spectral management or equipments interferences.
2.5. Stand-alone bitstream access	Stand-alone bitstream or Stand-alone wholesale broadband access (St-WBA) is a bitstream service enabling the provision of an xDSL line to the end-user without the end-user forced to pay a subscription service to the PSTN operator.. St-WBA allows operators to provide end-users with naked DSL offers. St-WBA is a key regulatory concern since it ensures: - The ability of end-users to pay only for the service required: • PSTN line + broadband ⇒ PSTN	**Best Practice 9** **Stand-alone bitstream access (St-WBA)** Its best practice for NRAs to ensure that competitors are given the opportunity to request alternative access arrangements and that the SMP operator provides such alternative arrangements upon reasonable request. Where there is material commercial demand, it is best practice for NRAs to include St-WBA in the WBA reference offer. From the end-users standpoint, naked DSL

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	line rental + broadband monthly fee; • Broadband only (with or without voice over broadband) ⇒ naked broadband monthly fee (naked DSL). - National equity by addressing households without PSTN line and which are not located in unbundled area; - An increase in competition and innovation by promoting multiple play offers at nationwide level; - Voice over IP wide-spreading. - Ultimately this will push broadband accessibility and penetration given the substantial consumer demand for naked DSL.	should be as user friendly as PSTN. This could be done by ensuring that the St-WBA offer fulfill at least the following requirements: - Availability of GNP synchronisation with St-WBA under the same conditions as those stated for FLLU; - Availability of an appropriate single line migration from bitstream (with PSTN) to St-WBA guaranteeing a minimum, if any, cut-off period; - Availability of bulk migration processes from St-WBA to FLLU under the same conditions as those stated in 'Bulk migration' above section. Whether St-WBA access is considered to be attractive, or not, will largely depend on its price. However it is best practice that St-WBA pricing guarantee an appropriate remuneration of investments needed to maintain the universal service provision e.g recovery of specific access line costs not covered anymore by the PSTN monthly fee.

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		In order to create/preserve incentive to unbundling, NRAs would need to ensure: - A sufficient economic space with FLLU under the conditions stated in the 'pricing' section; - An effective bulk migration process from St-WBA to FLLU is available under the same conditions as those stated in 'Bulk migration' above Best Practice.

PRICING

Prices of wholesale broadband offers are set to create incentives for both SMP player and new entrants to invest in broadband infrastructure. The level at which prices of wholesale broadband offers are set, compared to each other and to the incumbent retail offers, should create incentives for new entrants to climb the ladder of investment.

Mere access, transparency and non-discrimination obligations may help to cope with these issues. Nevertheless, price control obligation is required to guarantee fair and sustainable competition. The two major economic issues to be tackled are the following:
- Scope of services subject to price control obligation and associated cost standard, cost basis and modelling approach ;
- Economic spaces monitoring by the NRA.

As far as the scope of services under price control is concerned, it should be established taking into account the key wholesale products components, mainly:
- LLU : copper pair (full access, shared access …) , associated facilities (collocation, tie cables, …) and backhaul (duct sharing, optical fibre …)

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- Bitstream : xDSL line, backhaul (ATM, Ethernet, IP) As far as economic spaces monitoring is concerned, assurance of protection against downstream margin squeeze is essential. There needs to be reasonable certainty in advance of how a margin squeeze would be assessed and confidence that any complaint could in practice be resolved quickly.		
3.1. WLA ⇔ WBA Price Consistency	New entrants are rolling out more and more investments further down the network hierarchy. Both the size of these investments and the likely proportion of it that is potentially sunk increases. The level at which prices of wholesale broadband offers are set, compared to each other and to the incumbent retail offers, should create economic spaces so as to : - Create incentives for new entrants to further climb the ladder of investment; - Give assurance of protection against downstream price eviction. This implies guaranteeing consistency in wholesale offers pricing which consists in ensuring that each economic space between an upstream and a downstream service allows an efficient operator to cover its incremental costs generated by the use of the upstream product. A mere cost-based pricing for LLU is not sufficient to guarantee such a consistency as it	**Best Practice 10** **WLA & WBA Price Consistency** It is best practice for NRAs to ensure consistency between the prices of all SMP player's products available along the whole value chain of DSL. This consistency would guarantee that the level at which prices of wholesale broadband offers are set, compared to each other and to the incumbent retail offers, create sufficient economic spaces so as to : - Create incentives for new entrants to further climb the ladder of investment; - Give assurance of protection against downstream price eviction. - Promote infrastructure based competition

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	does not prevent the risk that bitstream prices become so advantageous for the new entrants that it disincentivises LLU based investments. Hence, NRAs must ensure sufficient economic space between WLA and WBA in order to allow efficient competitor to profitably compete: - Against WBA on the intermediate markets (wholesale market); - Against the SMP retail offers. This guarantee will promote efficient investment by giving new entrants the confidence needed to make the incremental investments.	This primarily would involve for NRAs the need to ensure sufficient economic space between WLA and WBA in order to allow efficient competitor to profitably compete: - Against WBA on the intermediate markets (wholesale market); - Against the SMP retail offers.
3.2. WLA⇔WBA Economic Space	WLA⇔WBA economic space should be set: - Wide enough so as to avoid eviction prices and not hinder competitors investments in LLU by artificially restraining LLU extension; - Not too wide in order to avoid inefficient investments and excessive pricing in the retail market especially in underserved areas. In establishing the relevant economic space needed for an efficient operator, NRAs must bare in mind that:	**Best Practice 11** **WLA⇔WBA Economic Space** it is best practice for NRAs to ensure that WLA⇔WBA economic space would be : - Wide enough so as to avoid eviction prices and not hinder competitors investments in LLU in alternative infrastructure by artificially restraining LLU extension; - Not too wide in order to avoid excessive pricing in the retail market

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	- In terms of access to the local loop, where very high initial investments are required, economies of scale and density are crucial; - WLA and WBA are subject to very different economies of scale and hence per user costs. This is mainly due to the fact that: • Upfront investments, mainly sunk costs, are much more important for WLA than WBA; • Unbundling costs (access equipments, collocation and related facilities, aggregation network…) are much more influenced by scale than WBA costs. One of the fundamental problems is that an efficient competitor using LLU does not benefit from economies of scale and density to the same extent as the incumbent. In particular, this allows the SMP player to operate a profitable WBA service on margins thinner than those required by a competitor to be profitable. In such a context, NRAs must integrate in the	especially in underserved areas. It has been also identified as a best practice that NRAs integrate in the course of its economic space valuation the appropriate level of economies of scale that an efficient operator can reasonably achieve. WLA⇔WBA economic space would be set taking into account of national circumstances including: - Market situation including DSL penetration and competition level; - Level of unbundling and its extension prospect. - The existence of alternative infrastructure. In addition, experience shows that NRAs would need to adopt a dynamic approach in order to assess the economic space and adjust it according to national market development.

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	course of its economic space valuation the appropriate level of such economies that an efficient competitor can reasonably achieve. This must be done taking account of national circumstances such as: - Market situation including DSL penetration and competition level; - Level of unbundling and its extension prospect. Given that these national circumstances are highly correlated with market evolution, NRAs should adopt a dynamic approach in order to assess the economic space and adjust it according to national market development. **National circumstances** LLU coverage and extension prospects are highly influenced by the economies of scale and density that an efficient operator can achieve. Such economies are determined by national circumstances: - Economies of scale on backhaul investments needed to connect DSLAM sites to convenient regional network points depend on country wideness, population dispersion (weight of under-	

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	populated/rural areas) and existence of alternative fibre networks; - Economies of scale on investments needed at DSLAM sites depend mainly on access network topology constraints i.e. MDF density (and eligible lines). In such circumstances a harmonised approach on WLA⇔WBA economic space can only be done by establishing a common scheme for assessing this space. Indeed, due to very heterogeneous national specificities as those mentioned above, defining a single European value for the economic space between WLA and WBA, which allow efficient competitors to profitably compete with the SMP player, is not possible. **Practical scheme for WLA⇔WBA economic space monitoring** In order to achieve the goals stated above and according to ERG experience, practical monitoring of WLA⇔WBA should be based on the following scheme: WBA minimum price = WLA price + efficient operator incremental costs of providing WBA	**Best Practice 12**

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	As stated before a dynamic approach is needed to assess an efficient operator's incremental costs. Such an approach is required in order to take account of the main drivers dynamics, which are mainly: 1. Cost evolution of components and technologies (function of time); 2. Market situation; 3. LLU roll out prospect of an efficient operator. This dynamic approach consists in establishing a reasonable laps of time during which the main drivers will be assessed. Due to the current dynamics of the broadband market, an assessment done once or twice a year is relevant. The main drivers are to be reassessed at least at the end of each reference time period and in case of wholesale offers (WLA and WBA) price revision. On the basis of this reference time period valuation of: 1. Cost of components and technologies by integrating: • Equipments costs (DSLAM,	**Practical Scheme for WLA⇔WBA economic space monitoring** It is best practice for NRAs to adopt the following WLA⇔WBA economic space practical monitoring scheme: WBA minimum price = WLA price + efficient operator incremental costs of providing WBA Assessment regularly (e.g. one or twice per year), or in case of wholesale offers (WLA and WBA) price revision, of this scheme to take into account market evolution impacts on the following main drivers: - Cost of components and technologies; - Economies of scale that can be achieved by an efficient competitor; - LLU roll out prospect .

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	switches, transmission …); • Stakeholders feedback on LLU especially facilities rate of usage. 2. Economies of scale that can be achieved by an efficient competitor taking account of market situation and level of demand: • Average DSL penetration; • Average market share of an efficient operator. 3. LLU roll out prospect based, among others, on: • National circumstances : access network topology, country size and backhaul availability and roll out, population distribution …; • Unbundling coverage status and its recent evolution; • Unbundling stakeholders' plans.	