A l'attention du **secteur des communications électroniques**

Gestionnaire du dossier Axel Palmaers (Fr)
Ingénieur-Conseiller
Pôle Télécom & Média
axel.palmaers@ibpt.be

Nos références
12/APA/BRxx 2012/Précons

tél. +32 2 226 88 46
fax +32 2 226 88 41

Bruxelles, le 22 février 2012

Concerne: consultation préalable relative à la proposition d'adaptation des offres de référence de Belgacom du 17 février 2012

Ce 17 février 2012, l'IBPT a reçu de la part de Belgacom une **adaptation majeure aux offres de référence BRxx et WBA** répondant aux obligations issues de la décision de la CRC du 1er juillet 2011 concernant l'analyse des marchés large bande et la décision du Conseil de l'IBPT du 11 août 2011 concernant les offres de référence BRUO/BROBA/WAB VDSL2/BROTSoLL 2010. Belgacom a également profité de ces adaptations pour proposer de manière volontaire de nouvelles modifications. Une liste reprenant l'ensemble des adaptations ainsi qu'une copie des offres de référence adaptées sont joints en annexe à ce courrier.

Par la présente, **nous vous invitons à réagir à la proposition** de Belgacom d'adaptation aux offres de référence **selon les modalités suivantes** :

- par courrier électronique à axel.palmaers@ibpt.be
- pour le **vendredi 16 mars 2012 au plus tard** à 12h
- pour des raisons techniques, les propositions d'adaptions aux offres BRUO, BROBA et WBA VDSL2 ont été publiées sur le site internet de l'IBPT sous forme de 4 parties indépendantes. Nous vous demandons toutefois de coordonner l'ensemble de vos réactions sur ces propositions dans un document unique.
- nous vous demandons de ne pas fournir à ce stade de commentaires sur le détail des processus opérationnels tels que clarifiés par l'intermédiaire des *process flows* publiés en annexe aux offres de référence.

Axel Palmaers (+32 2 226 88 46) se fera un plaisir de répondre à vos questions éventuelles.

Annexe(s):
1. Liste des adaptations apportées aux offres de référence
2. Liste des documents relatifs aux offres de référence fournies en annexe
3. Offres de référence BRUO, BROBA et WBA VDSL2 adaptées le 17 février 2012

ANNEXE 1 – LISTE DES ADAPTATIONS AUX OFFRES DE RÉFÉRENCE

Adaptations principales

1. Introduction d'une **distinction** claire entre les processus « **Ordering** » et « **Provisioning** »

2. **Description détaillée des processus opérationnels** sur base de « process flows » tels que présentés lors de l'OWG/1106

3. Introduction d'une nouvelle **procédure de changement de Tie Cable** en cas de défaut sur une porte DSLAM OLO (**BRUO** uniquement)

4. Introduction d'une **nouvelle procédure de prise en compte des résultats de mesure fournis par l'opérateur alternatif** en cas de demande de réparation et mise en place d'un template standardisé (BRUO)

5. **Ré-introduction des délais de notification aux modifications IT** ayant supprimés par erreur lors de la précédente révision des offres

6. Introduction d'une **offre Backhaul GE** dans les offres BROBA et WBA

7. Introduction d'une **redevance de type « pending order due to useless end-user visit »**

8. Ajout d'une **clause** selon laquelle Belgacom peut refuser de satisfaire à une **demande d'accès non raisonnable**

9. Amélioration de la **cohérence entre Basic SLA et Improved SLA en matière de repair** en ligne avec le contenu de la présenté « ISLA Repair Information Session » présentée par Belgacom lors de l'OWG/1105

10. **Clarification des offres concernant les calculs de SLA**, les rapports KPI individualisés et les éventuellement **compensations** qui en résultent

11. Affinage des SLAs relatifs aux outils IT

Adaptations mineures

12. Uniformisation des termes « end-user » et « user » entre les différentes offres

13. La restriction « if no further delay because of public domain obligations » telle que reprise dans l'offre BRUO a été étendue aux offres BROBA et WBA

14. Les délais relatifs à une demande de profils Dedicated VLANs figurant dans l'offre BROBA sont désormais aussi repris dans l'offre WBA

15. Introduction d'une description des annexes aux offres de référence sous le titre « General Information » dans l'annexe GT&C.

16. Les annexes WBA ont été renumérotées

17. Les annexes Pricing and Billing affichent désormais un tableau récapitulatif des prix

18. Les références vers les procédures d'escalades ont été corrigées

19. …

Compléments d'information

Concernant la facturation séparée des frais d'activation, de désactivation et de configuration demandée par Belgacom dans le cadre de l'offre BROBA Ethernet approuvée par la décision du Conseil de l'IBPT du 11 août 2011, Belgacom indique avoir rétabli la situation initiale malgré cette décision pour des raisons matérielles.

ANNEXE 2 - LISTE DES DOCUMENTS RELATIFS AUX OFFRES DE RÉFÉRENCE

Les documents relatifs aux offres de référence présentés à l'annexe 3 sont listés ci-dessous.

Pour des raisons techniques, les propositions d'adaptions aux offres BRUO, BROBA et WBA VDSL2 ont été publiées sur le site internet de l'IBPT sous forme de 4 parties indépendantes. Les adresses URL de ces 4 parties sont précisées ci-dessous.

Partie 1A - BRUO

Ces documents sont disponibles à l'adresse suivante :
http://ibpt.be/ShowDoc.aspx?objectID=3707

Type	Document	Description
BRUO	Main Body	
BRUO	Annex A	General Terms and Conditions
BRUO	Annex C	Technical ecifications
BRUO RC	Annex D1	Billing and Accounting
BRUO SP	Annex D2	Billing and Accounting
BRUO	Annex D3	Billing and Accounting
BRUO	Annex E	Planning and Operations
BRUO	Annex F	OSS
BRUO	Annex G1	Basic SLA
BRUO	Annex G2	ISLA Repair
BRUO	Annex G3	ISLA Provisioning
BRUO	Annex H	Price List

Partie 1B - BRUO

Ces documents sont disponibles à l'adresse suivante :
http://ibpt.be/ShowDoc.aspx?objectID=3708

Type	Document	Description
BRUO RC	Annex B1.1	SD2010
BRUO RC	Annex B1.2	SD2030
BRUO RC	Annex B1.3	SD2035
BRUO	Annex B1.4 B2.4 Appendix A	
BRUO	Annex B1.4 B2.4 Appendix B	
BRUO RC	Annex B1.4	SD2040
BRUO RC	Annex B1.5	SD2015
BRUO RC	Annex B1.6	SD2045
BRUO RC	Annex B1.7	SD2050
BRUO	Annex B1.8	Multiple pairs ordering
BRUO SP	Annex B2.1	SD3010
BRUO SP	Annex B2.2	SD3030
BRUO SP	Annex B2.3	SD3035

BRUO SP	Annex B2.4	SD3040
BRUO SP	Annex B2.5	SD3015
BRUO SP	Annex B2.6	SD3045
BRUO	Annex Ja	Intro
BRUO	Annex Jb	NDA
BRUO	Annex Jc	Technical Spec Tie Cable
BRUO	Annex Jd	Type 1 Pair Selection
BRUO	Annex Je	Type 2 Pair Selection
BRUO	Annex Jf	Shared Pair Pair Selection
BRUO	Annex Jg	Technical Spec Cables
BRUO	Annex Jh	KVD streets
BRUO	Annex K	Migrations to BRUO/BROBA/WBA

Partie 2 - BROBA

Ces documents sont disponibles à l'adresse suivante :
http://ibpt.be/ShowDoc.aspx?objectID=3709

Type	Document	Description
BROBA ADSL	Main Body	
BROBA ADSL	Annex 2	Technical Spec
BROBA ADSL	Annex 6	Pricing and Billing
BROBA ADSL-SDSL	Annex 1	General Terms and Conditions
BROBA ADSL-SDSL	Annex 2	Technical Spec
BROBA ADSL-SDSL	Annex 3	Exchange of information
BROBA ADSL-SDSL	Annex 4	Planning and Operations
BROBA ADSL-SDSL	Annex 5	Basic SLA
BROBA ADSL-SDSL	Annex 5A	ISLA Repair
BROBA ADSL-SDSL	Annex 5B	ISLA Provisioning
BROBA ADSL-SDSL	Annex 8	Prepayement Terms Conditions
BROBA SDSL	Main Body	
BROBA SDSL	Annex 2	Technical Spec
BROBA SDSL	Annex 6	Pricing and Billing

Partie 3 - WBA VDSL2

Ces documents sont disponibles à l'adresse suivante :
http://ibpt.be/ShowDoc.aspx?objectID=3710

Type	Document	Description
WBA VDSL2	Main Body	
WBA VDSL2	Annex 1	General terms and conditions
WBA VDSL2	Annex 2	Technical Spec
WBA VDSL2	Annex 3	Planning and Operations
WBA VDSL2	Annex 4	Basic SLA
WBA VDSL2	Annex 4	ISLA Repair
WBA VDSL2	Annex 4	ISLA Provisioning
WBA VDSL2	Annex 5	Pricing and Billing
WBA VDSL2	Annex 6	Prepayment Terms Conditions

ANNEXE 3 – OFFRES DE RÉFÉRENCE ADAPTÉES LE 17 FÉVRIER 2012

WBA VDSL2

Wholesale Broadband Access VDSL2

Main Body

Created on: 16 February 2012~~20 December 2011~~

1 Table of contents

2 Glossary

- **Certified Technician**: Any technician employed either by a Beneficiary or by one of Beneficiary's subcontractors, trained and certified by Belgacom in order to perform, in place of a Belgacom technician, the installation of the WBA VDSL2 without voice lines.
- **Customer Equipment**: Any equipment that belongs to the Customer
- **CPE**: Customer Premises Equipment.
- **IP-DSLAM**: Digital Subscriber Line Access Multiplexer. IP-DSLAMs are located in Belgacom Local Exchanges and they are owned and managed by Belgacom.
- **LDC**: Belgacom Local Distribution Center
- **Lex**: Belgacom Local Exchange
- **Network Termination Point (NTP):** The termination point of a loop at the End User premises. The Network Termination Point is a part of the Belgacom network.
- **NNI**: Network Node Interface.
- **OAL**: OLO (Ethernet) Access Line. An Access Line is an interface between the Customer Equipment and a Belgacom Service Router located in the Service PoP of the Service Area.
- **OLO**: Other Licensed Operator
- **P-bit**: priority bit.
- **ROP**: Remote Optical Platform.
- **Service PoP**: a Service PoP provides access to the Belgacom Ethernet network through NNI connection with a Belgacom Service Router.
- **UNI**: User to Network Interface.
- **VDSL2**: VDSL2 is an access service based VDSL2 (Very high Speed Digital Subscriber Line 2) technology that allows simultaneous transport of data and voice service, using the same local exchange service loop, to be sent over existing facilities.
- **VLAN**: Virtual Local Area Network. Unless specified otherwise, the word "VLAN" equally refers to a shared or to a dedicated VLAN.
- **WBA:** Wholesale Broadband Access.
- **WBA VDLS2:** Unless specified otherwise, the word "WBA VDSL2" equally refers to the two types of service: with shared or with dedicated VLANs.

3 Scope

1. This document provides a description of the Belgacom's WBA VDSL2 Service, including the method of connection.

2. This document entails the conditions related to the provision by Belgacom to the Customer, of the WBA VDSL2 service, which will enable the Customer to define its own VDSL2 products and to market, distribute and sell under its name and on its behalf its own VDSL2 products towards ~~End~~ Users, using Belgacom installed and existing Network infrastructure, pursuant to the technical limitation of this existing infrastructure for offering the service.

3. This offer and its tariffs are only applicable for connecting end-user premises either connected to an IP-DSLAM located in Belgacom premises (LEX or LDC) or connected to a ROP equipped with a remote IP-DSLAM module.

4. This document contains the technical, operational and financial conditions, as well as a possible method of connection and the applicable terms and conditions related to such service

5. The provision of the hereunder-described service supposes the following list of prerequisites that will need to be met at all times and in all circumstances:

   - WBA VDSL2 Connection between the network of the Customer and the Belgacom network (hereafter the "Network") is established pursuant to the principles set out in this document;
   - A line from the e~~E~~nd-u~~U~~ser premises to a Belgacom IP-DSLAM must be available.
   - The WBA VDSL2 Service is only offered if technically feasible and in accordance with VDSL2 deployment in Belgacom network. Belgacom will perform a technical feasibility study on the user line (line condition, distance etc.) after having received the order of the Customer;

4 Description of the WBA VDSL2 service

4.1 General

6. The WBA VDSL2 will allow the Customer to connect on Belgacom network at a Belgacom Service PoP and to receive any Ethernet frame from the End User using VDSL2 technology. The transport end-to-end between the End User and the Customer is Ethernet.

7. The offering of service covers:

   - The provision by Belgacom of one or several OLO Access Lines between the Customer Equipments and the Belgacom Service PoPs;
   - The provision by Belgacom of bandwidth (VLANs) between the IP-DSLAMs in which the Customer wants to connect End Users and the Belgacom Service PoPs to which the Customer Equipments are connected; These VLANs can be either shared between several users of a Customer in a same LEX or dedicated per separate user.
   - The provision and the configuration by Belgacom of Ethernet Transport between the IP-DSLAMs and the Customer Equipments.
   - The provision by Belgacom of VDSL2 lines to the user.

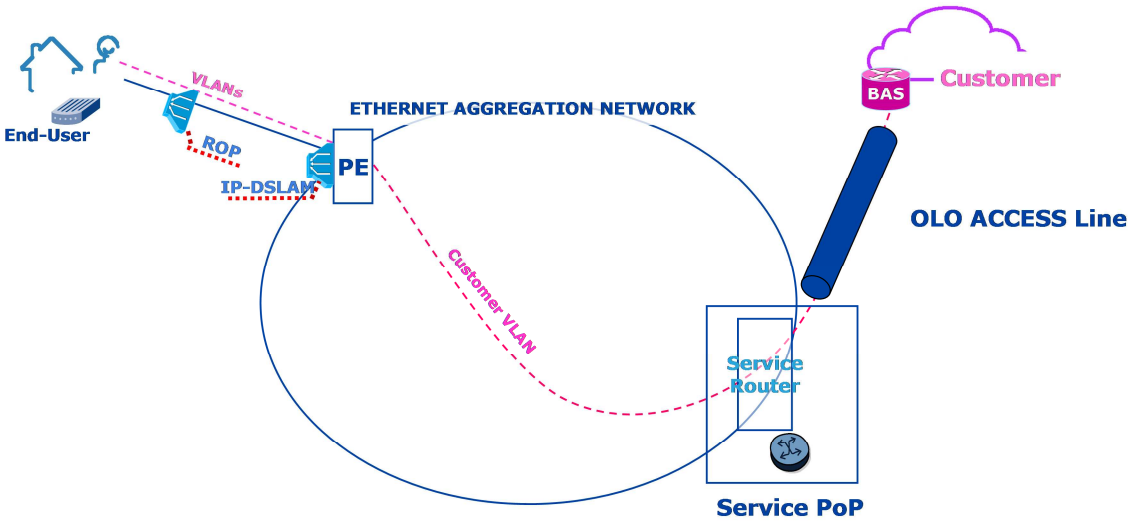


Figure 1: End-to-end overview

8. The WBA VDSL2 service is offered on basis of the equipment delivered by Belgacom's supplier at the moment of the equipment's bringing into service in a given site.

9. Belgacom will ensure the management of the IP-DSLAMs and their proper configuration.

4.2 OLO Access Line between a Belgacom Service PoP and the Customer Equipment

10. The connection between the network of the Customer and the Belgacom network is realized through OLO Access Lines (OAL) between the Customer Equipments and the Belgacom Service Routers, sited in the Belgacom Service PoPs.

11. To use the WBA VDSL2 to connect users of a Service Area, the Customer must interconnect with Belgacom in at least one Service PoP of this Area. If the Customer wants to be active anywhere in Belgium, he needs at least one interconnection per Area.

12. The list of Belgacom Service PoPs is available in Appendix B.

13. The description of the OLO Access Lines, and in particular the exhaustive list of combinations of bandwidth, protection mode and type (Belgacom-sited~~, or~~ Customer-sited, or Backhaul) offered by Belgacom in the scope of this agreement is described in the Appendix A of this document.

14. The Customer is responsible for

    - the choice of the Service PoPs on which terminate its OALs,
    - their dimensioning,
    - the choice of their protection modes,
    - and the choice of their types.

15. The Customer shall pay to Belgacom the installation and rental fees of its Access Lines, as set forth in the Annex "Pricing and Billing".

16. For information on the Technical Specifications of the OLO Access Lines, reference is made to Annex 2 (Section ~~10~~12: OLO Access Line).

17. The connection between the Belgacom Service Router and the Customer Equipment is subject to successful testing procedure, as set forth in Annex 2, (Section ~~10~~12.3: Testing the OAL).

4.3 Ethernet Transport between the IP-DSLAM and the Customer Equipment

18. This WBA VDSL2 service is offering an Ethernet connectivity between the OLO Access Lines and the user VDSL2 lines.

19. Four service qualities are offered for the WBA VDSL2 service, differentiated by the Ethernet p-bit (P):

    - P=0: best effort.
    - P=1: low priority.
    - P=3: medium priority.
    - P=5: highest priority.

20. Shared and dedicated VLANs

    - *Shared* VLANs: per service quality and per LEX, the Virtual LANs (VLANs) of the user lines of a Customer are aggregated and transported in 1 VLAN to a Service PoP where an Access Line of the Customer is connected. This Service PoP has to be located in the same Service Area as the LEX himself.

In each LEX where Belgacom installed IP-DSLAM's, Belgacom will create for the Customer maximum 8 *shared* VLANs - each dedicated to a different service quality, with a maximum of 2 Vlans per service quality - to which the Customer's End Users are connected in order to transport their VDSL2 traffic from the DSLAM to the Customer Equipment and reversely.

- *Dedicated* VLANs: per Customer's end-user, all Virtual LANs (VLANs) are transported transparently in 1 *dedicated* VLAN to a Service PoP where an Access Line of the Customer is connected. This Service PoP has to be located in the same Service Area as the LEX of the Customer's end-user.

21. There are 5 Service Areas for the whole of Belgium, each of them covering 1 geographical area. Per Service Area there are 2 Service PoPs, located in 2 different buildings. The list of Belgacom Service Areas, their definition and the address of the related Service PoPs is available in Appendix B.

22. VLANs will be configured by Belgacom, on behalf of the Customer, to transport the VDSL2 traffic of the Customer's End Users from the IP-DSLAMs on which Customer's End Users are connected up to the Customer's Equipment and reversely.

4.4 Bandwidth between the Local Exchanges and the Belgacom Service PoP to which the Customer equipment is connected

4.4.1 For shared VLANs

23. The Customer will order bandwidth and more precisely shared VLANs between each LEX in which the Customer wants to connect End Users and where Belgacom installed IP-DSLAM's and the Belgacom Service PoP(s) to which the Customer is connected. Each OLO may order up to 2 Vlan's per service quality per LEX.

24. The bandwidths that can be ordered by the Customer between a LEX and a Belgacom Service PoP are summarized in the following table, in function of the service quality chosen by the Customer for the related VLAN.

Offered VLAN Bandwidth (Mbps)	P=0	P=1	P=3	P=5
2	Y	Y	Y	Y
4	Y	Y	Y	Y
6	Y	Y	Y	Y
8	Y	Y	Y	Y
10	Y	Y	Y	Y
12	Y	Y	Y	Y
14	Y	Y	Y	Y
16	Y	Y	Y	Y
18	Y	Y	Y	Y
20	Y	Y	Y	Y
30	Y	Y	Y	Y

40	Y	Y	Y	Y
50	Y	Y	Y	Y
60	Y	Y	Y	Y
70	Y	Y	Y	Y
80	Y	Y	Y	Y
90	Y	Y	Y	Y
100	Y	Y	Y	Y
120	Y	Y	Y	N
140	Y	Y	Y	N
160	Y	Y	Y	N
180	Y	Y	Y	N
200	Y	Y	Y	N
220	Y	Y	Y	N
240	Y	Y	Y	N
260	Y	Y	Y	N
280	Y	Y	Y	N
300	Y	Y	Y	N
320	Y	Y	N	N
340	Y	Y	N	N
360	Y	Y	N	N
380	Y	Y	N	N
400	Y	Y	N	N
420	Y	Y	N	N
440	Y	Y	N	N
460	Y	Y	N	N
480	Y	Y	N	N
500	Y	Y	N	N
600	Y	N	N	N
700	Y	N	N	N
800	Y	N	N	N
900	Y	N	N	N
1gig	Y	N	N	N

25. Higher bandwidths could be possible in the future, if sufficient justification can be submitted by The Customer to Belgacom.

4.4.2 For dedicated VLANs

26. There is no pre-provisioning of the dedicated VLANs. Each dedicated VLAN is configured by Belgacom at the moment of the implementation of the user line, following specifications of the dedicated VLAN profile given by the Customer in the VDSL2 line ordering. The Customer is responsible for the choice and definition of each dedicated VLAN profile.

27. The Customer can obtain up to 10 dedicated VLAN profiles, and may only use its own dedicated VLAN profiles.

28. Each dedicated VLAN profile has following attributes:
    - Layer 2 (p-bit) or Layer 3 Qos (precedence, DSCP),
    - Maximum Upstream bandwidth per P-bit/precedence, DSCP,
    - Maximum Downstream bandwidth per P-bit/precedence, DSCP.

4.5 Interconnection at LEX level

29. Beside the connection of The Customer on Service Pop level described in section 4.1, 4.2, 4.3 and 4.4, which allows The Customer to use WBA VDSL2 to connect users of the whole Service Areas, The Customer may also interconnect with Belgacom at LEX level.

30. In case of interconnection of The Customer on a LEX, The Customer may only use WBA VDSL2 to connect end-users connected to this LEX, and transport Ethernet frames from and to end-users of this LEX.

31. In case of interconnection of The Customer on a LEX, Belgacom will provide, on behalf of The Customer who will define their dimensioning, types and protection types

    - One or several OLO Access Lines between the Customer Equipments and the Belgacom Service Routers, sited in this LEX,
    - Bandwidth (VLANs) between the IP-DSLAMs of this LEX and the OAL(s) connected to this LEX. These VLANs can be either shared between several users of a Customer in this LEX or dedicated per separate user.

4.6 Activation of WBA VDSL2 on a specific ~~End~~ User line

32. Subject to the conditions that the Customer has ordered the necessary infrastructure (OLO Access Line and VLAN(s)[1]), the Customer will be able to offer to ~~End~~ Users services based on VDSL2 technology, using Belgacom's installed and existing Network infrastructure, pursuant to the technical limitation of this existing infrastructure for offering VDSL2 technology.

33. Belgacom will deliver WBA VDSL2 service to specific ~~End~~ Users according to the Customer's orders transmitted to Belgacom. Belgacom is able to configure the individual lines of ~~End~~ Users at the IP-DSLAM level on basis of following characteristics:

[1] Only for WBA VDSL2 lines on shared VLANs.

- With or without voice service
  - 'With voice" means: data service offered in combination with a Belgacom PSTN/ISDN line.
  - "Without voice" means: data service offered without combination with a Belgacom PSTN/ISDN line.

- With shared or with dedicated VLANs
  - "With shared VLANs":
    - Maximum 4 VLANs per user line, each dedicated to a different service quality. The 4 service qualities are:
      - P=0: best effort.
      - P=1: low priority.
      - P=3: medium priority.
      - P=5: highest priority.
    - The VLANs of different Customer's user lines are aggregated per service quality and per LEX and transported in 1 shared VLAN to a Service PoP where an Access Line of the Customer is connected.
  - "With dedicated VLANs":
    - Maximum 4 Ethernet service qualities per VDSL2 connection, each service quality being differentiated by the Ethernet p-bit (P). The 4 service qualities are:
      - P=0: best effort.
      - P=1: low priority.
      - P=3: medium priority.
      - P=5: highest priority.
    - All VLANs of a separate Customer's user line are transported transparently in 1 dedicated VLAN to a Service PoP where an Access Line of the Customer is connected.

- Configuration by Belgacom of the VDSL2 line profile, according to the rules set forth in section 4.13, VDSL2 Deployment Rules:

Profile	Maximum speed		Minimum speed	
	Downstream	Upstream	Downstream	Upstream
LP701	20.000 Kbps	2.000 Kbps	14.500 Kbps	640 Kbps
LP702	16.500 Kbps	2.000 Kbps	10.000 Kbps	640 Kbps
LP703	14.500 Kbps	1.000 Kbps	10.000 Kbps	640 Kbps
LP704	9.000 Kbps	512 Kbps	4.600 Kbps	256 Kbps
LP705	30.000 Kbps	6.000 Kbps	14.500 Kbps	640 Kbps
LP706	25.000 Kbps	6.000 Kbps	14.500 Kbps	640 Kbps
LP707	20.000 Kbps	6.000 Kbps	14.500 Kbps	640 Kbps
LP708	14.500 Kbps	4.000 Kbps	10.000 Kbps	640 Kbps
LP711	12.064 Kbps	1.064 Kbps	4.664 Kpbs	256 Kpbs
LP712	12.064 Kbps	576 Kbps	4.664 Kpbs	256 Kpbs
LP713	7.064 Kbps	576 Kbps	4.664 Kpbs	256 Kpbs
LP714	10.100 Kbps	576 Kbps	4.664 Kpbs	256 Kpbs
LP715	16.500 Kbps	10.000 Kbps	10.000 Kbps	4.000 Kbps
LP716	16.500 Kbps	8.000 Kbps	10.000 Kbps	4.000 Kbps
LP717	14.500 Kbps	6.000 Kbps	10.000 Kbps	4.000 Kbps
LP718	12.000 Kbps	4.000 Kbps	4.000 Kbps	256 Kbps

34. For VDSL2, the splitter is dependent on the type of telephone line (PSTN or ISDN). Consequently, any cancellation or any conversion on the telephone services may possibly affect the Customer VDSL2 based service and require the installation of new equipment at the End User premises. Such installation will be at the Customer's expenses.

4.7 Use of the distribution pairs

35. The WBA VDSL2 Service will only be delivered by Belgacom on the direct pairs of the distribution cables, as defined in the Annex C "Technical Specifications" of BRUO, in the section 56 "Common technical specifications for the equipment to be connected to the loop or subloop", sub-section 56.1. "VDSL2", as described in the addendum of 24/10/2007 "Addendum to BRUO Annex C Technical Specifications regarding VDSL2".

36. The Customer can check the availability of direct pairs for a certain user, based on the user dial number, its address or its circuit ID, through the use of a web tool, the LLU Inquiry Tool, available on the Customer's personal page on the CWS secured site.

4.8 Internal cabling

37. To order a WBA VDSL2 Service for a specific user, the OLO must respect, at the customer premises of this user, the technical specifications regarding internal cabling defined in the Annex C "Technical Specifications" of BRUO, in the section ~~5~~6 "Common technical specifications for the equipment to be connected to the loop or subloop", sub-section ~~5~~6.1. "VDSL2", as described in the addendum of 24/10/2007 "Addendum to BRUO Annex C Technical Specifications regarding VDSL2".

38. If the specifications mentioned in the paragraph 37 are not fulfilled, one WBA VDSL2 line could disturb the other VDSL2 lines in the same cable bundle.

39. Therefore, the non-respect of the specifications mentioned in paragraph 37, will trigger at Belgacom the downgrade of the line towards a repair profile.

4.9 Network Termination Point

40. The Network Termination Point is the first termination point of a loop at the End User premises. The Network Termination Point is a part of the Belgacom network.

41. The NTP required for WBA VDSL2 is the model TF2007, equipped with its specific centralized splitter. This splitter protects the transmission of the VDSL2 signal towards the VDSL2 modem.

42. When correctly placed as first introduction point, the TF2007 and its specific full rate splitter are specially designed to respect the internal cabling rules mentioned in Section 4.8, "Internal Cabling".

43. This full rate splitter presents transmission characteristics specific to VDSL2, but is also suitable for ADSL and ADSL2+.

44. The access to the high bandwidth at the ~~End~~ User will be at the splitter egress of the centralized splitter.

4.10 WBA VDSL2 modem

45. The provision of VDSL2 on an existing ~~End~~ User line also requires the installation of a modem at the End User side. This modem will be provided and installed by the Customer, or the Customer's ~~end~~ user, according to the requirements set forth in §46.

46. The modem used by the End User must be in conformity with the applicable standardization and must be interoperable with the Belgacom network. The Customer has two options:

    - The Customer can use a standard modem (called Belgacom CPE) as defined and described in the Annex 2, Technical Specifications (Section 11: Modem). This modem is supported on the Belgacom network and may be installed at End User side.
    - The Customer can use his own modem (called OLO CPE) that will operate in a similar manner as a standard Belgacom CPE. In this case, specific Roles and Responsibilities apply (described in Annex ~~9~~7: Roles & Responsibilities throughout the OLO CPE lifecycle).

4.11 WBA VDSL2 user line installation

4.11.1 With shared VLANs

47. The Customer may order the provisioning of a WBA VDSL2 line with shared VLAN according to two installation types: without or with user visit.

48. Customer or Customer's ~~End~~ User is always responsible for the delivery and installation of the full rate splitter on the NTP.

4.11.2 Without user visit

49. The Customer or the Customer's user performs the installation at the end-user premises. Customer or Customer's user is responsible for the delivery and installation of the NTP.

50. Not withstanding the deployment rules set forth in Section 4.13, an installation without user visit is only possible if:

    - The End User is connected to direct pairs as described in Section 4.7;
    - The internal cabling requirements defined in Section 4.8 are met;
    - The NTP defined in Section 4.9 is present and correctly connected to the BGC network.

    The Customer should make sure these conditions are met, e.g. by using the LLU inquiry tool, by questioning its user at the order intake or by performing an on-site survey at end-user premises.

51. If during a repair action performed by Belgacom on a newly installed WBA VDSL2 line with shared VLAN installed without ~~End~~ User visit by Belgacom, it is found that the trouble covered by the Trouble Ticket was due to the absence of the NTP defined in Section 4.9, Belgacom will be entitled to invoice its repair intervention following the tariffs defined in the Annex ~~6~~5, Pricing and Billing.

52. If during a repair action performed by Belgacom on a newly installed WBA VDSL2 without voice line with shared VLAN installed without User visit by a certified technician, it is found that the trouble covered by the Trouble Ticket was due to the incorrect installation performed by the certified technician, Belgacom will be entitled to invoice its repair intervention following the tariffs defined in the Annex ~~6~~5, Pricing and Billing.

4.11.3 With user visit

53. The Customer may also order the provisioning of a WBA VDSL2 line with shared VLAN with user visit, in order to let Belgacom or a certified technician perform the NTP installation at the end-user premises. Belgacom or the certified technician is then responsible for the delivery and installation of the NTP. In case of installation by Belgacom, this installation includes the placement[2] of maximum 20 meters cable between the introduction and the NTP.

54. If an activation for WBA VDSL2 line with shared VLAN is ordered with installation by Belgacom and without user visit, but during the activation process of the line Belgacom finds that a ~~End~~ User visit is required (e.g.: to swap the End User from a return to a direct pair), Belgacom will inform the Customer and perform the installation with ~~End~~ User visit. The installation will then be invoiced following the tariffs of installation with user visit defined in the Annex ~~6~~5, Pricing and Billing

[2] Only in case no NTP initially present on site, no vertical cable, no drilling work, and placement in existing cable gutter.

55. If no Network Termination Point is present, it will be installed by Belgacom or by a certified technician at the moment of the line provisioning. This is automatically the case for:
    - Small Network Adaptations (at no extra cost for the Customer, i.e. this cost is included in the SNA fee).

56. If during a repair action performed by Belgacom on a newly installed WBA VDSL2 without voice line with shared VLAN installed with User visit by a certified technician, it is found that the trouble covered by the Trouble Ticket was due to the incorrect installation performed by the certified technician, Belgacom will be entitled to invoice its repair intervention following the tariffs defined in the Annex ~~6~~5, Pricing and Billing.

4.11.4 With dedicated VLANs

57. During the provisioning of a WBA VDSL2 line with dedicated VLAN Belgacom or the certified technician is responsible for the delivery and installation of the NTP at the end-user premises. In case of installation by Belgacom, this installation includes the placement[3] of maximum 20 meters cable between the introduction and the NTP.

58. Customer or Customer's ~~End~~ User is always responsible for the delivery and installation of the full rate splitter on the NTP.

59. If no Network Termination Point is present, it will be installed by Belgacom or by a certified technician at the moment of the line provisioning. This is automatically the case for:
    - Small Network Adaptations (at no extra cost for the Customer, i.e. this cost is included in the SNA fee).

60. If during a repair action performed by Belgacom on a newly installed WBA VDSL2 without voice line with dedicated VLAN installed by a certified technician, it is found that the trouble covered by the Trouble Ticket was due to the incorrect installation performed by the certified technician, Belgacom will be entitled to invoice its repair intervention following the tariffs defined in the Annex ~~6~~5, Pricing and Billing.

[3] Only in case no NTP initially present on site, no vertical cable, no drilling work, and placement in existing cable gutter.

4.12 Small Network Adaptations

61. The Introduction Cable (also referred to as drop wire) is defined as the physical part of a user line that connects the Distribution Cable to the user Network Termination Point.

62. In case no suitable Introduction Cable is available for the provisioning of a WBA VDSL2, the following solutions, called Small Network Adaptations, will be applicable:
    - Realization of a new introduction in the building of the ~~Beneficiaries~~ Customer's User
    - Renewal of the introduction in the building of the Beneficiaries User
    - Splicing additional pairs in the existing introduction splice of the building of the ~~Beneficiaries~~ Customer's User
    - Moving existing introduction from an existing Distribution Cable to another existing Distribution Cable.

63. These solutions will only be available upon specific request of the Customer and providing that the Belgacom standard conditions for access are fulfilled. This requires that a free duct or an open trench is available on the private domain. If a free duct or an open trench is not available on the private domain, Belgacom can be asked to also perform this part of the work on condition that the Customer agrees to pay the price for that part of the work performed by Belgacom. This price will be determined on a case-by-case basis.

64. The certified technicians will never perform Small Network Adaptations.

65. Belgacom will only perform the Small Network Adaptations if the splicing is done in front of the premises of that specific User. Belgacom will provide an Introduction Cable with a standard length of 20 meters to provide connection between the Distribution cable and the Network Termination Point. In case an introduction with a length more than 20 meters has to be provided, Belgacom will charge the Customer the relevant price for the extra work. On the private domain, duct and trench must be provided by the Customer.

66. In case no more free pairs are available in the Distribution Cable, the request for WBA VDSL2 without voice will be rejected. The construction or trenching of new distribution cabling, new street cabinets or new feeder cabling is outside the scope of the present offer.

4.13 VDSL2 deployment rules

67. The VDSL2 Line Profiles defined in §33 will be provisioned by Belgacom on an ~~end~~ user line according to the following deployment rules:

Att_{Loop} [dB]	$Length_{Loop}$ [m]	Line Profile name
<0,4	<400	LP705
<0,7	<700	LP701
<1	<1.000	LP702
<1,4	<1.400	LP711
<0,6	<600	LP715[4]

Where:

- Att_{Loop} = the loop attenuation at 800 Hz between the ROP and the end-user premises,
- $Length_{Loop}$ = the loop length between the ROP and the end-user premises,
- The conditions on loop attenuation and loop length must be fulfilled simultaneously to assign a specific Line Profile on an ~~end~~ user line.

68. Those conditions are applicable both for with voice (PSTN or ISDN) and without voice WBA VDSL2 lines.

69. Those values are only deployment rules and not a performance guarantee. The values are subject to evolution and could be reviewed.

4.14 Termination of the voice subscription with WBA VDSL2 with voice

70. In case of a WBA on VDSL2 with voice service where both Belgacom and the Customer provide services to an ~~End~~ User, it can occur that the ~~End~~ User cancels his voice subscription for that WBA VDSL2 with voice service. In that case, independent of the reason for termination of the voice subscription, Belgacom will ensure that the service on the high bandwidth remains into service.

71. Belgacom will inform the Customer that the WBA on VDSL2 with voice service has been converted to a WBA on VDSL2 without voice service, for which the Customer will be charged the monthly rental fee for WBA VDSL2 on a non-active loop instead of WBA VDSL2 on an active loop. For the change to WBA on VDSL2 without voice, a conversion fee as specified in Annex ~~6~~ 5 Pricing and Billing is applicable.

[4] The profile LP715 (and the related profiles LP716, LP717, LP718) enable OLOs to offer a WBA service with higher upstream. These profiles will only be provisioned if the OLO made a specific request to order the "WBA VDSL2 high Upstream" product and are available as from 12 March 2012. The details on ordering are available in the "WBA VDSL2 XML content description" document, on the OLO personal page.

5 Operational Processes

72. The provisioning and repair processes for the OAL, the VLAN and the ~~End~~ User lines are detailed in the Annex ~~4~~3, Planning and Operations.

6 Pricing and Billing

73. Principle: all Standard Fees as described in Annex ~~6~~5, Pricing and Billing, will be invoiced to and are to be paid by the Customer whenever relevant.

74. The Customer will receive a monthly invoice containing the fees (recurring and non-recurring) for that period. Invoices related to any relevant fees are to be paid within the foreseen deadlines as set out in the Annex ~~6~~5, Pricing & Billing ~~document~~.

7 Unique reference for without PSTN or ISDN Belgacom services

75. In case a Customer sends a request to take over a BRUO/BROBA/WBA VDSL2 service "without PSTN or ISDN Belgacom services" from another Customer or a Belgacom xDSL without voice service, there will be an issue in the identification of the copper pair on addresses with for example more than one pair in service.

76. For a request from a BROBA/BRUO/WBA VDSL2 without PSTN or ISDN Belgacom service or from a Belgacom xDSL without voice service, the Customer will include the circuit ID of the service communicated to the prior Customer as identification of the service to be transferred.

77. The circuit ID that has been communicated by Belgacom at the provisioning of a new BRUO/BROBA/WBA VDSL2 service or of a new Belgacom xDSL without voice service is a unique reference that will identify both the service and the copper pair.

78. The Customer communicates, for all services without PSTN or ISDN Belgacom services, the circuit ID provided by Belgacom to its ~~End~~ User. This should be done by including this reference on the bills and contracts that are sent to the ~~End~~ User for the service based on BRUO/BROBA/WBA VDSL2. By that, in case of transfer, the circuit ID can be exchanged between a Customer and the ~~End~~ User, just like is done with the dial number in the case of a with voice product. As a consequence the Circuit ID can be included systematically in the orders and this will avoid further problems in this case.

79. The Belgacom xDSL without voice service is identified by a circuit-id which can be found at the invoice.

Appendix A: Description of the OLO Access Line

80. The OLO Access Line is a point-to-point, high-speed data transfer service, offering a speed ~~from~~ of 10Mb, 100 Mb or 1Gb (depending of the different versions defined further in this document) , between your site and the Belgacom Ethernet network.

81. The OLO Access Line is based on Belgacom's fibre optic infrastructure. This is a comprehensive service which includes the network infrastructure, the transmission equipment and proactive management by Belgacom.

82. OLO Access Line is available throughout Belgium. Nevertheless, for each request, Belgacom will carry out a preliminary feasibility study to determine the infrastructure works that are required (works in the public and/or private domain, installation of fibre optic cables, entry points into buildings, etc.).

83. The terms, conditions and requirements set out in this section determine the general framework between Belgacom and the Customer on OLO Access Line Service in the framework of the provision of a connection between a Belgacom Service Router, located in a Belgacom Service PoP, and the Customer Equipment, in the framework of this service. This Service will be referred to hereafter as "OLO Access Line".

84. For the provision of OLO Access Line, the Customer will subscribe a one (1) year contract, under which the OLO Access Line is made available to the Customer for a fixed term of one year. At the end of this period, the contract will be tacitly renewed for an indefinite duration and can be terminated at any time with a notice of at least one calendar month. If the Customer wishes to terminate the contract during the initial one-year term, the Customer will pay to Belgacom a termination fee equal to the total of the rental fees until the end of such term.

85. The OLO may order **Customer-Sited OLO Access Lines**, in case the line terminates in the Customer premises, outside any Belgacom colocation, ~~or~~ **Belgacom-Sited OLO Access Lines**, in case the line ~~must~~ terminates in its colocation in the ~~same~~ building as the Service PoP, or **Backhaul OLO Access Lines**, in case the line terminates in its colocation in another building than the Service PoP.

1. Customer-Sited OLO Access Line

a. Description

86. Customer-Sited OLO Access Line is a connection system that is provided in its entirety by Belgacom between the Customer Connection point at the Customer premises, and a Belgacom Service Router.

87. Belgacom will install the necessary transmission equipment at the premises of the Customer.

88. The Customer-Sited OLO Access Line Service consists of one (1) or more Gigabit Ethernet (GbE) systems.

89. The 1 GbE Systems provided under this Service Plan do not have Diversity of routing.

90. The Customer Connection point is located at the Customer's premises.

b. Implementation

91. The implementation of Customer-Sited OLO Access Line Service will be in accordance with the Technical Specifications provided in Annex 2, Technical Specifications – (Section ~~10~~12: OLO Access Line).

c. General Conditions

92. A Customer-Sited OLO Access Line Service can be ordered by the Customer between a specified Belgacom Service PoP (Connection Point) and the specified Customer's premises.

93. The Customer shall provide and maintain, at its expense, the cabling from the Point of Connection in the Customer Premises to the Customer equipment including any cross connections that are required.

94. All Belgacom transmission equipment shall comply with the appropriate Belgacom Technical Specifications provided in Annex 2, Technical Specifications – (Section ~~10~~12: OLO Access Line).

d. Specific Conditions

95. Belgacom will identify each 1GbE Customer-Sited OLO Access Line provided pursuant to the conditions of this Section through attributing them a codification number.

2. Belgacom-Sited OLO Access Line

a. Preliminary

96. A Belgacom-Sited OLO Access Line Service can be brought into service with regard to a specified site, and the Customer can be entitled to install the equipment required to this effect in the Belgacom building concerned, if and only if the Customer has prior to this time signed an appropriate Colocation Agreement with regard to the site concerned.

97. The Belgacom-Sited OLO Access Line Service can only be used for all connection purposes with Belgacom Ethernet data network.

98. For the sake of clarity, it is noted that OLO Access Lines covered by this document are 1 GbE OLO Access Lines.

b. Description

99. ~~Belgacom-Sited OLO Access Line Service will only be available in Belgacom Service PoP.~~ Belgacom-Sited OLO Access Line is a connection system that is provided in its entirety by Belgacom between a Belgacom Service Router and the Customer Connection point sited in its colocation in the same building.

~~99.~~100. A "Belgacom-Sited OLO Access Line Service" is a connection service where Belgacom offers the possibility to a Customer to provide the entire OLO Access Line including the customer transmission equipment that is installed in a Belgacom technical building. The Customer will install its cable infrastructure at least up to an introduction duct designated by Belgacom in the immediate vicinity of the Belgacom Service PoP (building) in which any Belgacom Service Router is located.

~~100.~~101. The Customer Point of Connection for this type of OLO Access Line is located in the Belgacom premises on the indoor cable connecting the Customer's transmission equipment to the Belgacom DDF, at the place where that cable enters the collocation room.

~~101.~~102. In the event that Belgacom is caused to replace the collocation room in which the transmission equipment of the Customer is to be installed, then both Parties will cooperate to find a mutually acceptable solution.

~~102.~~103. The Customer shall install equipment in its colocation area and following the rules set out in the colocation agreement.

c. General Conditions

~~103.~~104. All Customer transmission equipment shall comply with the Technical Specifications provided in Annex 2 – (Section ~~10~~12: OLO Access Line).

~~104.~~105. The Customer shall provide to its employees full information regarding the content of the rules to be respected regarding Belgacom-Sited OLO Access Lines.

d. Procedures

~~105.~~106. The Customer is responsible for determining the number of Belgacom-Sited OLO Access Line Service that the Customer requires. In this respect, Belgacom does not make a representation that it will at all times be in a position to provide the full capacity ordered by the Customer. In particular, it is not excluded that, taking into account possible evolutions in the future, Belgacom may be confronted with a high number of requests for the installation of additional collocation spaces in different buildings that would not allow Belgacom to respect all relevant timers. In these cases, Belgacom will have to inform the market.

3. Backhaul OLO Access Line

a. Preliminary

107. A Backhaul OLO Access Line Service can be brought into service with regard to a specified site, and the Customer can be entitled to install the equipment required to this effect in the Belgacom building concerned, if and only if the Customer has prior to this time signed an appropriate Colocation Agreement with regard to the site concerned.

108. The Backhaul OLO Access Line Service can only be used for all connection purposes with Belgacom Ethernet data network.

109. For the sake of clarity, it is noted that OLO Access Lines covered by this document are 1 GbE OLO Access Lines.

110. The 1 GbE Systems provided under this Service Plan do not have Diversity of routing.

b. Description

111. Backhaul OLO Access Line is a connection system that is provided in its entirety by Belgacom between a Belgacom Service Router and the Customer Connection point, sited in its colocation in another building than the one hosting the Belgacom Service Router

112. A "Backhaul OLO Access Line Service" is a connection service where Belgacom offers the possibility to a Customer to provide the entire OLO Access Line including the customer transmission equipment that is installed in a Belgacom technical building. The Customer will install its cable infrastructure at least up to an introduction duct designated by Belgacom in the immediate vicinity of the LEX (building) in which The Customer colocation is located.

113. The Customer Point of Connection for this type of OLO Access Line is located in the Belgacom premises on the indoor cable connecting the Customer's transmission equipment to the Belgacom DDF, at the place where that cable enters the collocation room.

114. In the event that Belgacom is caused to replace the collocation room in which the transmission equipment of the Customer is to be installed, then both Parties will cooperate to find a mutually acceptable solution.

115. The Customer shall install equipment in its colocation area and following the rules set out in the colocation agreement.

c. General Conditions

116. All Customer transmission equipment shall comply with the Technical Specifications provided in Annex 2 – (Section 12: OLO Access Line).

117. The Customer shall provide to its employees full information regarding the content of the rules to be respected regarding Backhaul OLO Access Lines.

d. Specific Conditions

118. Belgacom will identify each 1GbE Backhaul OLO Access Line provided pursuant to the conditions of this Section through attributing them a codification number.

e. Procedures

119. The Customer is responsible for determining the number of Backhaul OLO Access Line Service that the Customer requires. In this respect, Belgacom does not make a representation that it will at all times be in a position to provide the full capacity ordered by the Customer. In particular, it is not excluded that, taking into account possible evolutions in the future, Belgacom may be confronted with a high number of requests for the installation of additional collocation spaces in different buildings that would not allow Belgacom to respect all relevant timers. In these cases, Belgacom will have to inform the market.

~~3.~~4. Product Options

The Belgacom-sited and Customer-sited implementations, generate following "product options", and offering different levels of redundancy.

Options	**Protection**
1 GE BGC-sited	-
1 GE Customer-sited	-

10 Mbit/s Customer-sited	-
100 Mbit/s Customer-sited	-
1+1 GE BGC- and Customer-sited	Port + fibre + card in BGC Service Pop
1 GE Backhaul	-

a. 1 GE / BGC sited

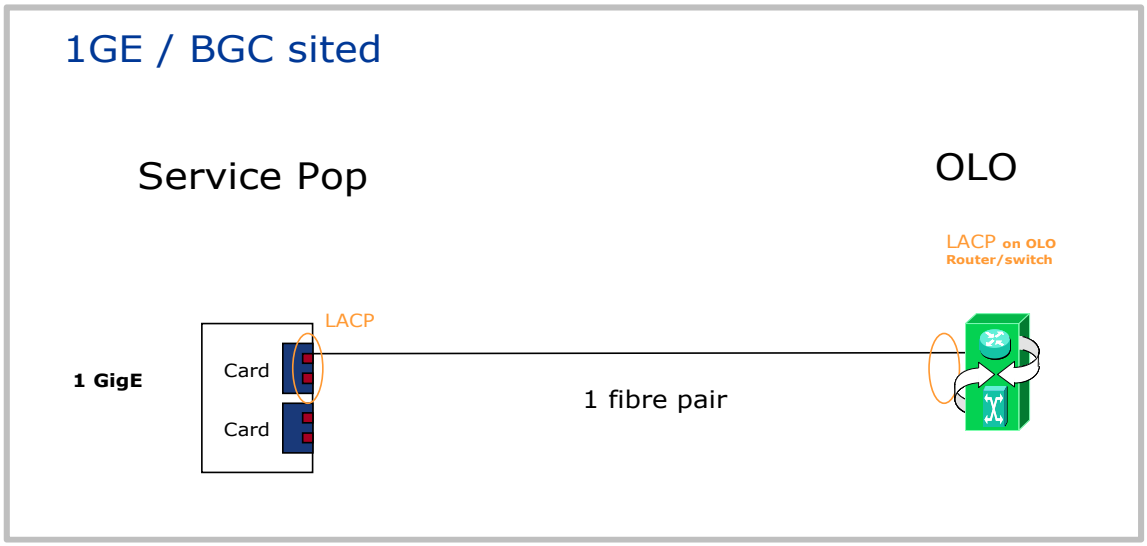


Figure 2: Design of the OLO Access Line 1GE Belgacom-sited

b. 1GE/100Mbps/10Mbps Customer sited

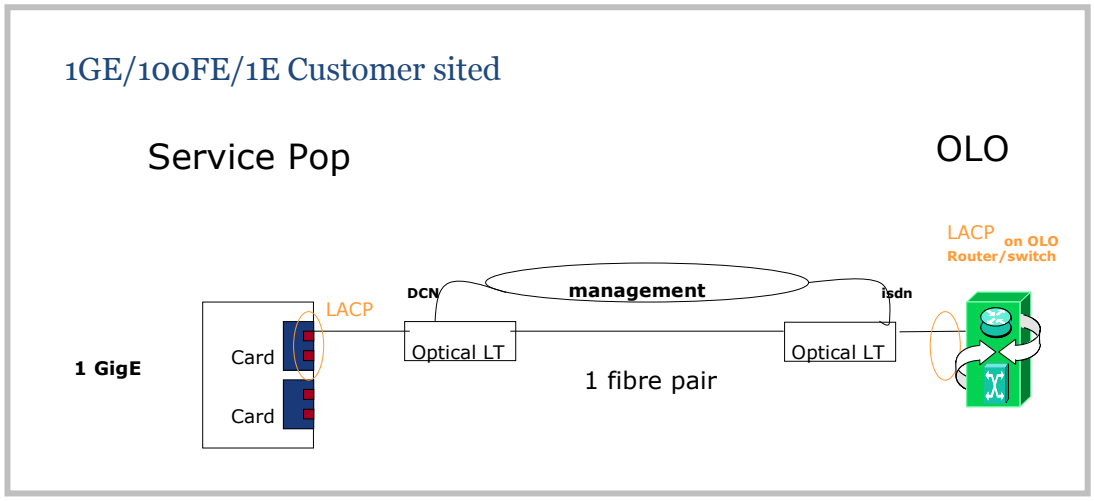


Figure 3: Design of the OLO Access Line 1GE/100Mbps/10Mbps Customer-sited

c. 1+1 GE / Belgacom + Customer sited

The BGC link is working / The OLO fibre pair is stand-by.

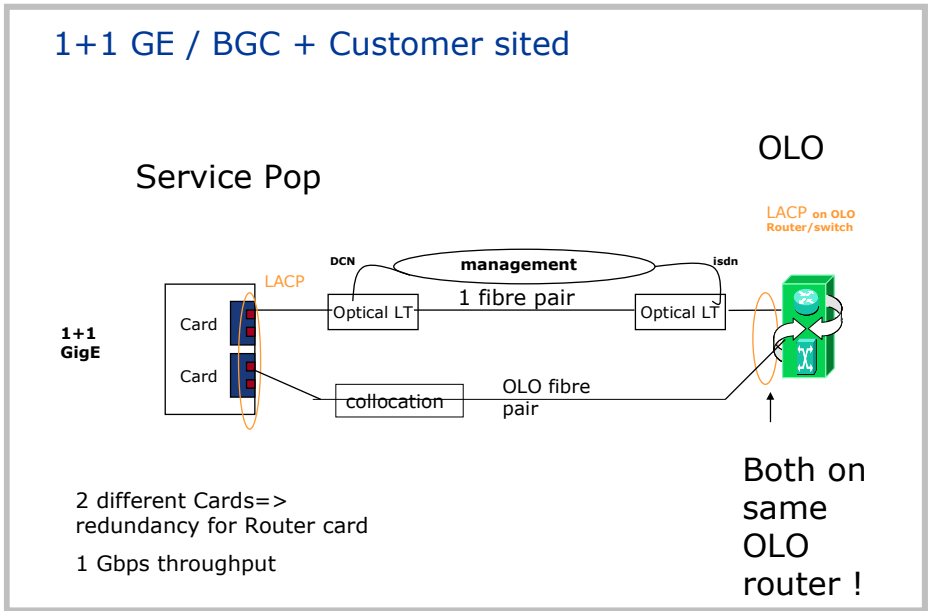


Figure 4: Design of the OLO Access Line 1+1 GE Belgacom- & Customer-sited

d. 1 GE Backhaul

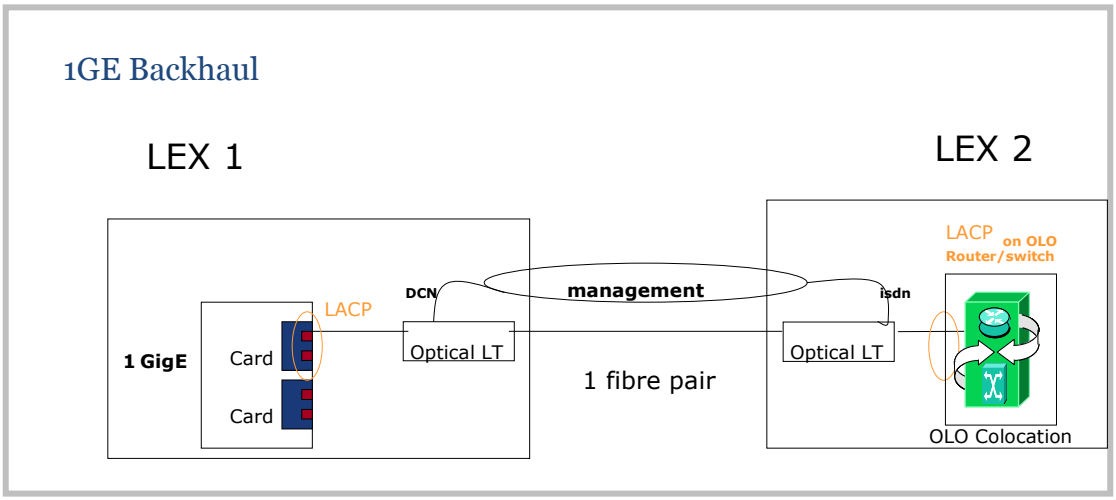
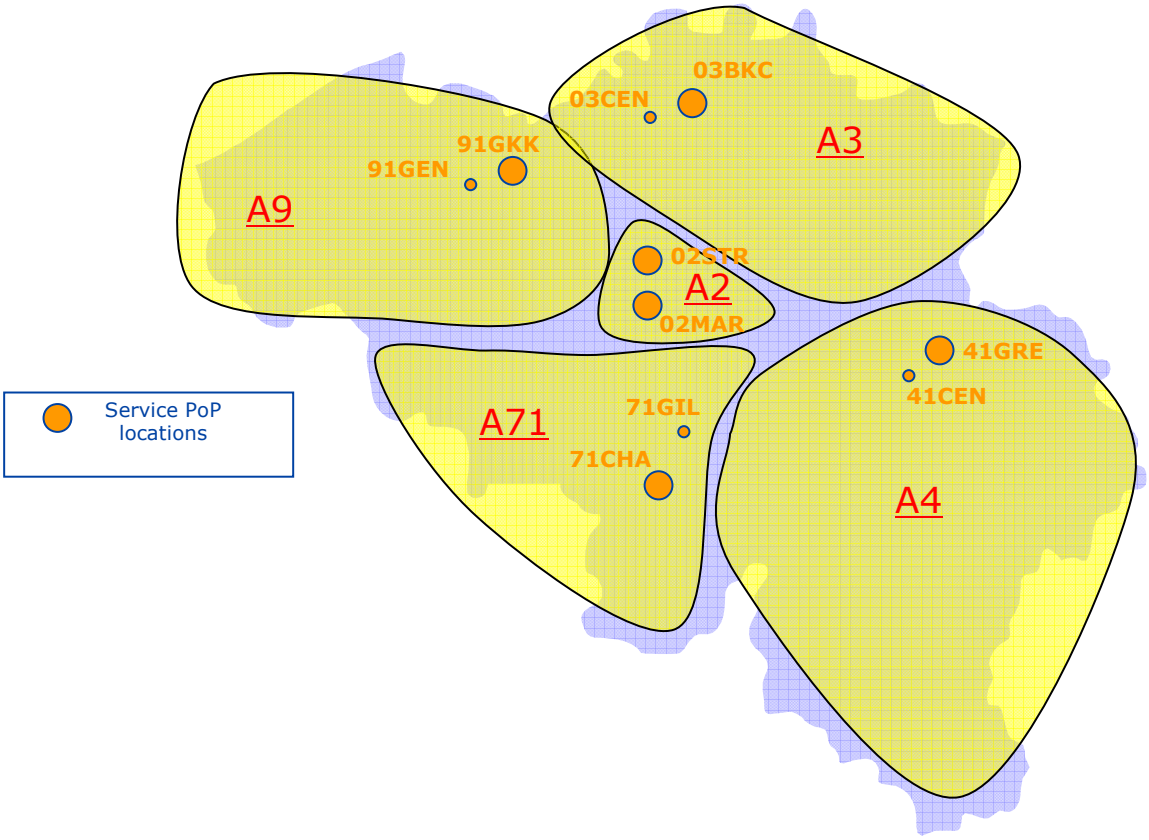


Figure 5: Design of the OLO Access Line 1 GE Backhaul

Appendix B: List of Service Areas and Service PoPs

a. Overview

5 Service Areas and 10 Service PoPs



b. Definition of the Service Areas

Service Area	**Included Telephone Zones**
A3:	03, 011, 012, 013, 014, 015, 016, 089
A2:	02
A4:	019, 04, 061, 063, 080, 081, 082, 083, 084, 085, 087
A71:	010, 060, 064, 065, 067, 068, 069, 071
A9:	050, 051, 052, 053, 054, 055, 056, 057, 058, 059, 09

(*): For the sake of clarity, it is confirmed that the zone codes indicated above in the context of the present offer are limited to the numbers which identify fixed network termination points. In particular, 09 and 04 are respectively limited to the number series 092, 093 and 042, 043. As far as the code 080 is concerned, the numbers starting with 0800 are excluded.

c. List of Service PoPs

Area		City	Address	NCOW
A9	91GKK	Gent - Keizer Karel	Keizer Karelstraat 1	9265
A9	91GEN	Gent - Centrum	Sint Niklaasstraat 27	9223
A3	03CEN	Antwerpen - Centrum	Lange Nieuwstraat 106	3224
A3	03BKC	Antwerpen - Berchem	Karel Coggestraat 2	3227
A2	02MAR	Brussels - Marais	Rue du Marais - Broekstraat 72-74	2220
A2	02STR	Brussels - Paille	Rue Lebeau - Lebeaustraat 2	2513
A71	71GIL	Charleroi - Gilly	Sentier de la Limite 80	7141
A71	71CHA	Charleroi - Centre	Rue de la science 2	7127
A4	41CEN	Liège - Centre	Rue de l'université 30	4223
A4	41GRE	Liège - Grétry	Rue d'Harscamp 17	4349

◆◆◆◆◆◆ End of document ◆◆◆◆◆◆

Wholesale Broadband Access VDSL2

Annex 1: General Terms & Conditions

Created on: ~~1~~6 February 2012~~20 December 2011~~

General information

This document constitutes an integral part of the Wholesale Broadband Access VDSL2 Services Offer (hereafter referred to as WBA VDSL2) communicated to the Belgian Institute for Post and Telecom (here-after the BIPT). It includes the general terms and conditions applicable to the provision of Wholesale Broadband Access VDSL2 to establish end-to-end Data Connectivity services based on VDSL2. These Wholesale Broadband Access VDSL2 services are provided in conformity with the relevant laws and decrees in effect. The present Terms and Conditions shall remain applicable until they are replaced by other terms and conditions.

A distinction should be made between the following:

The Main Body

This document describes in broad terms the conditions of the Wholesale Broadband Access VDSL2 service offered by Belgacom as it has been communicated to the BIPT.

The Annex 1, "General Terms and Conditions"

The General Terms and Conditions comprehensively list the rights and obligations of Belgacom and the Customer with regard to the provision of the Wholesale Broadband Access VDSL2 Services.

The Annex 2, "Technical Specifications"

The technical conditions define the technical specifications and the quality standards of the Wholesale Broadband Access VDSL2 Services.

The Annex ~~4~~3, "Planning & Operations"

The Planning & Operations Manual describes the conditions of delivery of the Wholesale Broadband Access VDSL2 Services.

The Annex ~~5~~4, "Basic Service Level Agreement"

The Basic Service Level Agreement defines the Terms and Conditions upon which Belgacom will deliver installation and maintenance for the basic Wholesale Broadband Access VDSL2 Services.

The Annex ~~5~~4a, "Improved Service Level Agreement"

The Improved Service Level Agreement defines the Terms and Conditions upon which Belgacom will deliver repair services in the framework of the Wholesale Broadband Access VDSL2 Services in case ISLA on repair was requested. The elements included in this document replace those in the basic service level agreement, unless otherwise stated.

The Annex ~~5~~4b, "Improved Service Level Agreement for Provisioning"

The Improved Service Level Agreement defines the Terms and Conditions upon which Belgacom will provision Wholesale Broadband Access VDSL2 lines in case ISLA on provisioning for those lines was requested. The elements included in this document replace those in the basic service level agreement, unless stated otherwise.

The Annex ~~6~~5, "Pricing and Billing"

The Pricing and Billing indicates the rates and the billing and payment conditions for the Wholesale Broadband Access VDSL2 Services.

The Annex ~~8~~6, "Prepayment Terms & Conditions"

The Annex ~~9~~7, "Roles & Responsibilities throughout the OLO CPE lifecycle"

This document aims at clarifying and defining all the roles & responsibilities of Belgacom and OLO throughout the lifecycle of an OLO Customer Premises Equipment ("OLO CPE").

***

The General Terms and Conditions, Main Body, the Planning and Operations, Technical Specifications, Price list, SLA, Improved SLA, Prepayment terms end conditions and, if any, the specific terms and conditions agreed upon by the Parties constitute the Wholesale Broadband Access VDSL2 Offer (hereinafter, the "WBA VDSL2 Offer").

***

With a view to the signature of the WBA VDSL2 Contract, the WBA VDSL2 Offer can be negotiated by the parties and does not substitute for the parties' will.

Except otherwise agreed by the parties, the WBA VDSL2 Contract shall be adapted if the WBA VDSL2 Offer is modified. This adaptation shall be in accordance with this WBA VDSL2 Offer's modification.

***

Anyone may examine the Main Body and Annexes ~~General Terms and Conditions relating to~~ of the Wholesale Broadband Access VDSL2 Service Offer, ~~and the up-dated price lists~~ as they are approved by BIPT and applicable at the time of consultation. These ~~may be obtained either from~~are available on Belgacom's Internet site, to the exception of the confidential version of the Annex 7, that will be communicated under NDA upon request of The Customer ~~or from Belgacom's Customer service department~~. ~~The other Annexes are available on the Secured website of Belgacom and may be consulted further to the signature of a non-disclosure Agreement.~~Other documents which are referenced in the Main Body or Annexes are available on the Secured website of Belgacom (Personal Page of Belgacom Wholesale) and may be consulted further to the signature of a non-disclosure Agreement.

1 Glossary

The capitalized terms in the present General Terms and Conditions for Wholesale Broadband Access VDSL2 Services have the meaning as defined below:

WBA VDSL2 Contract	Any agreement concluded between Belgacom and a Customer following the negotiations between Belgacom and the Customer on the basis of the present General Terms and Conditions, technical, operational, billing, planning and financial conditions for the WBA VDSL2 as described in the Offer of Belgacom. The WBA VDSL2 Contract is concluded as mentioned in the first chapter of the present General Terms and Conditions.
Request	The Customer's demand concerning the delivery of a WBA VDSL2 Service as described in this Offer.
Certified Technician	Any technician employed either by a Customer or by one of Customer's subcontractors, trained and certified by Belgacom in order to perform, in place of a Belgacom technician, the installation of WBA VDSL2 lines.
Contract	A contract for a WBA VDSL2 line.
Wholesale Broadband Access VDSL2 Services	All the Services described in the Wholesale Broadband Access VDSL2 Offer that are ordered by the Customer.
Party	Either Belgacom or Customer.
Parties	Collectively, Belgacom and Customer.

2 Contract procedure

2.1 Request by the Customer

1. In view of the offering of a Wholesale Broadband Access VDSL2 based service to ~~End~~ Users pursuant to the provisions of the Contract, the Customer must submit his request for a Service to the Customer Service department of Belgacom by completing and signing the appropriate order form. When submitting an order request in electronic format, the Customer will comply with the rules described in the Planning & Operations Manual. The terms and conditions for delivering the Services are described here-after.

2. The Customer shall consult the general terms and conditions and, the relevant WBA VDSL2 Offer as well as the list of technical requirements. These can be obtained from Belgacom's Internet site or by requesting them from Belgacom's Customer Service department.

3. Belgacom may not refuse to execute the Customer's request conform the WBA VDSL2 Offer, without prejudice to the negotiations between Belgacom and the Customer, except on one of the following grounds:

   a) the Customer or his authorized agent refuses to provide Belgacom with official documents to identify himself;

   b) in an emergency situation (i.e., exceptional cases of *force majeure as defined here after*), for the purpose of ensuring the safe operation of the Belgacom network, after all necessary measures taken by Belgacom to ensure access to the service are without effect;

   c) following the Customer's failure to observe obligations arising from the present General Terms and Conditions for the use of the service;

   d) for the purpose of maintaining Belgacom network integrity or the interoperability of the services or for any other technical reasons that make the delivery of the service impossible;

   e) the Customer has refused to provide proof of the existence of the unconditional financial guarantee as specified in the provision Financial Guarantees here-under.

   ~~e)~~f) the Customer's request for access to the WBA VDSL2 Service is unreasonable (as stipulated in the CRC decision of July 1st, 2011 regarding the analysis of the broadband markets) on the basis of other grounds than the ones listed hereabove.

4. In the event of a refusal on one of the grounds listed in article 3 above, Belgacom shall notify within 3 working days the Customer of its decision and the grounds for the decision by ordinary mail. A copy will be sent to the BIPT in the same delay.

5. The Customer may lodge an appeal against this decision by the procedure provided under the Dispute Resolution Procedure and in accordance with these General Terms and Conditions.

3 Conclusion, entry into force and duration of the Contract

6. The provision of the WBA VDSL2 Service is subject to the conclusion of a Contract between Customer and Belgacom according to the present General Terms and Conditions and the negotiations between the parties. The Contract is concluded when Belgacom has accepted in writing or via electronic way ("Validate" XML) the Order Form submitted by the Customer.

7. Unless otherwise stipulated, the Contract takes effect on the day after the date on which the WBA VDSL2 Service (as described here-after) is made available to the Customer. Belgacom shall confirm this date to the Customer in writing, or via electronic way ("Done" XML).

8. The Service is made available to the Customer for an indefinite term.

9. The OLO Access line is made available to the Customer for an initial one-year term. At the end of this minimum term, if the Customer does not terminate the contract in accordance with the procedure specified in the BROTSoLL General Terms and Conditions the contract shall be tacitly renewed for an indefinite term.

Services covered by these General Terms and Conditions

10. Belgacom shall provide to Customer and maintain on behalf of Customer Data Connectivity Services in accordance with WBA VDSL2 Reference Offer and its Annexes and/or Appendixes.

11. Subject to the successful completion of testing as defined in and pursuant to the provisions of WBA - VDSL2, the Parties will bring the Data Connectivity Services into service on the agreed Bringing Into Service Date. When Customer chooses to have the line installed by one of his Certified Technicians, the Customer alone decides upon the Bringing into Service Date and informs Belgacom of this date.

12. The data connectivity between the respective networks of the Parties shall be implemented in accordance with the technical specifications of the OLO Access Line in Annex 2 "Technical Specifications".

13. The Data Connectivity Service purchased by Customer according to the foregoing will enable Customer to define its own VDSL2 products and to market, distribute and sell under its name and on its behalf its own VDSL2 products towards ~~End-~~Users. In this respect Belgacom will inform the Customer of any modification of the technical specification, enabling a modification of the services offered, at the latest 3 months before the commercial launch by Belgacom of a commercial service based on these technical specifications.

14. For each ~~End-~~User to whom Customer will sell an VDSL2 product in accordance with the foregoing, Belgacom will, in accordance with and subject to the limitation set out in WBA - VDSL2, install, implement and provide connectivity from the End-User premises up to the demarcation point between Belgacom network and Customer network, as defined in WBA - VDSL2 in Annex 2 "Technical Specifications". If the Customer chooses to install a specific WBA VDSL2 line with a Certified Technician, Belgacom will provide to the Customer the exhaustive list of tasks to be performed in relation to the physical installation of this specific line, which tasks will all be executed by the Certified Technician chosen by the Customer.

15. Within the limits of what is permitted under the applicable regulatory framework, both Parties shall exchange appropriate operational information as provided in WBA - VDSL2 (including but not limited, in particular, maintenance contact numbers, network information, information required to comply with law enforcement and other security agencies of the government and such other information as the Parties shall mutually agree).

4 Obligations of the Parties

4.1 Obligations of the Customer

16. The Customer is at all times fully responsible in particular for the following tasks in respect of the establishment of the connection between the Customer network and the Belgacom network:
    - To order an OLO Access Line between Belgacom Service PoP and the Customer Equipment;
    - To inform Belgacom immediately and in writing of any change that may have an impact on the Belgacom network integrity, or on the performance of other services delivered by Belgacom towards ~~End-~~Users. The present rule does not imply that such changes can be made by the Customer independently;
    - To use the Belgacom network in conformity with the prevailing regulations on telecommunications and data protection and in conformity with the applicable law in general and especially the normal behaviour of a professional Customer;
    - To ensure that its ~~End-~~Users behave in a manner that is fully compatible with these elements and take also responsibility for such behaviour;
    - To comply with the instructions that Belgacom may issue to the Customer from time to time to ensure the security and correct operation of the Belgacom network and of any other network or infrastructure used by Belgacom for the supply of the connection between the End-User premises and the demarcation point between the Belgacom network and the Customer's network, or used in any other manner by Belgacom.

17. In respect of the necessary interventions of Belgacom related to connectivity between Belgacom and the Customer, the latter will communicate in good faith to Belgacom, in relevant cases and in a sufficiently timely and complete manner, all information needed by Belgacom for performing repair on the Customer VLAN's. Customer may refuse to communicate confidential data for which Customer motivates it is not relevant for the requested purpose. Belgacom may ask to BIPT the communication of this data if Belgacom is able to prove his need to obtain this information.

18. In respect of the offering of a service based on a WBA VDSL2 service to ~~End-~~Users pursuant to the provisions of the Contract, Customer is responsible:

    - to communicate orders for WBA VDSL2 connection of ~~End-~~Users to Belgacom;
    - to communicate to Belgacom via the "Open Calendar" interface, as described in the Planning & Operations Manual, if the installation of the WBA VDSL2 line must be performed by a Belgacom technician or by a Certified Technician;
    - in case of installation performed by a Certified Technician, to dispatch to the Certified Technician chosen by the Customer all the operational information needed to perform the installation of the WBA VDSL2 line;
    - in case installation by Certified Technician is chosen by the Customer, to be responsible for the installation of the Service;
    - to communicate to Belgacom the type of equipment present at the End-User premises in case the End-User has an ISDN line;
    - to ensure accurate communication of ~~End-~~Users information to Belgacom in accordance with the relevant provisions of the Contract;
    - to ensure the marketing, selling, distribution of its own WBA VDSL2 products based on these Terms and Conditions, as well as the billing and collection of the fees to be charged to ~~End-~~User, without this affecting the Customer's liability towards Belgacom;
    - to communicate to Belgacom network related problems;
    - to ensure by the Customer, or to have the latter impose on its ~~End-~~User, to use the Modem conformed to the provisions of the Offer;
    - to be the single and only point of contact of ~~End-~~User with regard to the VDSL2 service offered by the Customer to the ~~End-~~User and abstain from redirecting this ~~End-~~User towards Belgacom in any circumstance for any problem related to the VDSL2 service offered by the Customer to the ~~End-~~User on the concerned line;
    - To not modify Belgacom infrastructure and equipment at End User premises (as specified in appendix B of the Main Body), except in case of installation by Certified Technician and to the extent necessary to perform the installation tasks as explicitly foreseen in the tasks list communicated by Belgacom to the Customer;

- To pay to Belgacom the prices pursuant to the Contract;
- To handle responsibility related to network/equipment issues that aren't related to Belgacom.

4.2 Obligations of Belgacom

19. In case of installation performed by a Certified Technician, Belgacom will provide to the Customer all operational information needed to perform the installation of the WBA VDSL2 line.

20. Belgacom will provide and maintain WBA VDSL2 technology on behalf of the Customer from the End-User premises up to the demarcation point between Belgacom network and the Customer network. In this respect, Belgacom and Belgacom only will be entitled to carry out physical modifications to the Belgacom network.

21. Belgacom will not provide WBA VDSL2 on behalf of the Customer on a specific ~~End-~~User line and thus reject the Order of the Customer, if Belgacom has determined on the basis of a technical objective assessment that:

    (a) WBA VDSL2 is not technically feasible over existing facilities;

    (b) WBA VDSL2 will cause interference problems, according to the rules submitted to the BIPT or to the rules stated by the legal and regulatory framework, within the Belgacom network or other facilities. In this respect, WBA VDSL2 is incompatible with:
    - some line transmission systems in the same cable bundle;
    - pair gain systems;

    (applicable rules are described in BRUO Spectrum Management)

    (c) Cable is spectrally saturated according to the rules submitted to the BIPT or to the rules stated by the legal and regulatory framework.

    (applicable rules are described in BRUO Spectrum Management)

22. In such cases of rejection, Belgacom will communicate to the Customer:

    - in case of inquiry, the reason why it has been rejected.
    - in case of firm order, the type of rejection, i.e., definitive rejection or temporarily rejection;

    On demand of the Customer, Belgacom will communicate the cost of the study needed to determine when and at what costs it can be remedied to the rejection; alternatives will be tested and proposed to the Customer. The study will be done only after agreement of the Customer. In case the Customer agreed on the study, but does not take the proposed solution by Belgacom, the study cost will be charged.

    The Customer has the possibility to ask a detailed justification as well as verification with or without site visit, if necessary, in case where many rejections occur at a specific moment, in a specific place.

23. Belgacom shall respect all service levels, timers and other guaranties mentioned in the SLA document or otherwise shall conform to the applicable penalties.

24. Belgacom further reserves the right to reject requests for implementation of WBA VDSL2 on behalf of the Customer on a specific ~~End-~~User line based on wrong data which would not allow Belgacom to identify the user line unmistakably and to provide him the line.

Certified Technician

25. Belgacom allows the Customer to perform the installation of the WBA VDSL2 lines itself, via Certified Technicians, i.e. its own employees or employees of its subcontractor who are trained and certified by Belgacom. When the Customer chooses to work with Certified Technician, the installation works will not be performed under instruction of Belgacom, but on behalf of Customer itself, and at its own expenses.

26. Employees of Customer and employees of Customer's subcontractor may qualify as Certified Technician, if they fulfill the conditions described in the Specific Terms and Conditions relating to Certified Technician, available on the Personal Page of Belgacom Wholesale. In order to be certified, they will successfully follow training by Belgacom and sign the necessary confidentiality agreements.

27. Employees of Customer's subcontractor will only be certified, if Customer's subcontractor accepts the right of Belgacom to bring a direct claim against him for any damage caused by his employees to Belgacom, its employees, or third parties when installing the WBA VDSL2 lines. The Customer's subcontractor must also provide to Belgacom a "liability insurance" certificate of EUR 2.500.000 per claim and per year to cover his liability for any damages caused by his employees, acting as Certified Technician (see also art. 64).

28. Except for this right of direct claim of Belgacom against Customer's subcontractor and a confidentiality agreement, no contractual relationship exists between Belgacom and Customer's subcontractor.

29. The Customer shall allow Belgacom access to its Certified Technicians (both its own employees as well as its subcontractor's employees) for technical discussions. Such direct contact shall, in no cases, be considered as creating a direct contractual link between Belgacom and these Certified Technicians, nor shall it create any responsibility of Belgacom for the acts of the Certified Technicians.

30. When the Customer chooses to work with Certified Technician, he agrees to be responsible for all tasks related to the physical installation of the line (which are foreseen in the list of tasks provided by Belgacom to the Customer for each particular line), and releases Belgacom of any responsibility in this respect. Also, Belgacom cannot be held responsible for incidents during delivery of the Data Connectivity Service after installation of the line, nor for any non compliance of the line with Technical Specifications, to the extent that these incidents/non compliance are caused by a wrongful installation by Certified Technician.

31. The Customer guarantees that the Certified Technician will respect the rights and obligations applicable on the Customer under the WBA VDSL2 Reference Offer (e.g. confidentiality obligation, liability).

32. The Customer may only appeal upon Certified Technician for installation of the WBA VDSL2 lines, not for repair or maintenance. The exact scope of activities which may be performed by Certified Technicians is described in the Specific Terms and Conditions relating to Certified Technician, available on the Personal Page of Belgacom Wholesale.

33. The Certified Technician may lose its certification in any of the following events:
    - he no longer fulfils the conditions for certification as described in the Specific Terms and Conditions relating to Certified Technician, available on the Personal Page of Belgacom Wholesale;
    - he repeatedly or seriously breaches the obligations applicable upon the Customer under the WBA VDSL2 Reference Offer;
    - his work does not meet the quality standards, and repeatedly needs correction by Belgacom technician.

34. In case the installation of the WBA VDSL2 line is not correctly performed by Customer's Certified Technician, Belgacom will perform the necessary repair actions, at the expense of Customer, without prejudice to Belgacom's right to claim compensation for any other damages.

5 Financial Conditions

5.1 Billing and Payments

35. In consideration for Wholesale Broadband Access VDSL2 Services provided by Belgacom under the Contract, Customer shall pay the charges and fees provided in WBA VDSL2.

5.2 Financial Guarantees

5.2.1 General Principle - Pre-payment

36. Notwithstanding anything to the contrary in the Contract, in order to guarantee the payment by the Customer of the prices due for Services provided by Belgacom that are invoiced on a monthly basis under the Contract, the Customer will provide Belgacom with a monthly pre-payment based on the average of the monthly amount due by the Customer. The amount of the pre-payment shall be based on the average of the invoices issued by Belgacom during three months for the Services ordered in accordance with the Contract. The amount of the pre-payment shall be reviewed every three months. The terms and conditions of this prepayment are described in Annex "Prepayment Terms and Conditions".

37. In addition, the customer will provide an additional guarantee equal to two months of pre payment. Belgacom reserves the right to require from the Customer the immediate adaptation of this additional guarantee at any time if and when the amount of the monthly prepayment increases.

38. Without prejudice to any other legal or contractual remedies and notwithstanding anything to the contrary in the Contract , in the event Customer fails to pay in due time any undisputed amount due under the pre-payment conditions as defined in the present section and in Annex "Prepayment Terms and Conditions", Belgacom shall be entitled to execute the following alternatives until full payment is made:

- suspension of any SLA obligations that are not foreseen in the Basic SLA;
- refusal in writing of any new Order, including Migration Services, and excepted Cancellation and Deactivation;
- Suspension of the existing Services in accordance with article 86hereafter.

5.2.2 Sufficient Creditworthiness

39. This monthly pre-payment will not be required in the following circumstances.

40. The Customer has sufficient creditworthiness as evidenced by either of the following alternatives:

- the Customer has obtained a "Ba2" rating or above for its debt (Moody's); or

- the Customer has obtained a rating similar to Moody's "Ba2" rating, provided that (i) such rating is generally accepted by the market as giving similar reliability as Moody's, (ii) such rating is reviewed and updated on a regular basis.

41. In the event that the Customer would lose the above described creditworthiness at some point in time (either through the loss of "Ba2" credit rating or similar, or upon the occurrence of any default or delay of payment), Customer will have to provide Belgacom with a pre-payment or with another financial guarantee as defined in the present chapter within 10 working days of Belgacom's request thereto.

5.2.3 Other Financial Guarantees

42. The Customer obtains an irrevocable and unconditional parent corporation guarantee for the debts incurred by the Customer for the Services ordered in accordance with the Contract provided that such parent company is issued by a company that has sufficient creditworthiness as defined above. In the event that the Parent Company would lose the above described credit worthiness at some point in time, the Customer will provide Belgacom with a pre-payment or with another financial guarantee as described in the present article within 10 working days of the request of Belgacom.

43. The Customer has constituted a Deposit on an escrow account with a reputable bank or financial institution established in the EU. The amount of that deposit will be equal to an estimate of three months of invoices due by the Customer for the Services ordered in accordance with the Contract. Based on the actual evolution of the amounts due for the Services, the Customer and Belgacom will have the right to require an adaptation of the amount of the deposit every three months. Upon the request for adaptation of the amount of deposit, necessary steps will be taken to ensure adaptation within ten (10) working days. In case of default by the Customer to pay sums due under the Contract, the sums deposited on the escrow account will accrue to Belgacom. The interests accrued on the escrow account will be payable to the Customer. In the event the sums deposited are accrued to Belgacom, or if the amount of the deposit is not adapted despite Belgacom's request thereto, Customer will provide Belgacom with a pre-payment or with another financial guarantee as defined in the present article within 10 working days of the request of Belgacom.

44. The Customer has provided Belgacom with a irrevocable and unconditional bank guarantee on first demand issued by a reputable bank or financial institution established in the EU. That bank guarantee will be issued for a minimum period of three years and for an amount equal to an estimate of three months of amounts due by the Customer for the Services ordered in accordance with the Contract. Based on the evolution of the amounts due for the Services, Customer and Belgacom will have the right to require an adaptation of the amount of the bank guarantee every three months. Upon the request for adaptation of the amount of bank guarantee, necessary steps will be taken to ensure adaptation within ten (10) working days. Upon expiration of the bank guarantee or after Belgacom has called upon the bank guarantee, or if the amount of the bank guarantee is not adapted despite Belgacom's request thereto, the Customer shall provide Belgacom with a pre-payment or with another financial guarantee as defined in the present article within 10 working days of the request of Belgacom.

6 Principles

6.1 Retail Pricing & Billing

45. Customer shall be responsible for the setting of the tariffs that Customer will apply to the ~~End~~ Users to whom Customer will sell telecom service using the Wholesale Broadband Access VDSL2 Services and for the billing and invoicing of such ~~End~~ Users.

46. Except as provided otherwise in the Contract or its Annexes, no deductions or reductions shall be made from the payment of any charges or fees due for the Services for any bad or unpaid debts or any unrecoverable claims (including, in particular, claims arising from fraud cases) that Customer may have against ~~End~~ Users or any other third parties in relation with these Services.

6.2 Branding

47. The Parties agree not to offer any service under any brand, including any trademark, trade name or company name, of the other Party unless the use of the brand(s) of the other Party is explicitly provided under the Contract. Such use of the brand will then be strictly limited to the service at stake.

48. Customer shall offer telecom services to ~~End~~ Users under its own brand without any use of, or reference to Belgacom's brands.

49. Notwithstanding the foregoing, Parties acknowledge that, as provided in WBA VDSL2, the installation of equipment on the site of the relevant End Users ~~who have subscribed to an offering of Customer~~, may, when relevant under the terms and conditions of WBA VDSL2, be realized by Belgacom personnel. Both Parties agree that Belgacom shall have no obligation to unbrand or rebrand its service technicians or trucks. Belgacom will act in accordance with its general standard of integrity that it has internally developed and enforced.
In any case, Belgacom will not make any publicity or remarks to the detriment of the Customer or its image. Belgacom must in all circumstances stay neutral, in accordance with the technical nature of its intervention. Where Belgacom makes use of standard documents vis-à-vis users, it will submit these for prior approval by BIPT.

50. When Customer chooses to have installation of the WBA VDSL2 lines performed by Certified Technician, Customer will see to it that the Certified Technician acts with integrity and makes no publicity or remarks to the detriment of Belgacom or its image.

6.3 ~~End~~ User Terms and Conditions

51. Customer shall cause the terms and conditions governing Customer's contractual relationships with the ~~End~~ Users to be compliant with the rules and principles set out in the Contract and its Annexes. Notwithstanding the above, nothing in the present Reference Offer can be construed as creating or evidencing a contractual relationship of any kind between Belgacom and Customer's users or as providing to Belgacom any right to consult the contracts signed between Customer and its Users.

52. Customer shall indemnify Belgacom against all losses, claims or liability suffered by Belgacom due to the fact that Customer will have failed to incorporate the above mentioned rules and principles in its terms and conditions.

7 Coordination between the Parties

7.1 Single Points of Contact

53. As soon as possible after signing this Contract, each of the Parties will both appoint an individual as its respective single point of contact ("SPOC") who will act, within the organization of such Party, as the other Party's contact person.

54. The SPOC of either Party will have full authority to act and decide on behalf of the respective Party on all technical and operational matters regarding the day-to-day management of the performance of their WBA VDSL2 Contracts. All the decisions taken by any working group constituted by the Parties during the performance of this WBA VDSL2 Contracts will need to be expressly and formally validated by the SPOC of either Party to be binding on such Party. Except as otherwise expressly provided by the relevant Party, each Party's SPOC will have no authority to modify the conditions described in the Contract, or to act outside the day-to-day management of the performance of the Services.

55. Notwithstanding anything to the contrary in the foregoing, each Party will be authorized to replace its SPOC by notice sent to the other Party. Such notice will have immediate effect.

7.2 Working Group

56. The Parties will be free to set up any other working group in charge of discussing and agree on any technical or operational issue as the Parties may deem fit in the performance of the Services.

8 Liability

8.1 General rules

57. Taking into account the nature of the respective activities of the parties, the risks and potential profits associated with these activities and the consideration obtained by each Party from the Contract, Parties expressly agree that their respective liability shall be limited as follows.

58. If either Party is held liable to the other Party (including such other Party's employee(s) and contractor(s)) under the Contract that liability shall be limited to the following:

- if such liability results from any personal injury or death incurred as a direct result of the non-performance of the relevant Party's obligations under the Contract, then such liability shall be only subject to the limitation provided in article 59;
- if such liability results from any conduct attributable to the relevant Party, which is, under Belgian law, characterized as being gross negligence (faute lourde – zware fout) or intentional negligence (dol – bedrog), then such liability shall be subject to no limitation, except as ~~provided~~ permitted by law;
- if such liability results from any material damage (including any dysfunction of the Belgacom's Network), other than those referred to above, arising out of or in any way connected with the performance by the relevant Party of the Services or the breach of such Party's obligations under these Terms and Conditions, then the total amount which can be recovered from such Party for all acts or omissions shall, in no event, exceed an aggregate amount equal to EUR 1,250,000 (one million two hundred fifty thousand euro), subject to the limitation provided in article 59.

59. Neither Party shall be liable for indirect damages (pure and consequential), including without limitation loss of profit, loss of revenue, loss of data, loss of use, loss of savings, loss of goodwill, interruption of business or claim by third parties.

60. Customer will be responsible for, and will indemnify Belgacom against, any claim for damages issued by Customer's ~~End~~ Users in connection with the performance of this Contract, except if the customer is able to prove that the damage or claim result of a fault of Belgacom as regard his obligations described in this Contract.

61. In addition, Customer will indemnify Belgacom against any claim or loss related to the illegal use, or the use for illegal purpose of the Wholesale Broadband Access VDSL2 Services by Customer, Customer's ~~End~~ Users or by any person using the Wholesale Broadband Access VDSL2 Services.

9 Certified Technician

62. In addition, and notwithstanding the above, the Customer will be held liable to Belgacom, its employees or third parties for damages caused by one of its Certified Technicians (Customer's own employees, as well as Customer's subcontractor employees), when performing the installation of the WBA VDSL2 lines. The Customer shall indemnify and hold Belgacom harmless from any and all damage, costs or third party claims incurred as a result of any act or omission of Customer's Certified Technician, including claims against Belgacom based upon art. 544 Civil Code ("burenhinder/troubles de voisinage").

63. If a Customer chooses to install some or all of his WBA VDSL2 lines by one or several Certified Technician(s), he will have to provide to Belgacom, prior to his first request to have installation done by Certified Technician, a "liability insurance" certificate of EUR 5,000,000 per claim and per year to cover his liability for any damages caused by his employees or his subcontractors to Belgacom, its employees or third parties when provisioning the lines.

    The insurance policy has to be contracted with a first class insurance company in an E.U. country and must be maintained during the total duration of the agreement between parties. The policy must contain the following provision: the suspension, cancellation or the end of the insurance policy will be opposable to Belgacom, 15 calendar days after the reception of a registered letter from the insurance company informing Belgacom of the end of the policy. At the expiry of the insurance certificate, the Customer will be diligent in providing Belgacom an updated certificate, confirming the prolongation of the insurance policy.

64. The Customer will also procure that its subcontractors, who wish to qualify certain of its employees as Certified Technician, accept the right of Belgacom to bring a direct claim against Customer's subcontractor as to hold Belgacom harmless from any and all damage, costs or third party claims incurred as a result of any act or omission of the Certified Technicians employed by Customer's subcontractor, including claims against Belgacom based upon art. 544 Civil Code ("burenhinder/troubles de voisinage"). In the event that damage is caused by Customer's subcontractor, Belgacom can choose to bring a claim towards the Customer, or to Customer's subcontractor, or to both. For the sake of clarity, in case of parallel claims against the Customer and Customer's subcontractor, Belgacom can only once recover indemnification of its total damage.

    The Customer's subcontractor will provide to Belgacom a "liability insurance" certificate of EUR 2.500.000 per claim and per year to cover its liability for any damages caused by its employees, acting as Certified Technician, to Belgacom, its employees or third parties when provisioning the lines. The insurance policy has to be contracted with a first class insurance company in an E.U. country and must be maintained for the total duration of certification of any of Customer's subcontractor employees. The policy must contain the following provision : the suspension, cancellation or the end of the insurance policy will be opposable to Belgacom, 15 calendar days after the reception of a registered letter from the insurance company informing Belgacom of the end of the policy. At the expiry of the insurance certificate, the Customer's subcontractor will be diligent in providing Belgacom an updated certificate, confirming the prolongation of the insurance policy.

9.1 Force Majeure

65. Neither Party will be liable for any delay or failure to fulfil its obligations under the Contract arising from any event beyond its reasonable control, such as for instances but without limitation natural disasters and strikes (all such events being hereafter referred to as "Force Majeure").

66. The Party claiming Force Majeure shall as soon as possible send to the other Party a Notice of the Force Majeure. Such Notice shall contain adequate evidence of the occurrence and extent of the Force Majeure, as well as an estimate of the expected duration of the Force Majeure. As soon as practicable after receipt of such Notice, the Parties shall consult with each other in order to find an equitable solution to the problems and difficulties caused by the Force Majeure.

67. The Party claiming Force Majeure shall use all reasonable endeavours to minimise the

consequences of such Force Majeure, and to ensure, in as far as reasonably possible, the continuity of the services provided under the Contract and shall perform those of its obligations not affected by a Force Majeure. To the extent that a Party is prevented as a result of Force Majeure from providing one or several of the services or facilities to be provided under , the Contract, the other Party shall be released to the equivalent extent from its obligations to make payment for such services or facilities or complying with its obligations in relation thereto.

68. Upon cessation of the effects of the Force Majeure, the Party initially affected by such Force Majeure shall promptly notify the other Party of such cessation.

9.2 Accidents at work and Safety Rules

69. Each Party hereby undertakes to provide insurance cover against accidents at work for its own employees in conformity with the applicable legal requirements. Customer also procures that its subcontractors provide insurance cover against accidents at work for their employees in conformity with the legal requirements. Each Party hereby renounces any possible claim against the other Party, and undertakes to procure that its insurer shall not pursue against the other Party, or against any third party for whose acts or omissions the other Party may be responsible, any claim relating to accidents at work. Customer undertakes to procure that its subcontractors and subcontractor's insurer renounce any possible claim against Belgacom relating to accidents at work.

70. Each Party shall comply with safety practices and procedures reasonably applicable when entering the premises and installations of the other Party in order to carry out work (see, for Belgacom, safety rules and procedures in Specific Terms and Conditions relating to Certified Technician, available on the Personal Page of Belgacom Wholesale). Each Party undertakes to ensure that its personnel or its subcontractor personnel, while upon the premises and installations of the other Party, will respect any internal rules and codes of conduct therein applicable, provided that such rules and/or codes shall have been made available to them in advance. Without prejudice to the provisions of the chapter relating to Liability General rules or the chapter relating to Liability Certified Technician, depending on the situation, each Party shall indemnify and hold harmless the other Party for any and all damages, costs or expenses incurred as a result of any act or omission of a Party's personnel or a Party's subcontractor personnel while upon the premises and installations of the other Party.

10 Operational Matters

10.1 Operational Matters and Network Management

71. The Wholesale Broadband Access VDSL2 Services provided under the Contract shall be implemented and provided by the Parties in accordance with the technical specifications set forth in the Annex 2 "Technical Specifications" and the operational rules and procedures contained in the Annex ~~4~~ 3 "Planning and Operations".

72. Both Parties shall cooperate to install and maintain reliable services. Both Parties shall exchange appropriate information as provided in the Annex Planning and Operations (including in particular, maintenance contact number, networks information, information required to comply with law enforcement and other security agencies of the government and such other information shall mutually agree) to achieve this desired reliability.

73. Each Party shall apply sound network management principles by invoking network management controls to ease the operation of their respective systems and to alleviate or to prevent congestion. Each Party shall ensure that the network management controls are applied in such a way as to ensure that there is no discrimination in favour of that Party's own traffic.

10.2 Essential Requirements

74. The Parties shall ensure that the Essential Requirements, as defined and applicable under the regulatory framework, are adequately and sufficiently protected, in as far as the establishment, maintenance and operation of the services offered under the Contract are concerned.

75. It is acknowledged that the Contract and its Annexes and/or Appendixes (in particular, the Annexes WBA VDSL2 and the Annex "Planning and Operations" of the relevant service) contain a number of specific principles and rules that have been developed to ensure the protection of the Essential Requirements. Furthermore, the Parties shall consult with each other in order to ensure that the Essential Requirements are protected in an adequate and sufficient manner.

76. It is a condition for the provision by Belgacom of Wholesale Broadband Access VDSL2 Service under this Document that Customer's request is not detrimental to the operation of the telecommunications networks and telecommunications services in question or to their integrity or interoperability, and that the protection of service and internal data, network equipment, software and stored data, including personal data, confidential information and privacy can be sustained.

77. The conditions for and restrictions on use applying at any time appear from the Annex the "Technical specifications" Document.

78. Belgacom shall further be entitled to cause interruptions, disturbances or modifications of Belgacom's public network and services to the detriment of the supply of the services under the Contract in connection with measures that are deemed necessary for technical, maintenance and operating reasons taking into account the balance of the interests of both Parties or that are ordered by the regulatory authorities. Belgacom shall give in good faith Customer the longest possible notice of interruptions, disturbances and modifications, by any means it deems appropriate (e.g. via electronic communication) and state the reason for them.

11 Amendments and Revisions

11.1 General Principles

79. Except as otherwise provided in the Contract or its Annexes, any agreement departing from the Contract or its Annexes shall only be valid if duly agreed upon in writing by the respective representatives of the Parties.

12 Termination and Suspension

80. Customer has the right to terminate one or more WBA VDSL2 contract as provided in the WBA VDSL2 Offer annexed to the Contract. Belgacom has the right to terminate one or more WBA VDSL2 contracts annexed to these Terms and Conditions in order to preserve Belgacom's network integrity and security.

81. Without prejudice to the above, the Customer must request the termination of the WBA VDSL2 Contract when the telecom services are cancelled for any reason whatsoever on a specific loop. Said termination request shall automatically give rise to the deactivation of the WBA VDSL2 Service on the line without delay.

82. A WBA VDSL2 Contract shall automatically be terminated without prior notice to Customer upon the activation by Belgacom of another Service on the same line based on the valid migration request of either Belgacom retail or another Customer. Belgacom will further inform Customer of the new request without revealing the identity of the latter.

83. In the event Customer uses or allows the use of Services provided under the Contract in an illegal manner or for illegal purposes (such as for instances but without limitation: spamming, violation of intellectual property rights of third parties), or if Customer by its action or omission causes, or could reasonably be expected to cause a damage to the working or the security of the telecommunication network of Belgacom, and Customer fails to take appropriate measures in order to remedy to the situation within a period of fifteen (15) days from the receipt of a Notice of Suspension sent by Belgacom, Belgacom will have the right to suspend the provision of some WBA VDSL2 Contracts or of the whole Wholesale Broadband Access VDSL2 Service. Notwithstanding the foregoing, Belgacom will have the right to take proactive actions in order to protect the other xDSL lines prior to sending the above mentioned Notice in urgent cases (such as, for instances but without limitation, if the resynchronization rate exceeds 50 resynchronization per day) where unstable lines disturb the transmission quality and link stability of other xDSL lines. Those actions could be a change in the line profile such as a reduction of the target bitrates, the lock of the xDSL port or the physical disconnection of the line. In that case, Belgacom will inform the parties involved about the actions taken at the latest 24 hours after the suspension.

84. If the Customer uses or allows the use of Services provided under the Contract in a manner not corresponding to the Technical Specifications set forth in the Annex "Technical Specifications", and Customer fails to take appropriate measures in order to remedy to the situation within a period of fifteen (15) days from the receipt of a Notice sent by Belgacom, Belgacom reserves the right to suspend all or some of the services.

85. Belgacom will have the right to suspend Wholesale Broadband Access VDSL2 Services in the event that it is requested to do so by an order of a court or a competent authority. Belgacom will inform Customer as soon as possible of the cause of such suspension.

86. Without prejudice to article 38, in the event that Customer fails to pay outstanding invoice (invoice, preinvoice or final invoice) for any amount due under the WBA VDSL2 Reference Offer, Belgacom shall be entitled, after having duly informed the BIPT,

    - to suspend all WBA VDSL2 Services without further notice if the total amount due has not been paid within a period of fifteen (15) days following written Notice;
    - to terminate all WBA VDSL2 Services without further notice if the default is not cured within a period of 30 days following the same Notice.

87. Article 86 does not apply to amounts duly disputed by the Customer in writing, before the Due Date, including a clear summary of the grounds for the Dispute and the position of the Customer as to this dispute.

88. In the event that Customer fails to provide, renew, adapt or reconstitute the financial guarantee as provided in the chapter on Financial Guarantee here above, Belgacom shall be entitled, after having duly informed the BIPT,

    - to suspend all WBA VDSL2 Services without further notice if the default is not cured within a period of 15 days following written Notice;

- to terminate all WBA VDSL2 Services without further notice if the default is not cured within a period of 30 days following the same Notice.

89. The provisions of this chapter on Suspension of the Services are without prejudice to any other right or claim for compensation to which the non-defaulting Party may be entitled to in the event of suspension of the services.

90. In the event that either Party is declared bankrupt or enters into liquidation, then the other Party may terminate all the Wholesale Broadband Access VDSL2 Services, without any further legal or other procedures, by sending Notice of termination with immediate effect to the other Party.

91. In the event of suspension of this Contract, Customer will be responsible to inform the relevant ~~End~~ Users of the consequences of the suspension of this Contract in a neutral manner.

92. The provisions in this chapter on Termination of the Services are without prejudice to any other right or claim for compensation to which the non-defaulting Party may be entitled to in the event of termination of the Services, or in the event of termination of one or several Wholesale Broadband Access VDSL2 services ordered under this Contract.

93. In the case of termination of the Services for any reason, or in the event of termination of one or several Wholesale Broadband Access VDSL2 services ordered under this Contract, Belgacom shall be entitled to payment for all Services performed prior to such termination in accordance with the conditions that were applicable between the parties at the time of termination.

94. The provisions of the Contract which by their nature are determined to survive the termination of the Services (including, in particular but without limitation, the provisions on Confidentiality and Applicable Law and Jurisdiction) shall remain in full force and effect after the termination.

95. In the event of termination of this Contract, Customer will be responsible to inform the relevant ~~End~~ Users of the consequences of the termination of this Contract in a neutral manner.

13 Confidentiality

13.1 Confidential Information

96. For the purpose of this Chapter, the term "Confidential Information" shall mean:

- information communicated by one Party (or from any of its Associated Companies) (the "Disclosing Party") to the other Party (or to its employees and advisors) (the "Receiving Party"), or obtained by the Receiving Party in connection with the performance of the Services, provided that such information is, at the time of its disclosure, reasonably designated "confidential" or with an equivalent term. If such information was disclosed orally, it shall constitute Confidential Information provided that the Disclosing Party informs the other Party at the time of such disclosure, that such information is confidential and that (i) a written notice containing a summary of the information disclosed orally and mentioning that such information is confidential, is issued by the Disclosing Party to the other within five Working Days from the date of disclosure, or (ii) such disclosure is recorded in minutes of a meeting that are designated, labelled or marked "confidential" or designated, labelled or marked with an equivalent term.
- Shall in any event be considered as Confidential Information, any information or data obtained regarding customers of the other Party, regarding customers of other licensed operators, or any other information or data which the Customer or his subcontractor obtain via access to the tools which Belgacom puts at the disposal of the Certified Technician.

97. For purposes of these General Terms and Conditions, "Confidential Information" does not include:

a. information that is properly and lawfully in the public domain otherwise than by breach of the Contract or any other obligation of confidence;
b. information that was disclosed by a third party to the Receiving Party without restriction on disclosure or use, unless the Receiving Party knew or should reasonably have known that this information was acquired unlawfully or by a breach of contract or fiduciary relationship.

98. Except as specified in writing, by the Disclosing Party at the time of disclosure, Confidential Information shall continue to be deemed as such until the end of a period of three (3) years after its initial communication under the Contract.

13.2 Non-Disclosure

99. The Receiving Party shall refrain from disclosing the Confidential Information to any third party and shall use the Confidential Information only for the performance of the Services offered in accordance with the Contract. In addition, the Receiving Party shall take any reasonable measures to ensure the confidentiality of this information. In any event, the Receiving Party shall use efforts at least commensurate with those that such Party uses for protecting the confidentiality of its own Confidential Information.

100. Notwithstanding the foregoing and without prejudice to the provisions regarding the Disclosure to Personnel, Advisors, Suppliers or Resellers here-under, either Party shall be allowed to disclose the Confidential Information to third parties provided it has obtained the prior written consent of the other Party. Such written consent will be given case-by-case upon a discretionary basis. Such written consent shall only be valid and enforceable for the specific information listed therein. The written consent to disclose Confidential Information shall identify the third party or parties to which the information can be disclosed and shall set forth the terms and conditions to which such disclosure is subject.

101. The Disclosing Party shall remain free to disclose to any third party Confidential Information disclosed to the Receiving Party.

13.3 Disclosure to Personnel, Advisors, Suppliers or Resellers

102. A Receiving Party shall disclose the Confidential Information received from the other only to its directors, employees, suppliers, agents, advisors, contractors, sub-contractors, or resellers who have a need to know such information. Such Party shall ensure that such directors, employees, suppliers, agents, advisors, contractors, sub-contractors or resellers are bound by the obligations of confidentiality in respect of the Confidential Information, which is at least equivalent to the confidentiality obligation set forth in the Contract.

103. Notwithstanding anything to the contrary in the foregoing provisions, the Receiving Party shall not disclose or use the Confidential Information, with the aim of providing commercial advantage to business divisions of the Receiving Party, or business divisions of the Receiving Party's Associated Companies, which are engaged in activities competing with the other Party.

104. The Customer guarantees that the Certified Technicians, whom he uses for the installation of the WBA VDSL2 lines, comply with the confidentiality obligations described herein, and he will see to it that his Certified Technicians do not divulge or use Confidential Information belonging to Belgacom or to other licensed operators, when performing installation services on behalf of the Customer. The Certified Technicians will also conclude a confidentiality agreement with Belgacom directly before starting their training by Belgacom in order to obtain certification.

105. Each Party shall be liable under the limitations provided in the Chapter relating to Liability here-above, for any unauthorized disclosure or use of the Confidential Information by its directors, employees, suppliers, agents, advisors, contractors or subcontractors. The Party responsible for an unauthorized disclosure or use of the Confidential Information shall, in any event, take any reasonable measures (including but not limited to court proceedings) to mitigate the damage resulting there-from.

13.4 Disclosure Required by Law

106. If the disclosure of Confidential Information to third parties is required by reason of legal, accounting or regulatory requirements beyond the control of the Receiving Party, the Receiving Party may disclose such information to the extent necessary to comply with such requirements. Without prejudice to the application of the foregoing, the Parties shall endeavour to ensure the confidential treatment of the Confidential Information by the third parties receiving such information as a result of such requirement.

107. Without limitation to the generality of the foregoing, either Party will have the right to disclose Confidential Information to the BIPT, whenever required by law, or deemed reasonably necessary in the context of any proceedings or discussions held in front or with the BIPT. If any such disclosure of Confidential Information is made, the Party communicating the information will ensure that the attention of the BIPT is properly drawn to the fact that the information is confidential and that the information needs to be kept confidential.

14 Dispute Resolution and Applicable Resolution

14.1 Dispute resolution procedure

108. The SPOC shall, on an ongoing basis, attempt to solve any dispute, controversy or claim between the Parties concerning the interpretation, application and implementation of the present General Terms and Conditions and/or the Contract and its Annexes (a "Dispute") through discussions held in good faith.

109. In the event that the Parties have been unable to solve any Dispute, then upon Notice of either Party, each of the Parties will appoint a designated senior business executive (other than their respective SPOC) whose task it will be to meet for the purpose of endeavouring to resolve the Dispute. Each Party shall ensure that their respective designated executive has sufficient authority or decision-making power concerning the matter at stake. The designated executives will meet as often as the Parties reasonably deem necessary in order to gather and furnish to the other all information with respect to the matter in issue which the Parties believe to be appropriate in connection with its resolution. Such executives will discuss the Dispute and will negotiate in good faith in an effort to resolve the Dispute without the necessity of any formal proceeding relating thereto.

110. In the event the Parties fail to reach such a solution and/or settlement within fifteen (15) Working Days as from the receipt of the above Notice, they shall escalate the matter to a higher level within their respective organizations. Discussions at that level will be conducted as described in article 109. The Parties may, at any given escalation level, agree to extend the time limits described in this article and in article 109when they consider it necessary in order to facilitate that an agreement be concluded on the subject-matter of the dispute.

111. Except in the cases of urgency, as determined in good faith by the Party calling the Dispute, and unless otherwise in these general Terms and Conditions, no formal proceedings for the resolution of a Dispute may be started until the earlier to occur of (a) a good faith conclusion by the designated executives that amicable resolution through continued negotiation of the matter in issue does not appear likely or (b) the Parties have failed to reach an agreement on the Dispute within 15 Working Days of the escalation of the Dispute as described in article 109.

14.2 Applicable Law and Jurisdiction

112. The WBA VDSL2 Offer and the contract and its Annexes shall be governed by Belgian law.

113. Without prejudice to article 111, any dispute concerning the validity or the interpretation of the WBA VDSL2 Offer and the Contract, or the performance of the Wholesale Broadband Access WBA VDSL2 Services, or of subsequent contracts derived here-from shall be finally submitted to the Courts of Brussels, Belgium. This provision is without prejudice to the right of each of the Parties to submit the dispute to the BIPT with a view to reach conciliation or to submit the dispute to the Competition Council.

15 Miscellaneous

15.1 General Principles

114. All the terms and conditions of this Contract, including its Annexes and/or Appendixes, are agreed upon by the Parties without prejudice to the rights and obligations that either Party may derive from the applicable provisions of the regulatory framework. The fact that either Party has agreed to any provision in this Contract will not be construed as a renunciation by such Party to invoke (i) any right that such Party may derive from any imperative provision of the applicable regulatory framework or (ii) any obligation that may be imposed to the other Party pursuant to any imperative provision of the applicable regulatory framework.

115. In the framework of the applicable Belgacom WBA VDSL2 Offer for Wholesale Broadband Access VDSL2, should a conflict arise between the Main Body, and any or several Annexes, attachment or appendix to an Annex, the Main Body shall prevail, except for (a) Annex 1 - General Terms and Conditions, which will prevail over the Main Body unless otherwise specifically stated, (b) when otherwise agreed by the Parties, in writing or (c) when otherwise specifically stated in the Main Body or Annex, Attachment or Appendix. Should a conflict arise between Annex 1 - General Terms and Conditions and another Annex, attachment or an appendix to said other Annex, the Annex 1 - General Terms and Conditions shall prevail unless otherwise specifically stated. Should a conflict arise between an Annex and an attachment or an appendix to this Annex, the Annex shall prevail unless otherwise agreed by the Parties, in writing or otherwise specifically stated.

15.2 Notices – Address for Invoicing

116. Unless stated otherwise in this Contract, any Notice under this Contract will be sent to the respective SPOC of the Parties, in writing and by registered mail or by fax confirmed by registered mail to the following respective addresses:

To Customer:

***Customer Full name

[Address]

Fax: [Fax]

Attention: ***

To Belgacom:

Belgacom N.V./S.A.

27 Bd Albert II

B-1030 Brussels

Fax: [Fax]

Attention: ***

Notwithstanding the foregoing, Parties shall send to each other invoices and credit notes by ordinary mail to the following addresses:

To Customer:

***Customer Full name

[Billing Address]

Attention: ***

To Belgacom:

Belgacom N.V./S.A.

[Billing Address]

Attention: ***

15.3 No Assignment

117. Neither of the Parties is entitled to assign the Contract, in part or in its entirety, to any third party or to any other entity unless with the prior written approval of the other Party.

118. No approval will be required for an assignment of the Contract in case of transfer to a successor, to which a transfer has taken place of, at least, the Assigning Party's activities covered by the Contract. In such a case, the assigning Party shall immediately give Notice to the other Party of any such assignment permitted to be made under the Contract without requesting the other Party's consent.

119. Without prejudice to the foregoing, no assignment shall be valid unless the assignee

agrees in writing to be bound by the provisions of the Contract and its Annexes.

15.4 Waiver

120. A failure by either Belgacom or Customer to insist on the performance of any term of the Contract or to exercise any right or privilege hereunder shall not be construed as a continuing or future waiver of such term, condition, right or privilege. No waiver shall be valid unless it is in writing and signed on behalf of the Party making the waiver.

15.5 Fraud

121. The Parties accept to cooperate to the best of their respective abilities in order to prevent and eliminate any kind of fraud which involves Services provided under the Contract. If any of the Parties suspects such kind of fraud, the Parties shall co-operate in order to identify the origin of the fraud and to use any appropriate means in order to eliminate and prevent such fraud as soon as possible. For the purposes of the application of the present provision, fraud shall mean any manipulation of a communications network, including by Customer connected to the network of one of the Parties, in order to obtain one or more telecommunication services without paying the proper charge for it, or to support other criminal activities (including, in particular, wiretapping, eavesdropping and gathering secret numbers).

122. It is explicitly acknowledged by the Parties that any cooperation in the context of the present provision will need to be in due compliance with the entire regulatory framework.

15.6 Independent Parties – Approvals

123. Each Party shall be responsible for obtaining and keeping in effect all approvals from, and rights granted by, competent authorities, other operators, and any other persons that may be required in connection with the performance of its obligations under the Contract. Each Party shall reasonably cooperate with the other Party in obtaining and maintaining any required approvals and rights for which other Party is responsible.

124. Each of the Parties is and shall remain at all times an independent contractor. Neither Party is authorized and neither of the Parties nor their employees, agents, representatives or subcontractors shall at any time attempt to act or act on behalf of the other Party to bind the other Party in any manner whatsoever to any obligations. Neither Party nor its employees, agents or representatives shall engage in any acts which may lead any person to believe that such Party is an employee, agent, representative or subcontractors of the other Party. Nothing in the Contract shall be deemed to constitute a partnership between the Parties.

Wholesale Broadband Access VDSL2

Annex 2: Technical Specifications

Created on: ~~1~~6 February 2012~~20 December 2011~~

belgacom

together with

proximus

telindus

1 Table of contents

2 Scope

The purpose of this document is:

- To describe the technical specifications of the Wholesale Broadband Access VDSL2 service. Note that the description of the service is available in the Wholesale Broadband Access VDSL2, Main Body.
- To allow the Operator to setup a service based on this service from Belgacom, describing the interfaces in detail.
- To specify the technical requirements due to the use of the modem and of the internal cabling at end-user premises.

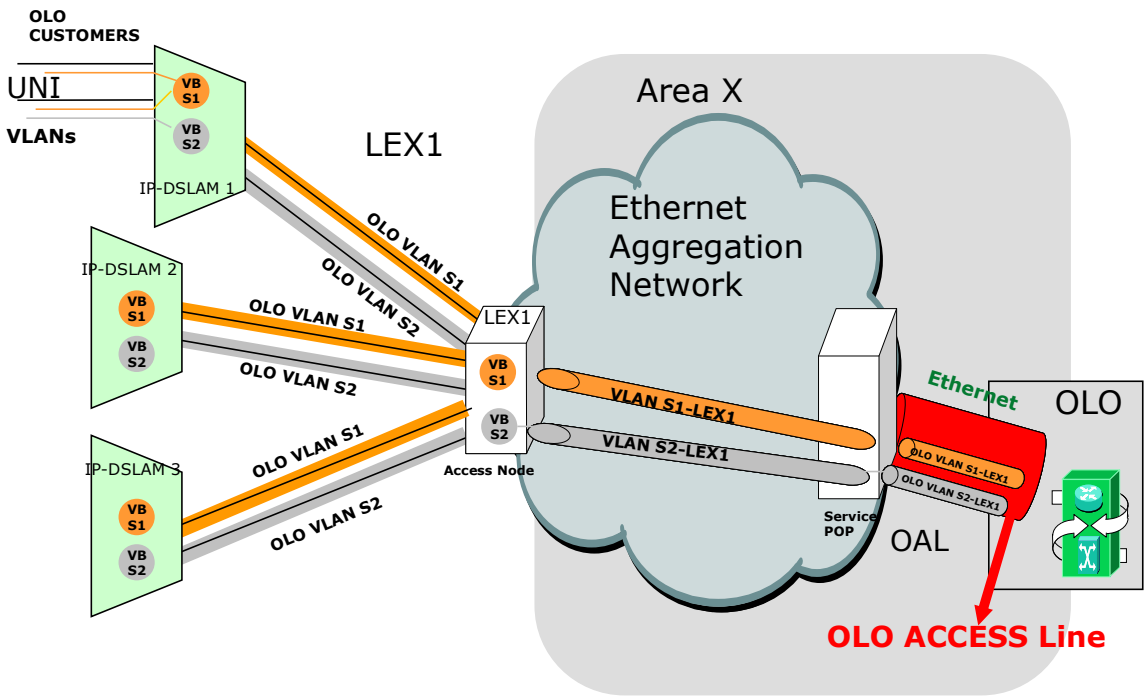
3 Abbreviations

	Description
DHCP	Dynamic Host Configuration Protocol
DS	Downstream
DSCP	Differentiated Services Code Point
GE	Gigabit Ethernet
GUI	Guided User Interface
IPoE	Internet Protocol over Ethernet
LACP	Link Aggregation Control Protocol
LAG	Link Aggregation
LAN	Local Access Network
LEX	Local Exchange
MTU	Maximum Transmission Unit
OAL	OLO (Ethernet) Access Line
OLO	Other Licensed Operator
p-bit	Priority bit
PoP	Point of Presence
PPP	Point to Point Protocol
PPPoE	Point to Point Protocol over Ethernet
UNI	User Network Interface
US	Upstream
U2U	User to User (communication)
VDSL2	Very High Speed Digital Subscriber Line 2 (= Ethernet Based, while VDSL1 is ATM based)
VLAN	Virtual LAN. Unless specified otherwise, the word "VLAN" equally refers to a shared or to a dedicated VLAN.
WBA VDSL2	Wholesale Broadband Access VDSL2. Unless specified otherwise, the word "WBA VDSL2" equally refers to the two types of service: with shared or with dedicated VLAN.

4 Overall Network architecture of WBA VDSL2 with Shared VLANs

4.1 End-to-End view

Wholesale Broadband Access VDSL2 Solution



Graph1: end to end overview (shared VLANs)

This **Wholesale Broadband Access VDSL2** (in short: **WBA VDSL2**) service is offering an Ethernet connectivity between the OLO Access Line and the VDSL2 lines. Eight services are defined on the Ethernet Network, differentiated by the Ethernet p-bit, two services for each p-bit:

- P=0 : best effort (P0 & P0bis)
- P=1 : low priority (P1 & P1bis)
- P=3 : medium priority (P3 & P3bis)
- P=5 : highest priority (P5 & P5bis)

Each VDSL2 line can offer to the End-user one or none of the two P0 services, one or none of the two P1 services, one or none of the two P3 services and one or none of the two P5 services.

The VLAN-id scheme on all VDSL2 lines is common for all OLO's.
E.g.: VLAN-id 10 = Best Effort (P0 or P0bis).

The IP-DSLAM is working as a VLAN Ethernet bridge performing translation between the VLAN-id on the VDSL line, to a VLAN, dedicated for 1 service and 1 OLO. This bridge is shared amongst all customers of the same service of the same OLO.
E.g.: All Best Effort P0 traffic of OLO1 customers is bridged to VLAN 2200 on the IP-DSLAM NT. All P0bis traffic of OLO1 customers is bridged to VLAN 2202 on the IP-DSLAM NT.

Per service, the VLAN's of the end-user lines of an Operator will be aggregated on LEX level in the Access Node of the Ethernet Aggregation Network and transported in 1 VLAN to the Service PoP, where the OLO Access Line is connected. They are 2 Service PoPs, located in 2 different buildings, per Aggregation Network, and 5 Aggregation Networks for whole Belgium. Each of the 5 Aggregation Network is covering 1 geographical Area.

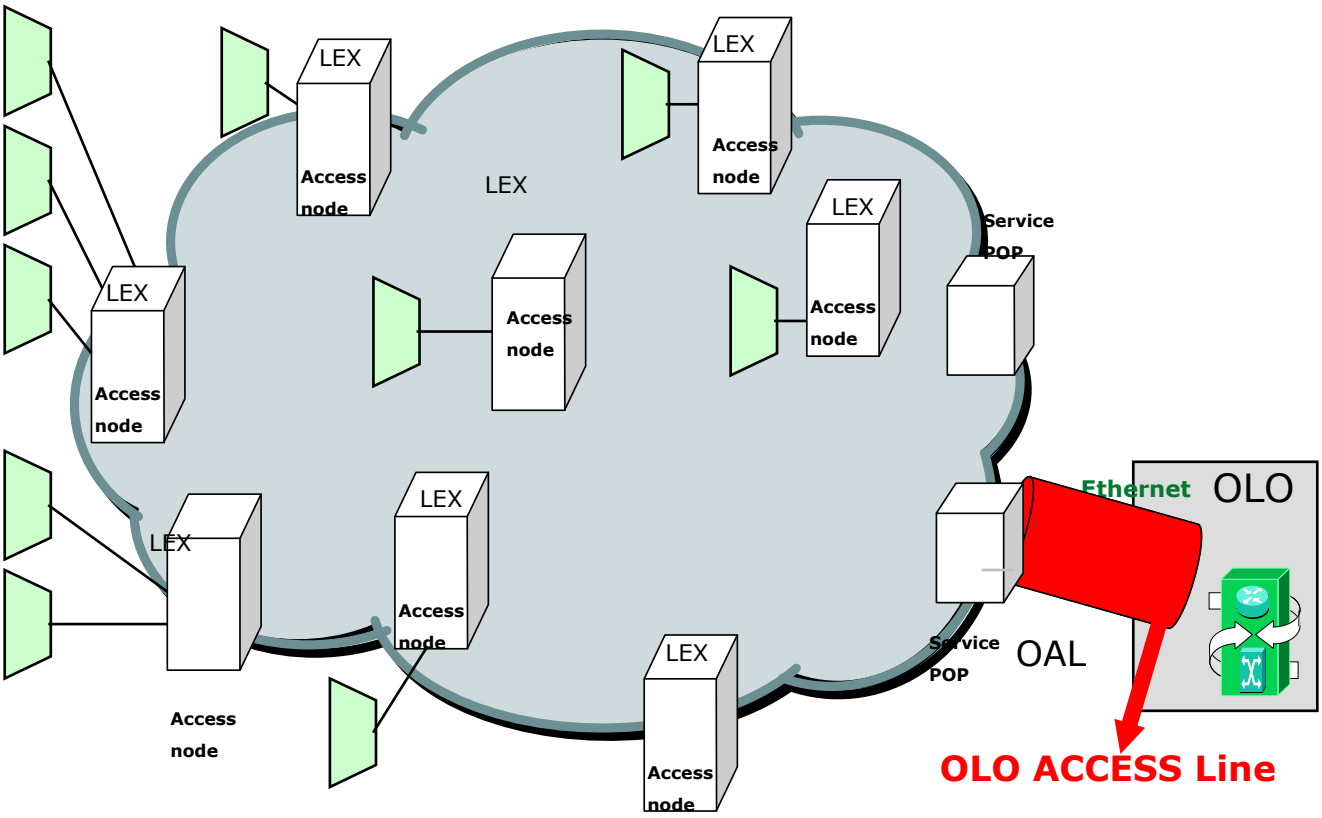
The VLAN ends in 1 VLAN on 1 OLO Access Line.

Per service and per LEX where the Operator wants to be active, he will need to order 1 separate VLAN between the LEX and one of the 2 Service PoPs of the Aggregation Network to whom the LEX belongs. In this LEX, all customers of the Operator with the same service (e.g.: P0bis) will share this same VLAN separated from the VLAN (e.g.: P0) of the same OLO or any other OLO

The OLO will connect the Service PoP to his OLO Access line.

4.2 Aggregation Network structure

Wholesale Broadband Access VDSL2
Aggregation Network structure



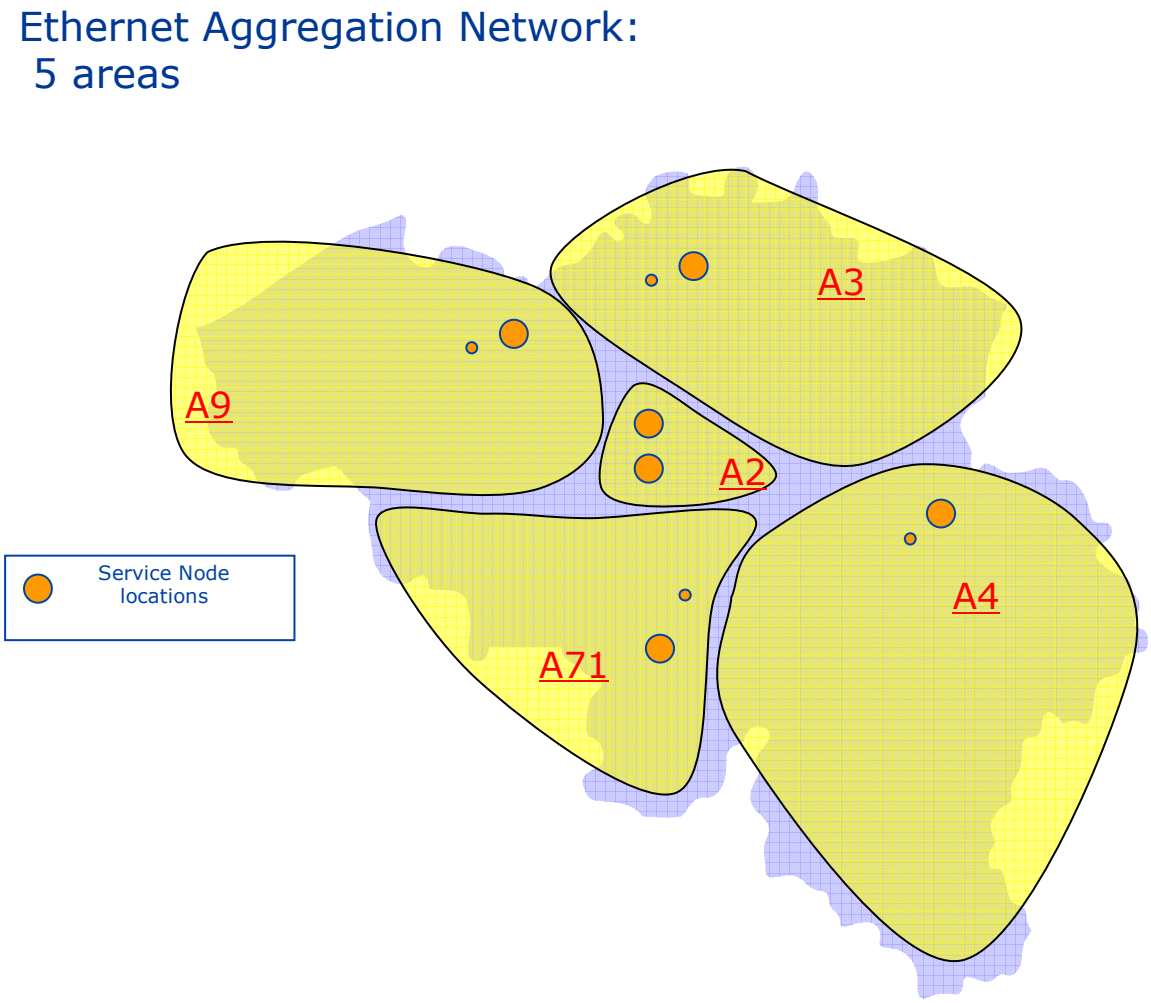
Graph 2: Aggregation Network Structure

The IP-Dslam is connected to one Access node.
The VLAN is routed from the OLO Access Line to the Access node of the LEX.

Redundancy:

- rerouting of the VLANs.
- The OLO access line redundancy is an option.
- The IP-DSLAM is connected to its Access node via GE lines.

4.3 Aggregation Areas

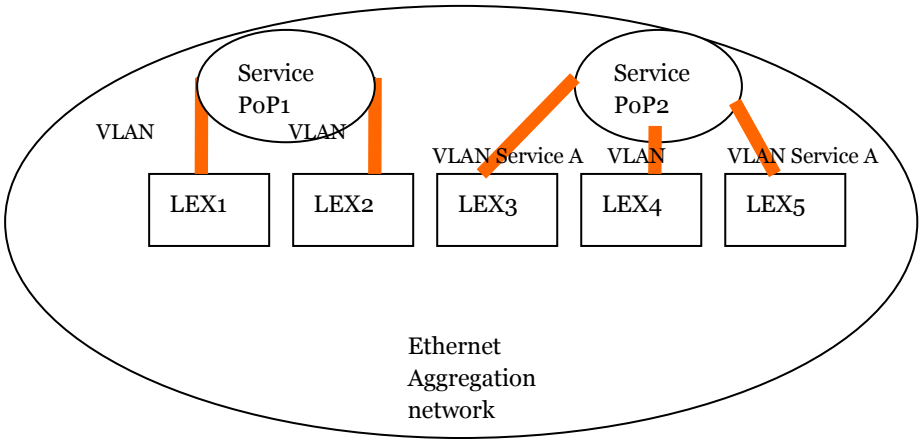


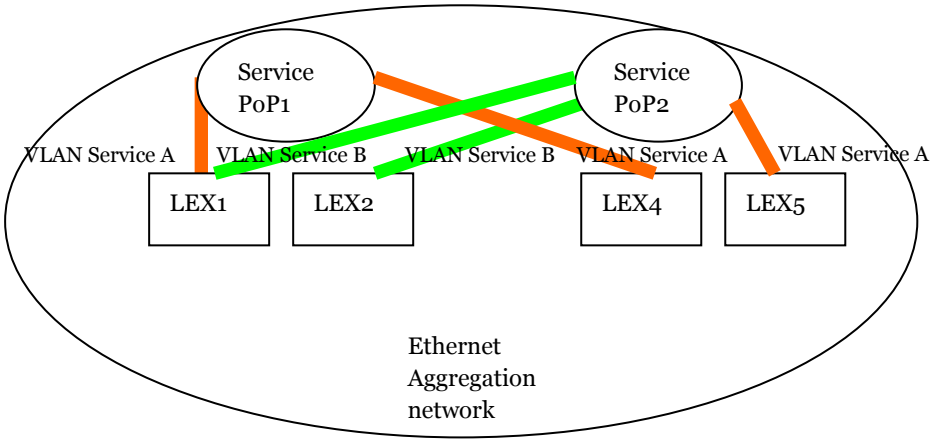
Graph 3: Aggregation Networks and Service PoP's location

As prerequisite to the ordering of the WBA VDSL2 service in one of the 5 Areas, the Operator must interconnect with Belgacom by ordering at Belgacom one or several dedicated Access Lines between the Operator's Equipment and the Belgacom Service PoPs of this Area.

To collect and terminate the traffic of an Area, the Operator only needs to connect to 1 of the 2 Service PoP's per area. The interconnection on the 2 service PoP's of a same area lets the OLO share its traffic over the 2 Service PoP's for more security. Nevertheless, this is not loadsharing: the OLO must choose himself to which Service PoP he connects the different LEXs.

E.g.: for one service A, it will be possible to connect LEX's 1 and 2 to Service PoP1 and LEX's 3, 4 and 5 to Service PoP2 (with Service PoP1 and Service PoP2 belonging to the Area of these LEX's). For one service A, it is not possible to connect one LEX to the 2 Service PoPs.
Alternatively, it is also possible to connect the same LEX to Service PoP1 for service A and to service PoP2 for service B (with Service PoP1 and Service PoP2 belonging to the Area of this LEX).





Graph 4: examples of connection between LEX's and Service PoP

To reach a national coverage, the Operator needs at least 1 interconnection in each Ethernet Aggregation area.

4.4 VLAN characteristics

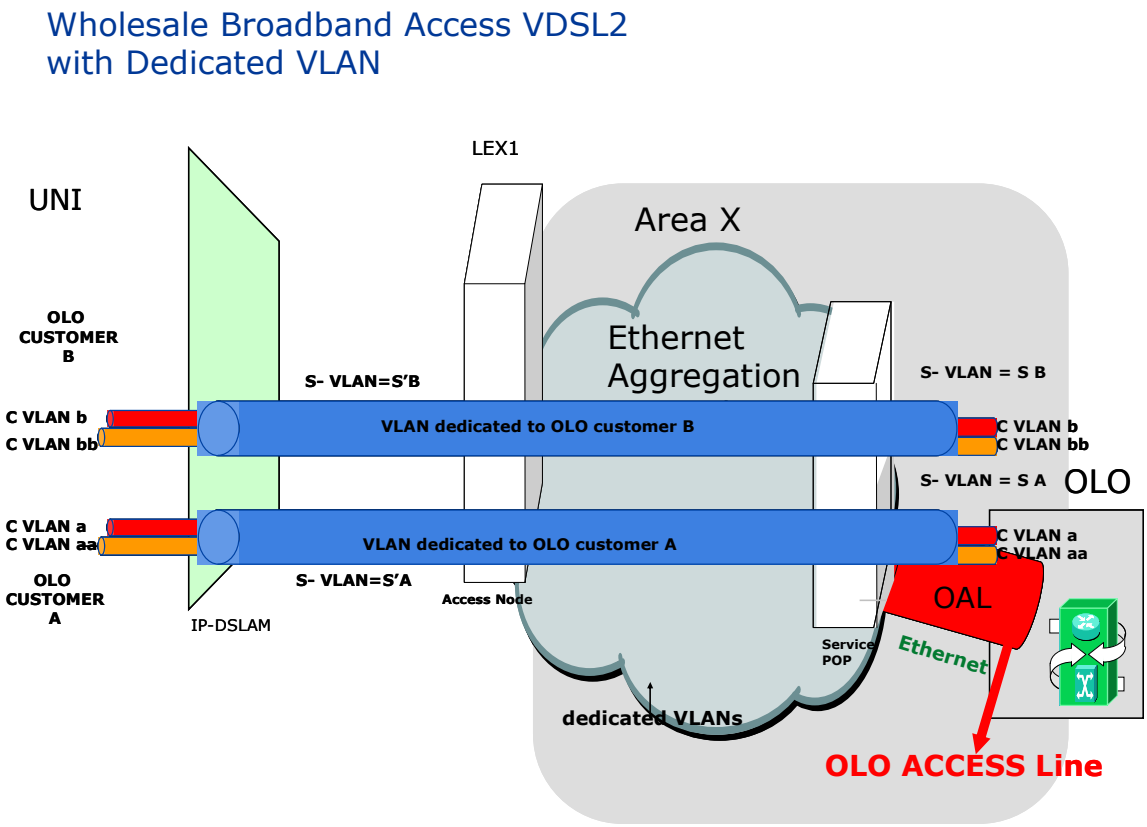
- Each VLAN is transporting 1 service (=p-bit) to 1 Access node (1 per LEX).
- **The offered VLANs allow very little amount of Multicast & Broadcast Ethernet frames => No Multicast service is possible !**
- The following table summarizes the VLAN Bandwidths available in function of the service chosen by the OLO:

Offered VLAN Bandwidth (Mbps)	P=0	P=1	P=3	P=5
2	Y	Y	Y	Y
4	Y	Y	Y	Y
6	Y	Y	Y	Y
8	Y	Y	Y	Y
10	Y	Y	Y	Y
12	Y	Y	Y	Y
14	Y	Y	Y	Y
16	Y	Y	Y	Y
18	Y	Y	Y	Y
20	Y	Y	Y	Y
30	Y	Y	Y	Y
40	Y	Y	Y	Y
50	Y	Y	Y	Y
60	Y	Y	Y	Y
70	Y	Y	Y	Y
80	Y	Y	Y	Y
90	Y	Y	Y	Y
100	Y	Y	Y	Y
120	Y	Y	Y	N
140	Y	Y	Y	N
160	Y	Y	Y	N
180	Y	Y	Y	N
200	Y	Y	Y	N
220	Y	Y	Y	N
240	Y	Y	Y	N
260	Y	Y	Y	N
280	Y	Y	Y	N
300	Y	Y	Y	N
320	Y	Y	N	N
340	Y	Y	N	N
360	Y	Y	N	N
380	Y	Y	N	N
400	Y	Y	N	N
420	Y	Y	N	N
440	Y	Y	N	N
460	Y	Y	N	N
480	Y	Y	N	N
500	Y	Y	N	N
600	Y	N	N	N
700	Y	N	N	N
800	Y	N	N	N
900	Y	N	N	N
1gig	Y	N	N	N

Table 1: VLAN Bandwidth per service

5 Overall Network architecture of WBA VDSL2 with dedicated VLANs

5.1 End-to-End view



Graph 5: end to end overview (dedicated VLANs)

This **Wholesale Broadband Access VDSL2** (in short: **WBA VDSL2**) service is offering an Ethernet connectivity between the OLO Access Line and the VDSL2 lines. Four services are defined on the Ethernet Network, differentiated by the Ethernet p-bit or Layer 3 IP Qos (DSCP or precedence bits):

- P=0 : best effort
- P=1 : low priority
- P=3 : medium priority
- P=5 : highest priority

The VLAN-id scheme on all VDSL2 lines is free (except for management VLAN of VDSL2 modem) for all OLO's, because it is transparently transported towards the OAL.

For each separate WBA VDSL2 line, the IP-DSLAM is adding in upstream a S-tag to any VLAN leaving the VDSL2 modem of the line and is transporting the S-tagged frame up to the OAL of the OLO in a **dedicated VLAN, completely dedicated to this OLO customer.**

Neither bridging nor MAC-learning is performed in the Belgacom network; the **dedicated VLAN** is transparently carried, except that the QOS parameters (see section 7.5.2) agreed between the OLO and Belgacom are policed.

The **dedicated VLAN** ends on 1 OLO Access Line, connected to a Service PoP of the Area to whom the end-user line belongs.

- No "inter Area" dedicated VLAN is possible.
- No rerouting to any other OAL is foreseen.
- The same OAL may be used for "shared" and for "dedicated VLAN" services.

At the OAL, Belgacom will deliver the VLAN, S-tagged carrying all C-VLANs of the VDSL2 line, unchanged. The S-tag is taking 1 VLAN-id. The standardized VLAN-id field size (12 bits) is thus limiting the number of VDSL2 sites, connectable to 1 OAL.

5.2 Aggregation Areas

See Graph 3, "Aggregation Networks and Service PoP's location", in section ~~2.3~~4.3 "*Aggregation Areas*".

As prerequisite to the ordering of the WBA VDSL2 service in one of the 5 Areas, the Operator must interconnect with Belgacom by ordering at Belgacom one or several dedicated Access Lines between the Operator's Equipment and the Belgacom Service PoPs of this Area.

To collect and terminate the traffic of an Area, the Operator only needs to interconnect to 1 of the 2 Service PoP's per area. The interconnection on the 2 service PoP's of a same area lets the OLO share its traffic over the 2 Service PoP's for more security. Nevertheless, this is not loadsharing: the OLO must choose himself to which Service PoP he connects each separate end-user line.

To reach a national coverage, the Operator needs at least 1 interconnection in each Ethernet Aggregation area.

6 Interconnection at LEX LEVEL

Beside the connection of the Operator on Service Pop level described in sections ~~1,~~ 4~~2~~ and 5~~3~~, which allows the Operator to use WBA VDSL2 to connect end-users of the whole Service Areas, the Operator may also interconnect with Belgacom at LEX level.

In case of interconnection of the Operator on a LEX, the Operator may only connect end-users **depending of this LEX**, and transport Ethernet frames from and to end-users **depending of this LEX**.

An OLO may connect more then 1 OAL in a LEX.
Any OAL in a LEX can transport WBA shared VLAN service, WBA dedicated VLAN service or a mix of both.

6.1 With shared VLANs

This **WBA VDSL2** service is offering an Ethernet connectivity between the OLO Access Line connected to the LEX and the VDSL2 lines in the same LEX.

VLAN Bandwidths available in function of the service chosen by the OLO: see section ~~2.4~~4.4.

A shared VLAN of a specific service in a LEX might be connected to an OAL in the same LEX, while another shared VLAN of another specific service ending in the same LEX is connected to an OAL in the service POP.
E.g.: shared VLAN P0 in LEX x is connected to the OAL in the LEX x, while shared VLAN P5 ending in the same LEX x is connected to the OAL in the service POP of the same Service Area.

6.2 With Dedicated VLANs

This **WBA VDSL2** service is offering an Ethernet connectivity between the OLO Access Line connected to the LEX and the VDSL2 lines in the same LEX.

7 UNI

Unless specified otherwise, the section ~~5~~7 equally refers to the two types of service: with shared or with dedicated VLANs.

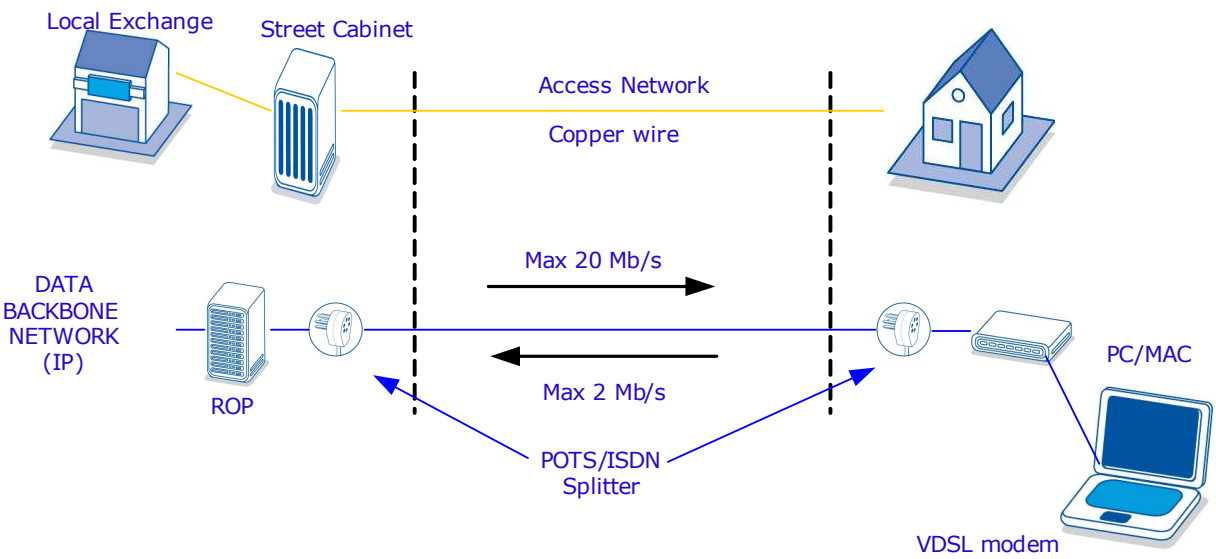
7.1 Physical Transport (Layer 0)

The physical layer is VDSL2 over copper line.

- With and without voice products 'With voice" means : data service offered in combination with a Belgacom PSTN/ISDN line.
- "Without voice" means: data service offered without combination with a Belgacom PSTN/ISDN line.

The most recent Belgacom Physical specification is called "UNI spec for VDSL2" and can be found at:
http://www.belgacom.com/group/gallery/content/network/vdsl2_uni_tech_specs_30072007_final.pdf

Regarding the VDSL2 framing, VDSL2 offers packet transport (PTM) with 64/65B encapsulation as described within EFM (Ethernet in First Mile) standard and ITU VDSL2 standard ITU-T G.993.2.



Graph 6: Physical layer between End-User and Local Exchange

7.2 DSL profiles at uni (Layer1)

The following profiles are chosen by Belgacom, based on the line quality:

Profile	Maximum speed		Minimum speed	
	Downstream	Upstream	Downstream	Upstream
LP701	20.000 Kbps	2.000 Kbps	14.500 Kbps	640 Kbps
LP702	16.500 Kbps	2.000 Kbps	10.000 Kbps	640 Kbps
LP703	14.500 Kbps	1.000 Kbps	10.000 Kbps	640 Kbps
LP704	9.000 Kbps	512 Kbps	4.600 Kbps	256 Kbps
LP705	30.000 Kbps	6.000 Kbps	14.500 Kbps	640 Kbps
LP706	25.000 Kbps	6.000 Kbps	14.500 Kbps	640 Kbps
LP707	20.000 Kbps	6.000 Kbps	14.500 Kbps	640 Kbps
LP708	14.500 Kbps	4.000 Kbps	10.000 Kbps	640 Kbps
LP711	12.064 Kbps	1.064 Kbps	4.664 Kpbs	256 Kpbs
LP712	12.064 Kbps	576 Kbps	4.664 Kpbs	256 Kpbs
LP713	7.064 Kbps	576 Kbps	4.664 Kpbs	256 Kpbs
LP714	10.100 Kbps	576 Kbps	4.664 Kpbs	256 Kpbs
LP715[1]	16.500 Kbps	10.000 Kbps	10.000 Kbps	4.000 Kbps
LP716[1]	16.500 Kbps	8.000 Kbps	10.000 Kbps	4.000 Kbps
LP717[1]	14.500 Kbps	6.000 Kbps	10.000 Kbps	4.000 Kbps
LP718[1]	12.000 Kbps	4.000 Kbps	4.000 Kbps	256 Kbps

7.3 Ethernet Format on VDSL2

[1] The profile LP715 (and the related profiles LP716, LP717, LP718) enable OLOs to offer a WBA service with higher upstream. These profiles will only be provisioned if the OLO made a specific request to order the "WBA VDSL2 high Upstream" product. The details on ordering are available in the "WBA VDSL2 XML content description" document, on the OLO personal page.

Ethernet format on DSL line:

- Frame format

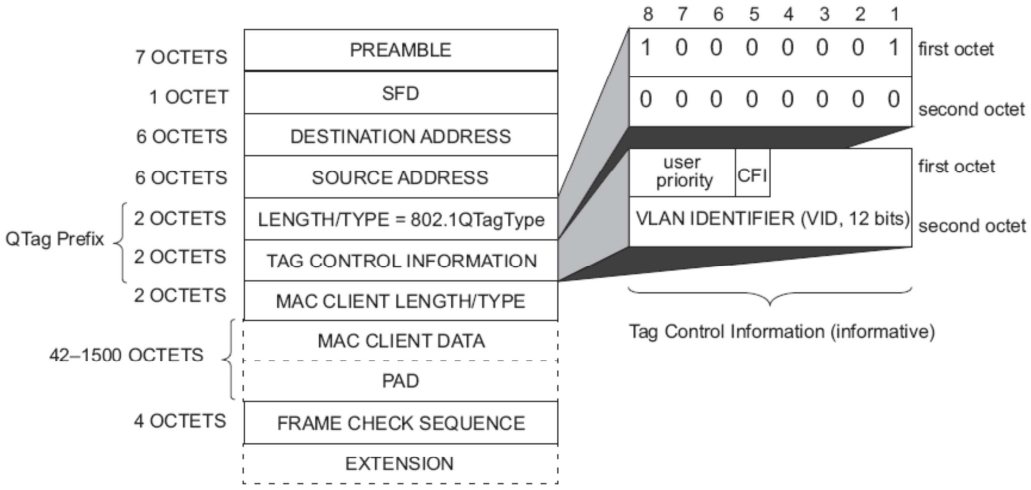


Figure 3–3—Tagged MAC frame format

Graph 7: Tagged MAC frame format

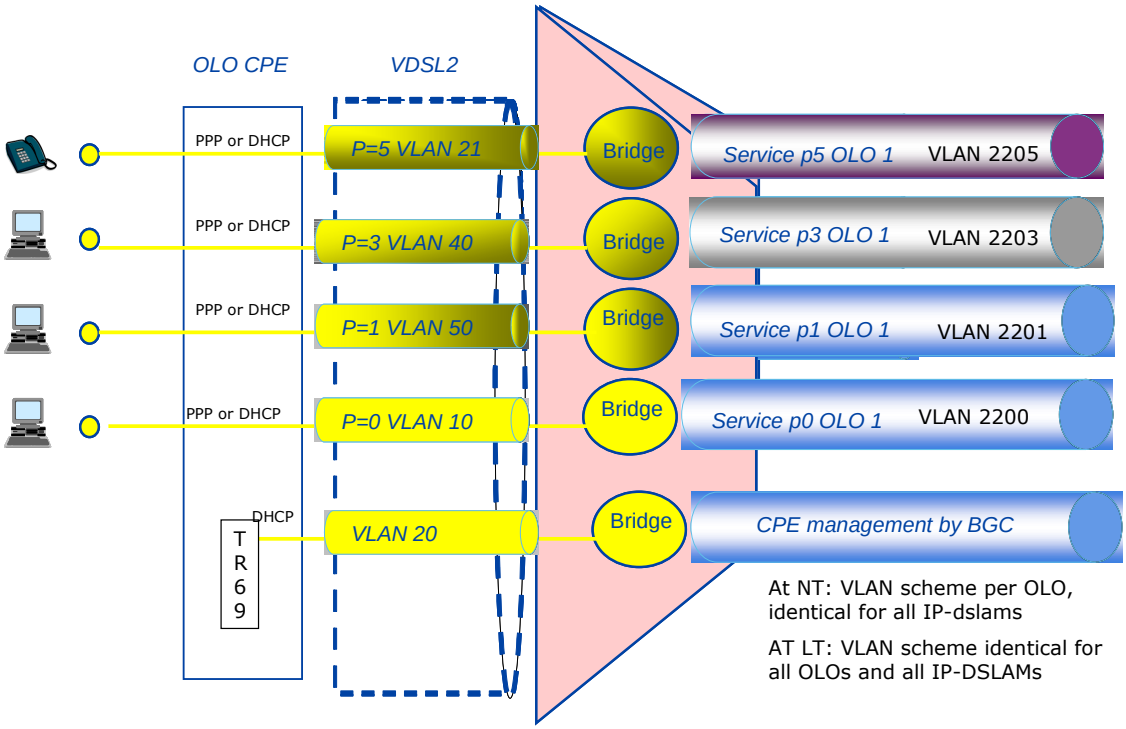
- IEEE 802.1Q also called "Tagged format" (see figure 3-3 from 802.3 – 2005)
- MTU size: the maximum length of the Data – Field (is MAC CLIENT DATA + PAD field in Figure 3-3 from 803.3-2005) is 1500 octets. In case of PPPOE, the PPP header uses 8 octets from those 1500 octets
- Duplex: full duplex (taking into account the asymmetric nature of the VDSL2 physical layer).

7.4 Ethernet Forwarding mechanism

The forwarding mechanism differs in case of shared or dedicated VLAN.

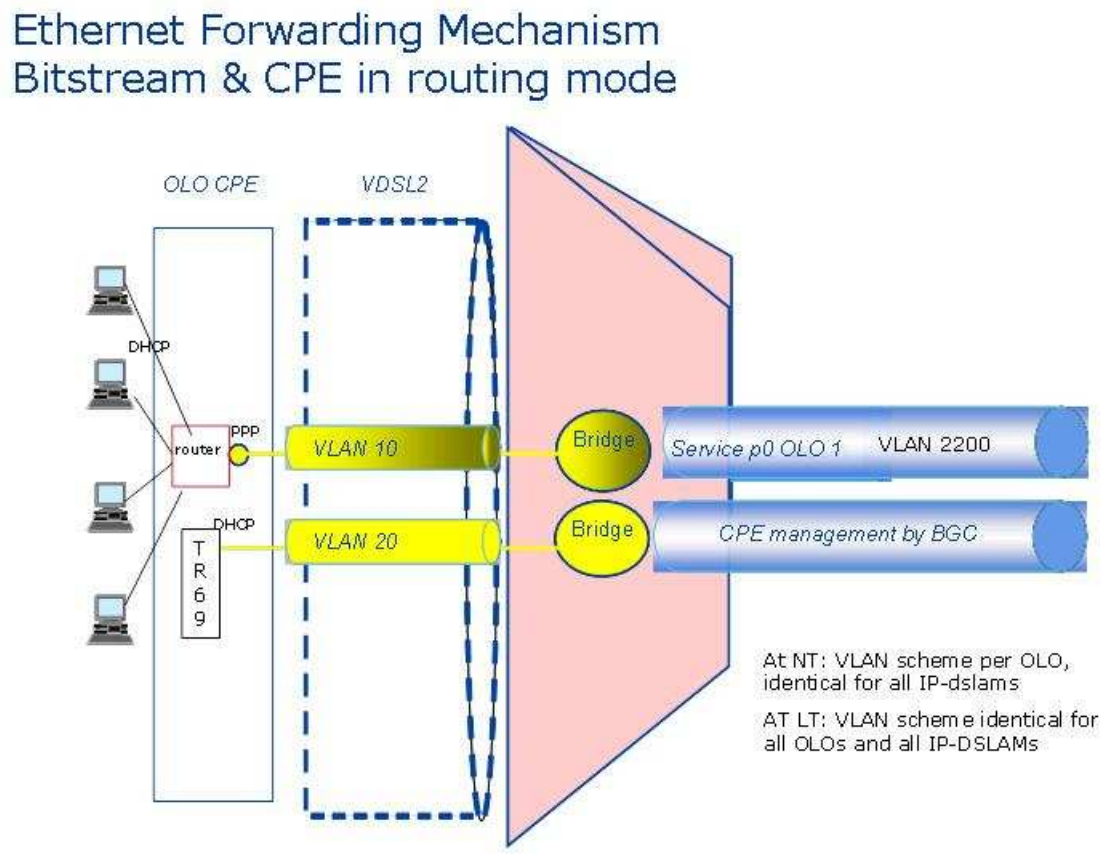
7.4.1 Shared VLAN

Ethernet Forwarding Mechanism
Bitstream & CPE in bridging mode



At NT: VLAN scheme per OLO, identical for all IP-dslams

AT LT: VLAN scheme identical for all OLOs and all IP-DSLAMs



Graph 8: Ethernet **Forwarding Mechanisms on VDSL2 (shared VLANs)**

The forwarding model for VDSL2 with shared VLAN can be considered as L2 bridge with additional security features. Within this mode it is possible to associate different logical ports to one Virtual LAN. In the upstream direction, frames are forwarded from a VLAN at the user side to a service VLAN at the network side, with a MAC learning process. In the downstream direction, the frames are forwarded based on the MAC address, with a check on the correctness of the VLAN id/MAC address usage.

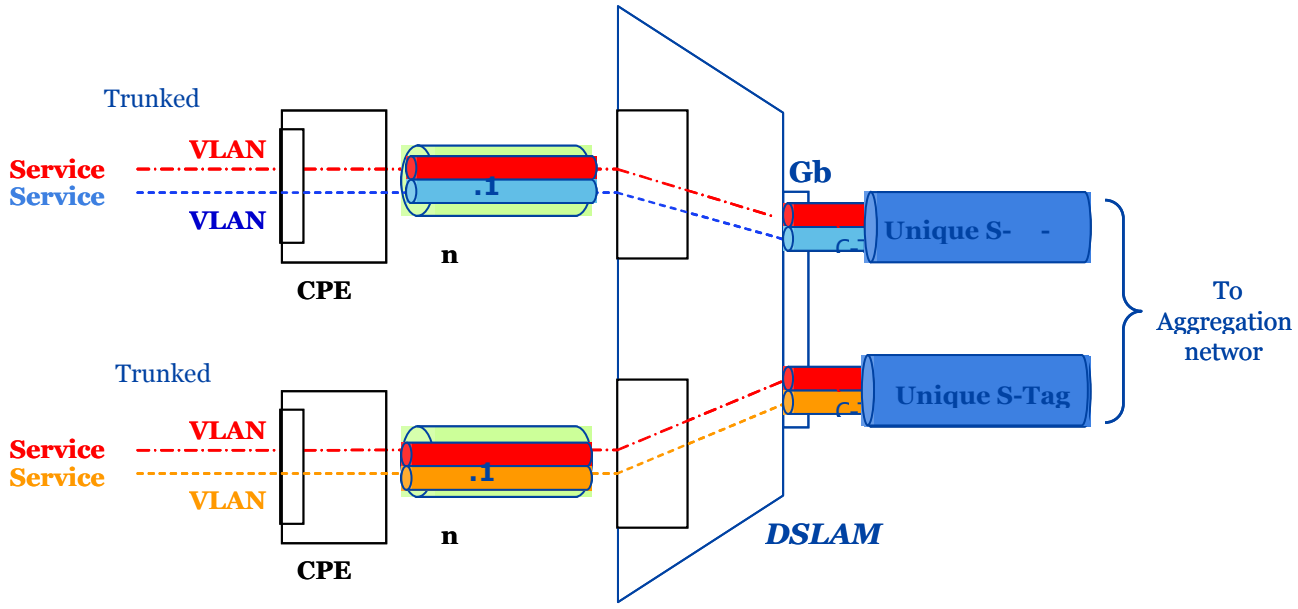
Each subscriber VLAN/Service on UNI is mapped to the Service VLAN(s) of the respective OLO at the uplink of the IP-DSLAM with VLAN Translation.

7.4.2 Dedicated VLAN

The forwarding mode for VDSL2 with dedicated VLAN can be considered as a (S-VLAN) XC model. In S-VLAN cross-connect mode, two levels of VLAN tags are used:

- the customer VLAN: C-VLAN
- the service provider VLAN: S-VLAN

The forwarding is transparent for the C-VLANs, also for the Management VLAN of the SAGEM CPE. Access Node applies S-Tag per DSL port. S-Tag must be unique within the Access Node. All control traffic (DHCP, ARP, IGMP…) is handled in a transparent way.



Graph 9: Ethernet Forwarding Mechanisms on VDSL2 (dedicated VLANs)

7.5 VLAN ID ALLOCATION and Qos at UNI

The VLAN ID allocation differs in case of shared or dedicated VLANs.

7.5.1 Shared VLAN

On UNI it is possible to provision up to 4 VLAN IDs. Belgacom will use VLAN 20 for management and upgrade of the CPE.

Mapping Table:

p-bit	0	1	3	5
VLAN id =	10	50	40	21

Table 2: Mapping p-bit and VLAN id

This VLAN id scheme is identical for all OLOs.
No multicast Ethernet packets are allowed!

Upstream Marking: p-bit setting on vlan on bridge port
Policing: No policing in upstream in the IP-Dslam.

Downstream Scheduling:

Hierarchical scheduler:
- P=0: best effort.
- P=1: low priority.
- P=3: medium priority.
- P=5: highest priority.

7.5.2 Dedicated VLAN

Any VLAN at UNI (is C_VLAN id) is transparently enveloped by the S-tag and not configured neither visible in the Belgacom network[2].

Qos: The OLO shall associate 1 VLAN profile to every VDSL2 line.
Each OLO can negotiate 10 VLAN profiles with Belgacom.

One "VLAN profile" has following attributes:
- Layer 2 (p-bit) or Layer 3 Qos (precedence or DSCP); applicable for both upstream and downstream
- Maximum Upstream bandwidth per p-bit (bandwidth p0, bandwidth p1, bandwidth p3, bandwidth p5)
- Maximum Downstream bandwidth per p-bit (bandwidth p0, bandwidth p1, bandwidth p3, bandwidth p5)

The attributes of a VLAN profile are identical for all VDSL2 end-user lines using this profile.

The 4 qos classes applicable to an Ethernet packet are the same as for "Shared VLAN" service:
- P=0: best effort.
- P=1: low priority.
- P=3: medium priority.
- P=5: highest priority.

The upstream and downstream Ethernet flows are policed following the VLAN profiles.

The service offers primarily a layer 2 Qos, but in order to accommodate customer equipment that is not able to set p-bits, a one to one mapping between each p-bit value (0, 1, 3 & 5) and one corresponding Layer 3 "precedence or DSCP" value is established at agreement between the OLO and Belgacom about the "VLAN profile".
E.g.: Precedence bits "1" may be set as equivalent for p-bit 1. In this case, the bandwidth of "precedence 1" IP packets will be policed instead of the bandwidth of p-bit 1 Ethernet frames.

[2] Also applicable for the VLAN for the VDSL2 modem management (see Section ~~8~~11, "Modem~~Modem~~"). Therefore the OLO customer shall not use this VLAN.

In the case of a Layer 3 qos, all p-bits shall be set to 0 or shall be lower than the corresponding Layer 3 class. E.g In case of Layer 3 VLAN profiles, lowest priority Layer 3 packets shall not be Layer 2 tagged to p=5.

The VLAN profile is policing all Ethernet packets of the dedicated VLAN and cannot differentiate following eg C-tag.

It is the responsibility of the OLO to underbook, match or overbook the instantaneous available physical bandwidth on the VDSL2 line (upstream and downstream). It is recommended not to overbook higher Qos bandwidths (P5, P3, P1).

7.6 Line Identification

7.6.1 Dedicated VLAN

Not applicable; The ISAM is not adding Line ids to eventual PPP or DHCP frames. The VLAN-id@OAL+ OAL identity sufficiently define the identity of the line.

7.6.2 Shared VLAN

Line identification will be enabled for both PPPoE and IPoE (DHCP) on each service VLAN of the OLO.

IPoE:

For IPoE access, per service VLAN a layer 2 DHCP relay function is implemented on the DSLAM as described within DSL Forum TR-101. The DHCP packet format is specified in RFC 2131. The DHCP Relay Agent Information option (option 82) format is specified in RFC 3046.

In upstream, the access loop identification will be encoded within the “Agent Circuit ID” sub-option 1 of DHCP Option 82 during the DHCP session setup.

In downstream, the DSLAM will remove DHCP option 82.

PPPOE:

For PPPoE access, per service VLAN the PPPoE Intermediate Agent function is implemented on the DSLAM as described within DSL Forum TR-101.

In upstream, the access loop identification will be encoded within the “Agent Circuit ID” sub-option 1 of the PPPoE vendor specific tag in the discovery messages (PADI, PADR, PADT) of the PPPoE protocol.

Format agent circuit id for IPoE and PPPoE:
"<Access-Node-Identifier> eth <rack>/<shelf>/<slot>/<dsl-line>:<vlan>"

Example: H02NOR00001 eth 3/2/01/06:20

7.7 Security

7.7.1 Dedicated VLAN

No security measures are applied in the Belgacom network: the OLO is responsible for the security of its network (eg number of MAC addresses, MAC learning aspects, control frames, multi- and broadcast,...).

7.7.2 Shared VLAN

- No U2U communication
- Prevention of Broadcast storm:
  - Downstream:
    - broadcast frames are dropped
    - Ethernet frames with unknown destination MAC@ are dropped.
      Ageing timer bridge = 900s (=> application shall send a message upstream at startup and every x sec, x<900, in order to keep joinable from the network)
  - Upstream:
    - Rate limiting control plane (DHCP, IGMP, ARP...).
    - Discard control frames (STP, Pause frames...)
    - Multicast blocking
- Maximum number of MAC@ per DSL port=8
- MAC anti spoofing.

8 Technical specifications for the USE of distribution cable to provision WBA VDSL2

The use of the return pairs of the distribution cables, either in ring topology or not, to deliver a WBA VDSL2 service towards the end-user premises is submitted to the limitations regarding distribution cables defined in the Annex C "Technical Specifications" of BRUO, in the section ~~5~~ 6 "Common technical specifications for the equipment to be connected to the loop or subloop", sub-section 56.1. "VDSL2", as described in the addendum of 24/10/2007 "Addendum to BRUO Annex C Technical Specifications regarding VDSL2".

9 Technical specifications for the equipment to be connected ON a WBA VDSL2

To use WBA VDSL2, the OLO must respect the technical specifications regarding internal cabling defined in the Annex C "Technical Specifications" of BRUO, in the section 56 "Common technical specifications for the equipment to be connected to the loop or subloop", sub-section 56.1. "VDSL2", as described in the addendum of 24/10/2007 "Addendum to BRUO Annex C Technical Specifications regarding VDSL2".

10 NTP & Splitters

- The Network Termination Point (NTP) is the first termination point of a loop at the End User premises.
- The NTP required for WBA VDSL2 is the model TF2007, equipped with its specific full rate splitter.
- When correctly placed as first introduction point, the TF2007 and its specific full rate splitter are specially designed to respect the internal cabling rules mentioned in Section ~~6~~9, *"Technical specifications for the equipment to be connected ON a WBA VDSL2~~Technical specifications for the equipment to be connected ON a WBA VDSL2~~"*.
- This centralized splitter presents transmission characteristics specific to VDSL2, but is also suitable for ADSL and ADSL2+.
- The provider of the TF2007 and of its full rate Splitter is:
  M.T.C. BELGIUM , BVBA
  Leuvensesteenweg 257
  1910 Kampenhout
  Tel.: 32 16 60 09 67
  Fax: 32 16 60 96 16
- In multi-users buildings where a complete RJ45 structured cabling is available from a building distribution frame, the direct use of the RJ45 pluggable filter (VDSL2 compatible) is an alternative for the TF2007.

11 Modem

11.1 Possible modems

The modem used by the End User must be in conformity with the applicable standardization and must be interoperable with the Belgacom network. The Customer has two options:

- The Customer can use a standard modem (called Belgacom CPE), configured by SAGEM for the WBA VDSL2 service. This modem is supported on the Belgacom network and may be installed at End User side. The technical description of this solution is detailed in section 11.2.
- The Customer can use his own modem (called OLO CPE) that will operate in a similar manner as a standard Belgacom CPE. In this case, specific Roles and Responsibilities apply. They are described in Annex ~~9~~7: Roles & Responsibilities throughout the OLO CPE lifecycle.

11.2 Technical description of the Belgacom CPE

The modem configurated by SAGEM for the WBA VDSL2 service (Belgacom CPE) is based on the generic SAGEM F@st3464. All information on this product must be requested directly by the Customer to SAGEM.

11.2.1 Configuration for WBA offer with Shared VLANs

Belgacom has specified for this modem a firmware interoperable with its WBA VDSL2 service with shared VLANs. The specific settings for this modem are listed here below.

11.2.1.1 Specific configuration

- The CPE shows a GUI, which allows choice between 2 options:
  - Option 0: All 4 Ethernet ports of the CPE are routed to the High Speed Internet Access VLAN (VLAN 10).
  - Option 1: transparent L2 bridging for 4 Ethernet services with Layer 2 QOS.
- The VLAN 20 is used by Belgacom for remote management. This will allow Belgacom to upgrade the VDSL2 datapump of this specific SAGEM modem model.
- The TR-069 parameters are configured so that the TR-069 client of the CPE contacts the Belgacom TR-069 ACS server via the management VLAN (VLAN 20).

11.2.1.2 Firmware upgrades

VDSL2 technology is currently a work in progress. Since the VDSL2 datapump is expected to evolve after the product launch, Belgacom will possibly upgrade remotely the firmware of this specific SAGEM modem, after its installation at end-user site. Only the datapump part of the firmware will be modified.

The firmware upgrade will preserve the PPP settings of the SAGEM modem.

Until interoperability of the VDSL2 technology, the OLO may not modify the firmware of this modem.

11.2.2 Configuration for WBA offer with Dedicated VLANs

Belgacom has specified for this modem a firmware interoperable with its WBA VDSL2 service with dedicated VLANs. The specific settings for this modem are listed here below.

11.2.2.1 Specific configuration

The VDSL2 modem connects transparently the VLANs between the VDSL2 line and the customer CPE. The interface with the CPE is 100Mbps and is in trunked mode only (IEEE 802.1Q) (No native Ethernet).

11.2.2.2 Firmware upgrades

VDSL2 technology is currently a work in progress. Since the VDSL2 datapump is expected to evolve after the product launch, upgrade of the firmware of this specific VDSL2 modem, after its installation at end-user site, or remotely via VLAN 4090 is possible. Only the datapump part of the firmware will be modified.

Since all VLANs (also the management VLAN 4090 of the VDSL2 modem) are transparently transported to the OAL and further to the OLO network, Belgacom cannot perform this firmware upgrade.

Belgacom practice (for information):

- use VLAN 4090 (C-tag) for IP connectivity between VDSL2 modem and OLO network
- use static IP address (/23) on Sagem
- use TFTP for firmware upgrades on SAGEM CPE; no DHCP.
- Password protected

12 OLO Access line

The following bandwidths and protection modes are possible :

- 1 GE,
- 1+1 GE, capacity is 1Gig; 1 GE is working and 1GE is standby,
- 10Mbps or 100Mbps (only for Customer-sited OAL).

Ethernet aspects of 1GE port:

- MAC frame format for "shared VLAN": IEEE 802.1Q also called "Tagged format" (see figure 3-3 from 802.3 – 2005)

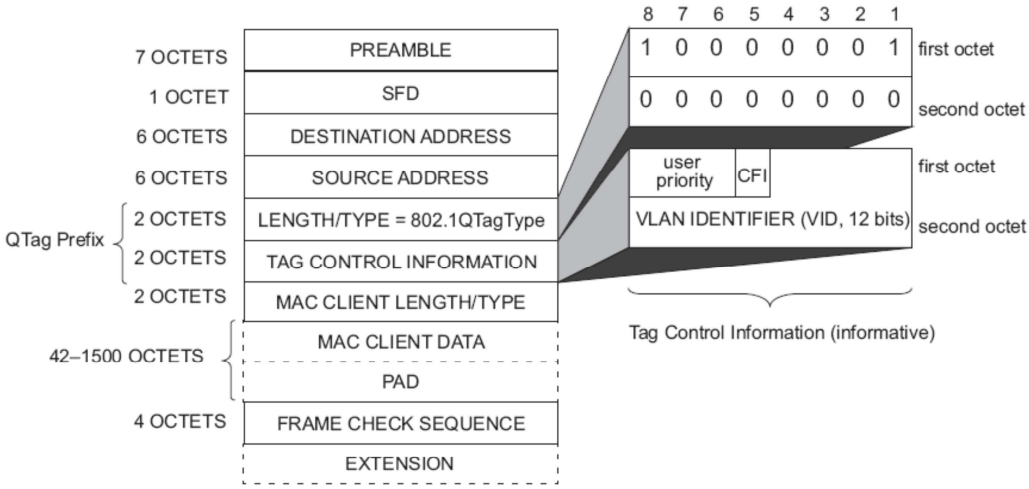
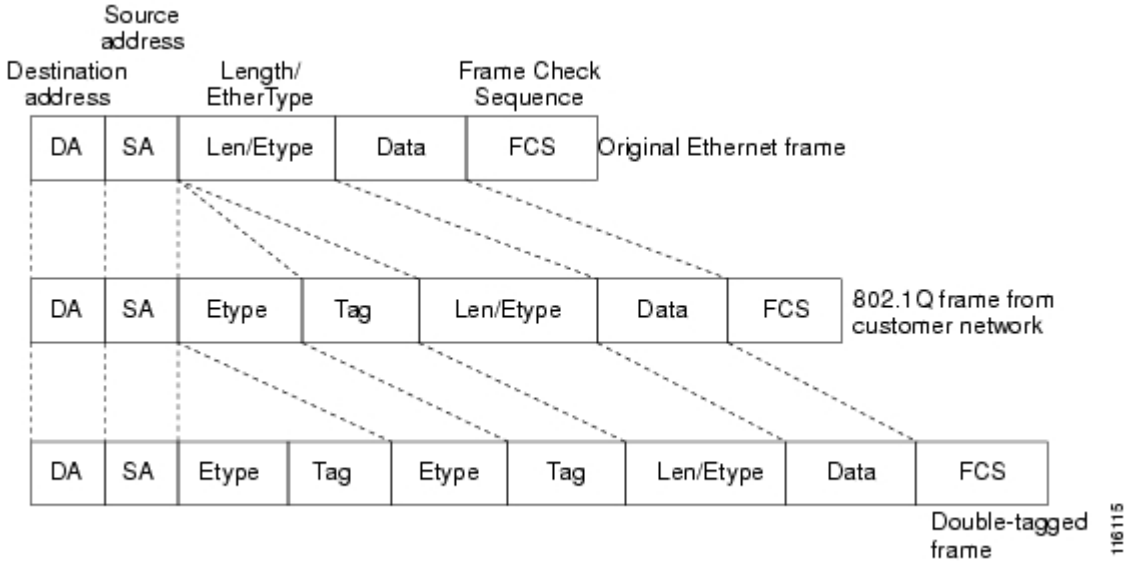


Figure 3–3—Tagged MAC frame format

Graph 10: Tagged MAC frame format

- MAC format for "Dedicated VLAN"

In case of dedicated VLAN, a S-Tag will be added to the C-tags on the VDSL2 line, following IEEE802.1ad ("Q in Q). The latter are transparently carried by the Belgacom core Ethernet network.



- The Physical connectivity for 1 GE is specified in (IEEE 802.3z) and for multiple GE's, bundled in LAG[3] , using LACP[4], as specified in (IEEE 802.3ad).
- MTU size: the maximum length of the Data – Field (is MAC CLIENT DATA + PAD field in Figure 3-3 from 803.3-2005) is 1500 octets. In case of PPPoE, the PPP header uses 8 octets from those 1500 octets.
- Duplex: full duplex (taking into account the asymmetric nature of the VDSL2 physical layer)
- Autonegotiation: **OFF**

12.1 Belgacom-Sited

Optical : GigE type LX ; wavelength 1310nm; Range 10Km

Connectivity:

In the colocation, the OLO can connect to an Optical Distribution frame.The standard optical connector at Belgacom will be **SC/APC 8°.**
It is available at Belgacom as 900µ pigtail which needs to be fusion spliced on the fiber. (4m of 900µ fiber , 2* SC/APC installed, meant to be cut in two and spliced on the fiber).

12.2 Customer-sited

[3] LAG = Link Aggregation (also 1 GE will be configured in LAG, in order to be able to add easily other GEs).
[4] LACP= Link Aggregation Control Protocol. (not activated for 1 single GE)

12.2.1 Gigabit Ethernet

Optical: GigE type LX; wavelength 1310nm; Range 10Km

Connectivity
The Optical Line Termination (e.g. FSP2000) will be installed by Belgacom in the Belgacom rack.
The OLO can connect, using male Optical SC/PC connectors (= default) or LC/PC connectors on customer request.

12.2.2 Ethernet (10Mbps) & Fast Ethernet (100Mbps)

Fibre connects the customer site with the BGC network.
A LTE will be installed by Belgacom in the Belgacom rack Customer Sited.

A circuit between following two points will be constructed for every 10M/100M OAL link:

- One port on the Service Router in the Service Pop of Area X or LEX (cfr above in this document about conditions for "Interconnection at LEX Level").
- One Ethernet or Fast Ethernet port in the Operator site. The securization option (double fibre access) is not included.

So every OAL is offered via a separate circuit, terminated at BGC site on one port on a Service Router and one Ethernet port in Operator site.

12.3 Backhaul

Optical: GigE type LX; wavelength 1310nm; Range 10Km

Connectivity

In the colocation, the OLO can connect to an Optical Distribution frame.The standard optical connector at Belgacom will be **SC/APC 8°.**
It is available at Belgacom as 900µ pigtail which needs to be fusion spliced on the fiber. (4m of 900µ fiber , 2* SC/APC installed, meant to be cut in two and spliced on the fiber).

~~12.3~~12.4 Interface of every port at Operator Site: RJ45 requiring CAT 5 twisted pair cabling.Testing the OAL

The testing of the OAL is in 3 phases:

- stand alone from Optical Modem to Optical Modem (only in case of Customer Sited)
- RFC 2544 test (only in case of Customer Sited)
- ping test between Belgacom access router to customer router: 1000 pings of 64bytes (may loose 2 pings) ; 1000 pings of 1500bytes (may loose 2 pings); (10exp -9 quality)

This last phase could be the equivalent of the ATM access Line tests, defined in the BROBA offer.

It could be implemented as follows:

1. Belgacom temporarily provides an IP address to the OLO for the tests (WBA VDSL2 does not offer IP connectivity => no IP addresses); The OLO implements it as loopback address on the OLO Router.
2. Make the ping test, described above and let the OLO do the same ping test from his side.
3. Exchange the results
4. The OLO deconfigures the IP address; it will be reused for other OLO tests (other OLOs and / or other OALs).

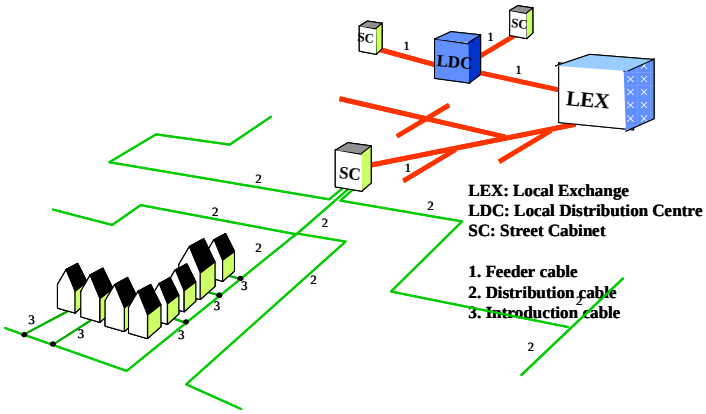
~~12.4~~12.5 VLAN id allocation on the OAL

Shared VLAN: For the WBA VDSL2, Belgacom allocates the VLAN id in the range 120 to 799.
Dedicated VLAN: S-tags 800 – 4095.
The Ethernet tests use VLANs 100 and 101 (at delivery AND in case of later problems).

13 Characteristics of Cabling - Transmission properties of the access network

13.1 Generalities

A subscriber loop consists of sections of twisted pairs cables of different gauges. All the sections are buried and connected together by means of electrical joints, called splices, directly placed in the ground or sometimes in a manhole.



In the ideal situation, the Access Network has a star configuration with the feeder cable bundles going from the main distribution frame to the street cabinet. From the street cabinet, via distribution cables and drop wires, the wire pairs are terminated at the NTP (Network Termination Point) in the individual customer sites. The reality shows that cable arrangements leads sometimes to a meshed structure in the feeding network.

Each telecom cable consists of a number of copper conductors grouped in quads; these quads can be arranged in bundles or in layers, depending on the type of cable.

13.2 Physical characteristics of the cables

A conductor can be isolated by a layer of paper (in the old generation cables) or synthetic material, usually polyethylene.

Most of the conductors have a 0.5 mm or 0.6 mm diameter; distant customers however needs to be connected via conductors of 0.8 and 1.0 mm; 2000 pairs cables going out of the central office are sometimes made of 0.4 mm conductors.

In paper insulated cables, the conductors are surrounded by a lead sheath, generally protected by armouring and polyethylene sheath.

In plastic insulated cables used in the distribution network, the conductors are surrounded by a polyethylene sheath.

In plastic insulated cables used in the feeding network, the conductors are surrounded by an aluminium screen, a polyethylene internal sheath, an armouring and a polyethylene external sheath.

The plastic cables are in the majority of the cases longitudinally waterproof.

13.3 Electrical characteristics of the cables

The table below gives some typical characteristics of the access network cables [figures given by the cable manufacturers or by measurements in the field]

Diameter	LR	KC	A800	A40.000	A150.000	A300.000
0.4 mm	275	55	2.0	7.5	11.5	14.5
0.5 mm	180	50-55	1.3	6	9	11
0.6 mm	123	38.5-46	1.0	4	6	8
0.8 mm	69	38.5	0.7	2.5	4	5.5

LR = Loop Resistance in ohm/km
KC = average Kilometric Capacity in nF/km (it depends on the type of cable)
A800 = Attenuation measured at 800 Hz in dB/km
A40.000 = Attenuation measured at 40.000 Hz in dB/km
A150.000 = Attenuation measured at 150.000 Hz in dB/km
A300.000 = Attenuation measured at 300.000 Hz in dB/km

NB: the attenuation values are conditional. The reader must note that these figures are given for cable. A loop is made of several pieces of cables and then additional attenuation and reflections due to the splices and the different cable gauges will occur.

The insulation resistance between the 'a' and 'b' wires of a pair (without terminal equipment) or between wire and earth is supposed to be at least 750 kohms.

◆◆◆◆◆◆ End of document ◆◆◆◆◆◆

Wholesale Broadband Access VDSL2

Annex ~~43~~: Planning & Operations

Created on: ~~13~~16 February 201~~220~~
~~December 2011~~

belgacom

together with

1 Table of contents

2 Introduction

1. This annex describes the Planning and Operations principles, related to the provisioning and repair of the Wholesale Broadband Access VDSL2 Service.

2. Both parties will use at any time their best efforts to ensure an adequate level of service provisioning both between the Parties and towards the End Users concerned.

3. In the event that difficulties or problems arise in respect of Planning and Operations, the Parties will perform all necessary co-operation and consultation with a view to developing appropriate and workable solutions.

4. All relevant technical documentation and order forms if any can be retrieved at the secured part of the website for this offer.

3 Acronyms

ACK	Acknowledged
BGC	Belgacom
CA	Certification Authority
CSD	Customer Support Desk
CWS	Carrier and Wholesale Services
DC	Data Connectivity
DES	Data Encryption Standard
FUT	Friendly User Testing
ISDN	Integrated Service Digital Network
LEX	Local Exchange
MDF	Main Distribution Frame
MIME	Multipurpose Internet Mail Extensions
NACK	Not Acknowledged
PSTN	Public Switched Telecommunications Network
P-Bit	Priority Bit
SOR	Statement Of Requirements
SPOC	Single Point Of Contact
VDSL2	Very High Speed Digital Subscriber Line 2
VLAN	Virtual Local Area Network. Unless specified otherwise, the word "VLAN" equally refers to a Shared or to a Dedicated VLAN.
WBA VDSL2	Unless specified otherwise, the word "WBA VDSL2" equally refers to the two types of service: with shared or with dedicated VLANs.

4 Exchange of information

5. This chapter includes some communication guidelines in order to ensure a good interchange of information and to define an effective communication channel that focuses on both improving the comprehension and execution of the processes.

4.1 Single Point Of contact

6. Both Parties will appoint a member of its staff as Single Point Of Contact for Wholesale Broadband Access VDSL2. This person, referred to as "SPOC", will be in charge of all matters regarding the day-to-day management of the performance of this offer. In particular, all firm orders must be submitted by registered mail to the SPOC of Belgacom, unless noticed otherwise.

4.2 Preliminary Exchange of Information for the initial setting up

7. Without prejudice to what is stated above, it is recommended that the Customer provides a Statement Of Requirements (SOR) to Belgacom as early as possible in any discussions between The Customer and Belgacom. The SOR is sent by registered mail to the SPOC of Belgacom. After the receipt of the SOR, Belgacom shall notify to the Customer its observations, if any, concerning the SOR. In particular, when appropriate, Belgacom may request additional information to complete the information contained in the SOR For more information on the SOR, reference is made to Appendix A of this document.

4.3 Implementation Committee

8. The Implementation Committee is a meeting between both parties to supervise, discuss and examine at a general level technical and operational application of this offer, in particular, the implementation of the respective obligations of the Parties, as described in this offer.

9. The Implementation Committee will meet at least on a quarterly basis. Each Party will be entitled to call additional meetings within reasonable notice, as may be necessary. Each Party will be represented at the Implementation Committee by its SPOC accompanied by any staff as deemed necessary by the relevant Party.

10. In addition to the Implementation Committee, the Parties will be allowed to request for the set-up of any other bilateral working group in charge of discussing and agreeing on any technical or operational issues, including more specialized members on the specific topic.

5 Ordering OLO Access Line

5.1 General

11. Before the Customer can submit an order for the activation of Wholesale Broadband Access VDSL2 on a specific End User line, an Ethernet OLO Access Line needs to be in service in the relevant Service Area.

12. Firm orders of OLO Access Line, between a BGC Service PoP and Customer's equipment, shall be done through the use of the specific templates provided in Appendix D of this document. Templates will be considered as valid only when they are properly completed. In case data is missing or is not correct, the template will be rejected. In the latter case, Belgacom will indicate the reasons of rejection on the template. All firm orders will be submitted by fax to the SPOC of Belgacom for Wholesale Broadband Access VDSL2.

13. Irrespective of the terms and conditions stated below, Belgacom reserves the right to reject orders if the volumes requested by the Customer are not in line with reasonable market demands. In the event of such a rejection, Belgacom will provide the Customer with the reasons for the rejection and the Parties will need to enter into a good faith discussion for finding a solution to deal with the difficulty that has arisen.

5.2 Ordering procedure

14. The Customer can order its OLO Access Line through a firm order. A firm order consists of the requested OLO Access Line, per type of service (Appendix D). Together with the firm order, the Customer includes the date when he wants the OLO Access Line to be ready.

15. Delays for the provisioning of these OLO Access lines take into account the fact that, when public infrastructure works have to be realized, several actions and several actors can extend the time needed for provisioning of the access lines. Examples of interventions can be:
    - Studies
    - Creation of implementation plan
    - Requests to Public Authorities for authorization to realize works on the Public Infrastructure (often 2 months or more)
    - Realization of the works

16. In the event that difficulties or problems arise in this respect, the Parties will use all necessary co-operation and consultation with a view to developing appropriate and workable solutions subject to agreement between the Parties.

17. The Customer is notified that in very exceptional situations, significant delays may be experienced :
    - In case of periods of large demands that could not be foreseen,
    - In an emergency situation (i.e., exceptional cases of *force majeure*),
    - In situations of lightning and any other natural disasters that causes damage to the Belgacom network.

18. When the installation of the OLO Access Line is complete, Belgacom will confirm it to the Customer.

6 Ordering Bandwidth for shared VLANs

6.1 Bandwidth Allocation

6.1.1 General

19. The Customer will order bandwidth between each LEX in which the Customer wants to connect End Users and the Belgacom Service PoP to which the Customer is connected. Belgacom does the set-up and the configuration of the shared VLAN's, between the LEX's from which the End Users depend and the Customer equipment, on behalf of the Customer.

20. Firm orders of bandwidth per LEX shall be done through the use of an XML order as described in the WBA VDSL2 XML content description documents available on the Customer's personal page on the CWS secured site. Orders will be considered as valid only when they are properly completed. In case data is missing or is not correct, the order will be rejected. In the latter case, Belgacom will indicate the reasons of rejection on the reject. Orders are sent via the secured electronic messaging system. For more detailed information on the ordering process via XML, reference is made to the Belgacom Wholesale secured website – Regulatory information – WBA - Information on ordering, and to the corresponding WBA VDSL2 XML content description documents. There is one request per XML order. XML with encrypted XML files is the standard procedure.

21. Irrespective of the terms and conditions stated below, Belgacom reserves the right to reject orders if the volumes requested by the Customer are not in line with reasonable market demands, i.e. in case of massive and unexpected orders of a Customer that would paralyze the Belgacom ordering system. In the event of such a rejection, Belgacom will provide the Customer with the reasons for the rejection and the Parties will need to enter into a good faith discussion for finding a solution to deal with the difficulty that has arisen.

6.1.2 Prerequisites

22. An OLO Access Line with sufficient available capacity has to be implemented between a Belgacom Service PoP and the Customer equipment.

6.1.3 Ordering procedure

23. The Customer can order a shared VLAN through a firm order. A firm order consists of the requested shared VLAN with its associated parameters (bandwidth, Service, Service PoP, OAL, ...).

24. The Customer is notified that in very exceptional situations, significant delays may be experienced:
    - In case of periods of large demands that could not be foreseen,
    - In an emergency situation (i.e., exceptional cases of *"Force Majeure"*).

25. When the Customer sends an order to activate the Wholesale Broadband Access VDSL2 on an End User line, Belgacom will provide the Customer with all the necessary information in order to

configure the related VLAN at the Customer's side of the network, when the done XML is sent back to the OLO.

26. The Customer is requested to deliver Belgacom with a technical Customer contact for the synchronization in setting up shared VLAN's.

6.2 Capacity Change

6.2.1 General

27. The Customer can request, within the limits of the shared VLAN specifications mentioned in this offer (Allowed shared VLAN Bandwidth in function of the Service),
    - For an upgrade of the Bandwidth of each shared VLAN he ordered between specific LEX and the Service PoP to which he is connected
    - For a downgrade of the Bandwidth of each shared VLAN he ordered between specific LEX and the Service PoP to which he is connected

28. Firm orders of bandwidth modification shall be done through the use of an XML order as described in the WBA VDSL2 XML content description document available on the Customer's personal page on the CWS secured site. Orders will be considered as valid only when they are properly completed. In case data is missing or is not correct, the order will be rejected. In the latter case, Belgacom will indicate the reasons of rejection on the reject. Orders are sent via the secured electronic messaging system. For more detailed information on the ordering process via XML, reference is made to the Belgacom Wholesale secured website – Regulatory information – WBA - Information on ordering, and to the corresponding WBA VDSL2 XML Content Description document. There is one request per XML order.

29. Belgacom reserves the right to reject orders if the volumes requested by the Customer are not in line with reasonable market demands, i.e. in case of massive and unexpected orders of a Customer that would paralyze the Belgacom ordering system. In the event of such a rejection, Belgacom will provide the Customer with the reasons for the rejection and the Parties will need to enter into a good faith discussion for finding a solution to deal with the difficulty that has arisen.

6.2.2 Prerequisites

30. The order is relative to an existing shared VLAN and must contain its correct identification (cfr all information specified in the WBA VDSL2 XML content description document for shared VLAN ordering).

6.2.3 Ordering procedure

31. The Customer can ask to modify the existing parameters of its shared VLAN's through a firm XML order. A firm order consists of the requested shared VLAN's parameters per LEX, per shared VLAN.

32. The Customer is notified that in very exceptional situations, significant delays may be experienced:
    - In case of periods of large demands that could not be foreseen,
    - In an emergency situation (i.e., exceptional cases of *force majeure*).

33. When a shared VLAN is modified by Belgacom, the Customer will be provided with all the necessary information in order to configure the related shared VLAN at his side of the network.

6.3 Capacity Cancellation

6.3.1 General

34. The Customer can request the cancellation of an existing shared VLAN.

35. Firm orders of bandwidth cancellation shall be done through the use of an XML order as described in the WBA VDSL2 XML content description document available on the CWS secured site. Orders will be considered as valid only when they are properly completed. In case data is missing or is not correct, the order will be rejected. In the latter case, Belgacom will indicate the reasons of rejection on the reject. Orders are sent via the secured electronic messaging system. For more detailed information on the ordering process via XML, reference is made to the Belgacom Wholesale secured website – Regulatory information – WBA - Information on ordering, and to the corresponding WBA VDSL2 XML content description document. There is one request per XML order.

36. Belgacom reserves the right to reject orders if the volumes requested by the Customer are not in line with reasonable market demands, i.e. in case of massive and unexpected orders of a Customer that would paralyze the Belgacom ordering system. In the event of such a rejection, Belgacom will provide the Customer with the reasons for the rejection and the Parties will need to enter into a good faith discussion for finding a solution to deal with the difficulty that has arisen.

6.3.2 Prerequisites

37. The order is relative to an existing shared VLAN and must contain its correct identification.

38. A customer may only cancel a shared VLAN in a specific LEX once the service quality of this shared VLAN is not offered anymore on any End User of this Customer in this LEX.

6.3.3 Ordering procedure

39. The Customer can ask the cancellation of its shared VLAN through a firm XML order. A firm order consists of the requested shared VLAN's parameters per LEX.

40. The Customer is notified that in very exceptional situations, significant delays may be experienced:

- In case of periods of large demands that could not be foreseen,
- In an emergency situation (i.e. exceptional cases of *force majeure*).

7 Ordering Bandwidth for dedicated VLANs

7.1 General

41. There is no pre-provisioning of the dedicated VLANs. The creation of each dedicated VLAN is included in the process of provisioning a WBA VDSL2 end-user line with dedicated VLAN.

42. Belgacom configures each dedicated VLAN at the moment of the implementation of the corresponding end-user line, following specifications of the dedicated VLAN profile given by the Customer in the VDSL2 line ordering.

43. The Customer is responsible for the choice and definition of each dedicated VLAN profile.

44. For any demand of new dedicated Vlan profiles, the Customer must specify to Belgacom the number of profiles (in line with rules on number of profiles defined in WBA VDSL2 Main Body §27) needed and their attributes:
    - Layer 2 (p-bit) or Layer 3 Qos (precedence, DSCP),
    - Maximum Upstream bandwidth per P-bit/precedence, DSCP,
    - Maximum Downstream bandwidth per P-bit/precedence, DSCP.

45. Belgacom will provide for approval to The Customer the monthly recurrent fees corresponding to the requested dedicated Vlan profiles, in function of the applicable tariffs for Ethernet transport with dedicated Vlan's.

46. Conditional to the availability of sufficient resources for IT implementation, the creation of additional profiles in the Belgacom systems is expected to be possible 4 months after approval of the tariffs by The Customer, in the subsequent Belgacom IT release at the earliest, or in any subsequent release. In any event these delays do not contain a commitment of Belgacom. Same timing are applicable for own and common profiles.

7.2 Modification of dedicated VLAN profile

~~42.~~47. The Customer can request a change of the dedicated VLAN profile of a specific WBA VDSL2 with dedicated VLAN line.

~~43.~~48. Firm orders of dedicated VLAN profile modification shall be done through the use of an XML order as described in the WBA VDSL2 XML content description document available on the Customer's personal page on the CWS secured site. Orders will be considered as valid only when they are properly completed. In case data is missing or is not correct, the order will be rejected. In the latter case, Belgacom will indicate the reasons of rejection on the reject. Orders are sent via the secured electronic messaging system. For more detailed information on the ordering process via XML, reference is made to the Belgacom Wholesale secured website – Regulatory information – WBA - Information on ordering, and to the corresponding WBA VDSL2 XML Content Description document. There is one request per XML order.

~~44.~~49. Belgacom reserves the right to reject orders if the volumes requested by the Customer are not in line with reasonable market demands. In the event of such a rejection, Belgacom will provide the Customer with the reasons for the rejection and the Parties will need to enter into a good faith discussion for finding a solution to deal with the difficulty that has arisen.

~~45.~~50. Prerequisite: the order is relative to an existing WBA VDSL2 with dedicated VLAN line and must contain its correct identification (cfr all information specified in the WBA VDSL2 XML content description document).

~~46.~~51. The Customer is notified that in very exceptional situations, the theoretic delays may be escalated:

- In case of periods of large demands at once that could not be foreseen,
- In an emergency situation (i.e., exceptional cases of *force majeure*).

~~47.~~52. When a dedicated VLAN profile is modified by Belgacom, the Customer will be provided with all the necessary information in order to configure the related dedicated VLAN at his side of the network.

8 Feasibility Check

~~48.~~53. Prior to the request for activation of an individual End User line, the Customer can obtain through the Feasibility Check Tool the confirmation whether the requested service described in this offer is available for this individual End User line, based on the end-user dial number, its address or its circuit ID.

Specific remark on the use of the circuit ID: whenever there is a modification on the installation of a line, the circuit id identifying the line could change. The WBA VDSL 2 XML Content Description, available on the Customer's personal page on the CWS secured site, summarises the cases where the circuit id change or remain unchanged.

~~49.~~54. The Feasibility Check tool is available on the Customer's personal page on the CWS secured site and is accessible through a login and password. Multiple login's are possible. The Feasibility Check tool is fully separated from the ordering process: the result of the check does not deliver any option to order the activation of Wholesale Broadband Access VDSL2 on an End User line.

~~50.~~55. The Feasibility Check Tool can be accessed by the Customer either through web Interface or through a dedicated XML.

9 Ordering Wholesale Broadband Access VDSL2 on a specific End User line

9.1 Introduction

56. The Ordering process of a specific WBA VDSL2 End User line covers the activities of The Customer and of Belgacom, between the submission of an Order to Belgacom by The Customer until validation or rejection of this Order to The Customer by Belgacom.

~~9.1~~9.2 General

~~51.~~57. A commercial contract is signed between an End User and the Customer.

~~52.~~58. The Customer introduces a WBA VDSL2 request to Belgacom, with the following mandatory information:

- The Customer requested date of activation;
- For line with voice, Directory Number and address are mandatory. For line without voice, address is mandatory. Currently, CID is optional in all cases.
- The name, address and contact person phone number during office hours, of the End User.
- For a WBA VDSL2 line with shared VLAN: the service quality(ies) requested on the line.
- For a WBA VDSL2 line with dedicated VLAN: the dedicated VLAN profile requested for the line.
- The option "certified technician", for a line without voice, if T~~t~~he ~~Beneficiary~~ Customer has decided to realize the installation with a certified technician.

~~53.~~59. *Only for a WBA VDSL2 line with shared VLAN:* at the moment the Customer requests the activation of WBA VDSL2 on an End User line, Belgacom verifies the existence on the LEX where this End User line is connected of the VLAN necessary to transport the VDSL2 traffic of this End User between the LEX from which this End User depends and the Customer equipment and reversely. When the existence of the necessary VLAN has been confirmed, Belgacom start the configuration of the individual line of the End User on IP-DSLAM level.

~~54.~~60. In order to activate on an End User line, Belgacom will perform, for each request, some checks, and a.o.:

- Technical spectral check of the system at the time of request for activation;
- Pair gain system check;
- Spectral saturation of cable;
- Availability of direct pairs to connect the End User
- Distance and Attenuation between the ROP and the End User premises

On the basis of these checks, the order will be rejected and/or accepted. The list of reject codes is available in the WBA VDSL2 XML Content Description, posted on T~~t~~he Customer Personal Page on the Belgacom Wholesale~~CWS~~ secured website.

~~If the order is accepted, the Customer order intake will be performed, by a Belgacom technician, or when relevant by a certified technician, including:~~

- ~~The performance of the necessary preparatory works in the LEX, LDC or KVD for connecting an individual End User line to the IP-DSLAM or the Remote Optical Platform.~~
- ~~The realization of the necessary documentation to track that the End User line carries VDSL2 technology of the Customer.~~

61. If the order is accepted, and after design, configuration and planning of the installation by Belgacom, Belgacom will confirm the order to The Customer and communicate him the installation date through "VALIDATE" XML.

~~9.2~~9.3 Ordering via the Open Calendar Interface

~~55.~~62. The ordering process can be decomposed into 2 phases:

Phase 1: Negotiation phase
Negotiation is only possible by use of the Open Calendar interface. It allows T~~t~~he Customer~~Beneficiary~~ to introduce all parameters for the requested ordered product to

- get an overview of the work orders needed to provision the line
- get the available time slot
- indicate whether the installation is to be executed by a Certified Technician or not
- select the suitable timeslot according to the requirement of the end user and start the ordering process.

The ~~Beneficiary~~ Customer does not need to send an additional order via the classical XML way (No BGCIN).The order is automatically generated in the Belgacom ordering systems by the Open Calendar interface.

Phase 2: Order confirmation
This phase starts by the sending by Belgacom of a validate XML message via the classical xml way ("validate" or "reject" xml). This XML contains the final confirmation of the information exchanged via the Open Calendar interface. If the information exchanged during phase 1 should be modified, this is notified to the OLO by this "Validate" or "Reject" XML.

~~56.~~63. The follow-up of the order is performed by use of the Hold, Cancel, Amend, Reject and Done messages exchanged via the classical XML interface as described in the chapter Ordering via XML. Amend messages may also be performed via the Open Calendar interface, exclusively for orders introduced through the Open Calendar interface.

~~57.~~64. Reference is also made to the Belgacom Wholesale secured website – Regulatory information – WBA - Information on ordering, for more detailed information on the ordering process via the Open Calendar interface in the following documents:

- Process documentation on Open Calendar interface
- Technical documentation on Open Calendar interface

~~9.3~~9.4 Ordering via xml

~~9.3.1~~9.4.1 Generals

~~58.~~65. All exchange of information between Belgacom and the ~~Beneficiary~~ Customer will be done through an electronic system.

~~59.~~66. Orders can be placed through the use of an electronic ordering system via xml directly or through the use of the Open Calendar interface as described above.

~~60.~~67. Reference is also made to the Belgacom Wholesale secured website – Regulatory information – WBA - Information on ordering, for more detailed information on the ordering process via XML.

~~61.~~68. The communication process between ~~Beneficiary~~ Customer and Belgacom is based on SMTP Mail for the transfer, an ACK/NACK protocol and a message file in attachment with a predefined format.

~~62.~~69. The messages that are exchanged between the ~~Beneficiary~~ Customer and Belgacom are encrypted and signed by the sender. Each message contains one order form in attachment that is coded in XML. Technical Info and the order forms for XML ordering are included on the secured website.

~~63.~~70. The ~~Beneficiary~~ Customer prepares the file in the predefined XML format, signs it, encrypts it, attaches it to a mail and sends it to the mailbox of Belgacom. The e-mail address for Wholesale Broadband Access VDSL2 is WBS@belgacom.be.

~~64.~~71. In the framework of WBA with voice an existing end-to-end PSTN or ISDN line with Belgacom is a prerequisite.

~~9.3.2~~9.4.2 Definitions

~~9.3.2.1~~9.4.2.1 Type of Messages

- Acknowledge Message
- Order Message: message to initiate the creation of a new order
- Action Message: message to ask for a precise action on an existing order
- Answer Message: message sent to give an answer to an Order Message or Action Message
- Information Message: message sent to communicate the result of the Test de Bonne Fin

All possible messages are explained below and described in detail (on xml level) in the WBA VDSL2 XML Content Description Manual, which can be found on the Belgacom secured website - Regulatory Information – WBA – Documentation on ordering.

~~9.3.2.2~~9.4.2.2 Acknowledge Messages

~~65.~~72. For any message exchanged between Belgacom and The Customer, an acknowledge message (ACK/NACK) is sent to confirm

- The message has been received
- The message has been decrypted
- The signature has been successfully validated.

~~66.~~73. NACK is sent if decryption or signature check does fail. NACK will contain the reason of rejection.

67.74. If no ACK nor NACK message is received by the sender, the sender is supposed to send again the message. The order is not further processed by Belgacom.

68.75. If an ACK is received by the Customer, this does not automatically mean that the order will be provisioned. The order could still be rejected.

9.3.2.39.4.2.3 Order Messages

69.76. An Order can be:

INITIATED BY THE CUSTOMER

- PROVIDE NEW : the activation of a complete new Wholesale Broadband Access VDSL2 service
- CEASE : the deactivation of a Wholesale Broadband Access VDSL2 service
- CONVERT – cease part and provide part : conversion of his own existing Wholesale Broadband Access VDSL2 product or another type of product towards a (another) Wholesale Broadband Access VDSL2 product
- PROVIDE CHANGE OWNER : transfer of ownership of an existing xDSL belonging to another Customer (Belgacom end-user customer included) with or without conversion of the existing product
- CHANGE : Modification of the existing Wholesale Broadband Access VDSL2 product (with shared VLAN: add/delete Service; with dedicated VLAN: modify VLAN profile)

INITIATED BY BELGACOM DUE TO AN ACTION OF ANOTHER CUSTOMER OR FROM THE END-USER CUSTOMER ON HIS VOICE SERVICE

- CEASE CHANGE OWNER : launched as a consequence of a validated PROVIDE CHANGE OWNER of another Customer, or an action started by the end-user-customer of Belgacom
- MOVE – cease part and provide part : launched as a consequence of a MOVE of the voice of the end-user-customer; the Wholesale Broadband Access VDSL2 product will be moved along if technical possible.
- CONVERT – cease part and provide part : launched as a consequence of
  - Change of technology of the voice of the end-user-customer from PSTN to ISDN and vice versa
  - A cease or an export of the voice; the Wholesale Broadband Access VDSL2 with voice will be converted into a Wholesale Broadband Access VDSL2 without voice
  - A new connection or an import of the voice; the Wholesale Broadband Access VDSL2 without voice will be converted into Wholesale Broadband Access VDSL2 with voice

- CEASE (for technical reasons) : launched as a consequence of an action on the voice part - e.g. move/conversion of the voice – while the Wholesale Broadband Access VDSL2 product can not be re-established in the new situation due to technical reasons

~~9.3.2.4~~9.4.2.4 Action Messages

~~70.~~77. An Action Message can be:

INITIATED BY THE CUSTOMER

- AMEND: this message can be sent by the Customer to change the Due Date of an existing order
- CANCEL: this message can be sent by The Customer to cancel an existing order.

INITIATED BY BELGACOM

- HOLD: this message can be sent by Belgacom to inform The Customer that Belgacom will not perform the service at Due Date. due to technical reasons; due to absence of the end-user-customer; a new Due Date is communicated to The Customer in this message

~~71.~~78. These action messages apply only on pending orders sent by the Customer to Belgacom.

~~9.3.2.5~~9.4.2.5 Answer Messages

~~72.~~79. An Answer Message can be:

- REJECT: after the ACK was sent by Belgacom for a certain message, this message may however show some problems that will prevent Belgacom to treat the request correctly:
    - The message contents (file attachment) does not respect predefined format
    - The message does not contain predefined values
    - The message does not respect precedence rules
    - The message refers to a non existing order
    - The new order does not pass through administrative validations: pending order, unknown or non activated Directory Number, non PSTN/ISDN-BA installation, bad payer, …
    - The new order does not pass through technical validations: no pair available, distribution pairs absent, …

  The rejection message contains at least one, if possible more, rejection codes to inform the Customer of all reasons for rejection so that sender can send again the message and minimise the retry cycle. If rejected, the order does not exist anymore. If The Customer wants to retry, he will have to issue again the same demand, but through a new order.

  The list of pending orders which cause a reject is available and documented on the Belgacom secured Personal Page website.

- VALIDATE: this message confirms that the order will be executed on the given due date; Belgacom will provide the Customer with the following information: the circuit-id, if a SNA is needed, the due-date or a due date + an appointment date for the provisioning, the line profile and the Service Line identification.

- DONE: this message confirms the execution of the order, the field intervention for service activation is completed.

- FAIL: this message is sent when it is not possible for Belgacom to succeed in providing the service with existing infrastructure; the order has not been executed. The message contains the appropriate codes to inform The Customer about the reason(s) for failing. After this message the order is considered as not existent and is removed out of the ordering system.

- CANCELLED – AMENDED: those messages confirm the action messages, CANCEL and AMEND

~~9.3.2.6~~9.4.2.6 Information Messages

~~73.~~80. An Information Message is sent to the Customer to communicate the result of the Test de Bonne Fin. Belgacom will send this message to inform the OLO of the line profile set on a VDSL2 line as a result of a remote line test done by Belgacom on this line. The message contains the trigger of the Test de Bonne Fin, the type of the Test de Bonne Fin, the old line profile and the new line profile.

~~9.3.3~~9.4.3 Small Network Adaptations (detected during the order validation)

~~74.~~81. The Customer~~Beneficiary~~ has the possibility to indicate 'SNA not allowed' when ordering. If 'SNA not allowed' is flagged when ordering, Belgacom will send a reject of the order should the need for a SNA be established at any point in the ordering (or provisioning) phase.

~~75.~~82. In case the order is not flagged 'SNA not allowed', and that a Small Network Adaptation need is detected during the order validation, ~~the process is as follows:~~

- ~~If a Small Network Adaptation need is detected during the order validation,~~

  Belgacom will notify this into the XML VALIDATE message by communication in the remark type SmallNetworkAdaptations the word "NEEDED".

- ~~If a SNA need is detected during provisioning,~~

  ~~Belgacom will create a HOLD message where a new appointment date will be proposed and with in the remark type SmallNetworkAdaptations the word "NEEDED".~~

T~~In both cases, t~~he Customer can then contact its End User for further negotiations.

The Customer will be enabled till the day before the Due Date (DD-1) to cancel its request. If there is no cancellation, the SNA will be considered as accepted by the Customer and realized as such.

10 Provisioning of a Wholesale Broadband Access VDSL2 on a specific End User line

10.1 Introduction

83. The Provisioning process of a specific WBA VDSL2 End User line covers the activities of Belgacom, between notification of the validation of an Order by Belgacom to The Customer until the moment the Order completion has been communicated by Belgacom to The Customer.

10.2 General

84. After validation of an order by Belgacom ("Validate" message), the field interventions will be performed by a Belgacom Technician or, when allowed and requested via the Open Calendar interface, by a Certified Technician, including:
    - The performance of the necessary preparatory works in the LEX, LDC or KVD for connecting an individual End User line to the IP-DSLAM or the Remote Optical Platform.
    - The installation at End-User location,
    - The testing of the End-User line.

    Belgacom will perform the remote intervention tasks, including:
    - The realization of the necessary documentation to track that the end-user line of the Customer carries VDSL2 technology,
    - The remote configuration of the End-User line,
    - After order completion, once all remote and fields activities have been performed, the sending of a delivery message ("Done" message) to The Customer.

10.3 End-User Appointment fixing and rebooking

85. In case a visit at End-User premises is needed for installation of the WBA VDSL2 End-User line and in order to reduce the absence of the End-Users, Belgacom will contact directly the End-User to ensure that the appointment date fits him well. In case the appointment date does not fit the End-User, Belgacom gives him the opportunity to reschedule it at his best convenience. Belgacom will contact the End-User according to following timing:

    - Belgacom calls the End-User 2 days before appointment date,
    - Belgacom calls the End-User approximately 30 min before intervention,
    - Belgacom calls the End-User after the appointment, if the End-User was absent when the technician wanted to intervene.

The procedure used by Belgacom in these cases, and the information sent by Belgacom to The Customer, in function of the different possible situations, is available on the Customer Personal Page on the Belgacom Wholesale secured website.

10.4 Small Network Adaptations (detected during the order provisioning)

86. The Customer has the possibility to indicate 'SNA not allowed' when ordering. If 'SNA not allowed' is flagged when ordering, Belgacom will send a reject of the order should the need for a SNA be established at any point in the (ordering or) provisioning phase.

87. In case the order is not flagged 'SNA not allowed', and that a SNA need is detected during provisioning, Belgacom will create a HOLD message where a new appointment date will be proposed and with in the remark type SmallNetworkAdaptations the word "NEEDED".

    The Customer can then contact its End User for further negotiations.

    The Customer will be enabled till the day before the Due Date (DD-1) to cancel its request. If there is no cancellation, the SNA will be considered as accepted by the Customer and realized as such.

~~9.4~~10.5 Rush provisioning

88. Rush Provisioning is the delivery of the implementation of a new line in minimum 3 working days and maximum 5 working days (subject to the conditions of the point below).

~~76.~~89. The rush provisioning is subject to all conditions of regular provisioning, including the presence of the required connectivity to the Belgacom network before ordering. An order is considered as a Rush Provisioning Service when T~~t~~he ~~Beneficiary~~ Customer asks this explicitly to Belgacom.

90. Rush Provisioning will be always during working hours.

~~77.~~91. Rush Provisioning is offered as a service when resources can be found to perform the necessary tasks. In case Belgacom cannot perform the works in the delay requested, Belgacom will continue the provisioning as a default order. Belgacom will inform in that case T~~t~~he ~~Beneficiary~~Customer.

~~78.~~92. Any delay for a Rush Provisioning Process put in place by Belgacom, for instance absence of User on the Customer Requested date, will entitle Belgacom to charge ~~the~~ The ~~Beneficiary~~ Customer with 50% of the Rush Provisioning Fee. In any case the process will continue and a new Customer requested Date will be settled following default procedures (Hold & Change Date).

~~79.~~93. The standard order will be submitted by XML, possibly by the means of the Open Calendar interface. The ~~Beneficiary~~ Customer will in a first phase call (phone) Belgacom to prioritize this order and confirm by e-mail to Car_LLU. The ~~Beneficiary~~ Customer is requested to specify the exact date requested for the provisioning: the Service Required Date (SRD). If the rush order has been accepted, Belgacom will provide T~~t~~he ~~Beneficiary~~ Customer with the committed RFS date and the data service identifier (Circuit ID), by using the default validation service through XML.

    Specific remark on the use of the circuit ID: whenever there is a modification on the installation of a line, the circuit id identifying the line could change. The WBA VDSL 2 XML Content Description, available on

the Customer's personal page on the CWS secured site, summarises the cases where the circuit id change or remain unchanged.

~~80.~~94. Per line for which rush provisioning is requested, the installation fee is doubled.

~~9.5~~10.6 Escalations

~~81.~~95. An escalation can be requested in case of Belgacom Fault (e.g. Missed Appointment).

96. The ~~Beneficiary~~ Customer will in a first phase call (phone) Belgacom to prioritize the order and confirm by e-mail to ~~Car_LLU~~llu.car@belgacom.be. Belgacom will verify this request, and handle it in a manual escalation mode if the request for escalation is justified.

97. An escalation order has no additional cost.

98. All information on escalations can be found in the WBA Annex "Basic SLA".

11 Ordering and Provisioning Process flows

99. The Process Flows describing the Ordering and Provisioning Business Process of the Wholesale Broadband Access VDSL2 at level 1, 2 and 3 can be found on the OLO Personal Page of the Belgacom Wholesale website. In case of conflict between the Process Flows and the Wholesale Broadband Access VDSL2 Services Offer, the Offer prevails.

100. The following table summarizes the parts of the Ordering and Provisioning Business Process described in these flows, and their level of description:

Process Flows	**Level of description**	**Level of ordering or provisioning**
I. Provide new	Level 1	End-User, Shared Vlan , Dedicated Vlan profiles and OLO Access Line
Order Intake at OLO	Level 2 & 3	End-User, Shared Vlan , Dedicated Vlan profiles and OLO Access Line
Order Consistency Check	Level 2 & 3	End-User, Shared Vlan and OLO Access Line
Order Intake at Belgacom	Level 2 & 3	End-User, Shared Vlan , Dedicated Vlan profiles and OLO Access Line
Design	Level 2 & 3	End-User, Shared Vlan , Dedicated Vlan profiles and OLO Access Line
PEC	Level 3	End-User
Configuration	Level 2 & 3	End-User, Shared Vlan, Dedicated Vlan profile and OLO Access Line
Plan Installation	Level 2 & 3	End-User and OLO Access Line
Site Survey	Level 3	OLO Access Line
End-User Installation	Level 2 & 3	End-User
SNA	Level 3	End-User
OAL Installation	Level 2 & 3	OLO Access Line
II. Amend Due Date	Level 2 & 3	End-User
III. Auto-Convert	Level 1	End-User
Order Intake end-user & Consistency Check	Level 2 & 3	End-User
Order Handling	Level 2 & 3	End-User
Design & De-Design	Level 2 & 3	End-User
Configuration	Level 2 & 3	End-User
Plan Installation	Level 2 & 3	End-User
Installation	Level 2 & 3	End-User
IV. Auto-Move	Level 1	End-User

Order Intake end-user & Consistency Check	Level 2 & 3	End-User
Order Intake at Belgacom	Level 2 & 3	End-User
Design & De-Design	Level 2 & 3	End-User
Configuration	Level 2 & 3	End-User
Plan Installation	Level 2 & 3	End-User
Installation	Level 2 & 3	End-User
V. Cancel	Level 1	End-User
Order Intake at OLO	Level 2 & 3	End-User
Order Consistency Check	Level 2 & 3	End-User
Order Intake at Belgacom	Level 2 & 3	End-User
VI. Cease	Level 1	End-User
Order Intake at OLO	Level 2 & 3	End-User
Order Consistency Check	Level 2 & 3	End-User
Order Intake at Belgacom	Level 2 & 3	End-User
De-Design	Level 2 & 3	End-User
De-Configuration	Level 2 & 3	End-User
Position to re-use	Level 2 & 3	End-User
VII. Change	Level 1	End-User
Order Intake at OLO	Level 2 & 3	End-User
Order Consistency Check	Level 2 & 3	End-User
Order Intake at Belgacom	Level 2 & 3	End-User
Configuration	Level 2 & 3	End-User
VIII. Provide Change Owner	Level 1	End-User
Order Intake at OLO	Level 2 & 3	End-User
Order Consistency Check	Level 2 & 3	End-User
Order Intake at Belgacom	Level 2 & 3	End-User
Design & De-Design	Level 2 & 3	End-User
De-Configuration & Configuration	Level 2 & 3	End-User
Plan Installation	Level 2 & 3	End-User
Position to re-use	Level 2 & 3	End-User
Installation	Level 2 & 3	End-User
IX. Escalation OLO	Level 3	End-User, Shared Vlan and OLO Access Line
X. Rush Provisioning	Level 3	End-User
XI. Provide Convert	Level 1	End-User
Order Intake at OLO	Level 2 & 3	End-User

Order Consistency Check	Level 2 & 3	End-User
Order Intake at Belgacom	Level 2 & 3	End-User
Design & De-Design	Level 2 & 3	End-User
De-Configuration & Configuration	Level 2 & 3	End-User
Plan Installation	Level 2 & 3	End-User
Position to re-use	Level 2 & 3	End-User
Installation	Level 2 & 3	End-User

~~10~~12 Forecasting of orders

~~1.~~97. Forecasting of orders shall be done by the procedure as described in Appendix B.

~~11~~13 Fault Reporting and Repair

~~2.~~98. This section describes the responsibilities of Belgacom and The Customer in fault reporting and repair.

~~11.1~~13.1 General Process

~~3.~~99. Repairs are carried out on the Network after the Customer has informed Belgacom provided the Customer has made the preliminary investigations and is confident that the problem is in Belgacom Network. The Customer is responsible for the repair of the Wholesale Broadband Access VDSL2 service for which he has the control and is responsible to filter all non-Belgacom related problems. The Customer, when reporting that there is a problem, has to give precise information about the nature of the problem. Belgacom will, when appropriate, confirm the existence of the problem.

~~4.~~100. Belgacom will be responsible for the repair of the PSTN/ISDN Belgacom Services offered to the End User.

~~5.~~101. If Belgacom becomes aware of a problem on the network, Belgacom automatically coordinates the necessary actions to resolve the problem according to the applicable arrangements.

Note: modification and interruptions

~~6.~~102. The maintenance and the development of the Network may require Belgacom to limit the WBA VDSL2 service or to suspend it temporarily. Belgacom undertakes to limit the duration of this period to the time that is required for the execution of the work and that duration will, in no way, be longer than the period that Belgacom would require if her own services needed to be suspended. In such cases, Belgacom will inform the Customer in due time at least 48 hours in advance, and communicate the estimated suspension time and the reason of suspension.

Repair for spectral issues reasons

~~7.~~103. If spectral issues occur within a cable as a consequence of the broadband services offered by alternative Operators or by Belgacom (for instance: interference of the Customer system with existing system in service in the cable bundle, connection of non-compatible equipment), Belgacom will first try to solve the issue by treating the most polluting line. If this solution does not solve the issue, Belgacom may solve the problem by removing the concerned Customer service on the concerned End User line under LIFO (Last In First Out) mode. The related costs will be invoiced to the Customer. In case of dispute regarding the costs either party can ask BIPT to verify the claimed costs.

~~8.~~104. Note that the Feasibility Check Tool doesn't examine the spectral characteristics of the line and cannot consequently determine with 100% accuracy that the line won't present technical problems.

~~9.~~105. Belgacom developped remote testing and monitoring tools allowing him to identify the VDSL2 perturbating lines. Based on the use of those tools Belgacom is authorized to take proactive actions in order to protect the other xDSL lines. Those actions could be, in function of the increasing

severity of the perturbation: a change in the line profile, the lock of the xDSL port or the physical disconnexion of the perturbating line. Specifically relating to the change of line profile, Belgacom will downgrade:

- the LP701 to LP702, LP703, LP704, LP711, LP712, LP713 & LP714,
- the LP702 to LP703, LP704, LP711, LP712, LP713 & LP714,
- the LP705 to LP706, LP707, LP708, LP704, LP711, LP712, LP713 & LP714,
- the LP711 to LP712, LP713, LP714 & LP704.
- the LP715 to LP716, LP717 & LP718.

The choice of the line profile will relate to the severity of the perturbation. The Customer will always be proactively informed by Belgacom of the monitoring of the line and of the resulting action taken by Belgacom.

~~10.~~106. If the VDSL2 services offered by the Customer appear to be the cause of an abnormal[1] perturbation, Belgacom will demonstrate that this was caused by the services of the Customer and will, eventually and after information of the Customer, interrupt the service to be able to make this demonstration.

~~11.2~~13.2 Points of Entry for Complaint

~~11.~~107. In case of repair, two modes of contact between the Customer and Belgacom are possible according to the type of problem:

- E-tool for repair tickets
- By call (080093122): the National Call Center (also referred to as NCC) for the reporting of faults at shared VLAN level or at OLO Access Line level.
- By e-mail: the address "080093122@belgacom.be" for the reporting of faults at End User level only.

~~11.3~~13.3 Fault Reporting

~~12.~~108. It is always the Customer that

1) Reports faults in the Wholesale Broadband Access VDSL2;

2) Receives own End Users' fault reports before reporting faults to Belgacom. Belgacom will not take calls directly coming from End Users of the Customer Wholesale Broadband Access VDSL2;

3) Handles own End Users' fault reports before reporting faults to Belgacom.

[1] Abnormal: when disturbances on other lines in the same cable are not in line with the technical rules and authorization conditions as defined within the context of the technical specifications

~~13.~~109. It is the Customer's responsibility to check that there is sufficient ground to assume that the fault is with Belgacom.

~~11.4~~13.4 Customer's liabilities in connection with fault reporting

~~14.~~110. For fault reporting, the Customer will contact Belgacom by e-mail or via the e-tool. The e-mail address to be used by the Customer is 080093122@belgacom.be.

~~15.~~111. Before contacting Belgacom, the Customer will test the concerned faulty equipment to ensure that the fault is attributable to Belgacom. The Customer is responsible for transmitting all necessary information requested by Belgacom. In the following cases the trouble ticket creation will be rejected:

- Information is incomplete
- More than one ticket is sent in the e-mail

~~16.~~112. The Customer will possibly communicate to Belgacom:

- Measurements from equipment on the Customer's side that can help in solving the fault (if available).
- Contact point and phone number of the End User during office hours[2] (in case an intervention is required at the End User side).
- Hours of availability of End User during office hours[2] (in case an intervention is required at the End User side).

~~17.~~113. It is always the Customer that receives own End Users' fault reports regarding the Wholesale Broadband Access VDSL2 services before reporting faults to Belgacom. In case Belgacom receives fault reports regarding the Wholesale Broadband Access VDSL2 service, Belgacom will refer the End User to the Company with whom he has signed an agreement.

~~18.~~114. When the Customer receives a fault from one of his End Users for Wholesale Broadband Access VDSL2, the Customer performs a first diagnostic.

- In case the issue does not require a Belgacom intervention, the Customer manages the issue and contacts the End User once the issue is solved and closed.
- On the opposite, if the issue requires a Belgacom intervention (typically for network issues), the Customer continues the issue resolution process with Belgacom.

~~19.~~115. Important note: The Customer must clearly specify to the End User that the modem must be left "on" in order to let the possibility to Belgacom to perform all the actions required to identify and fix the issue.

[2] Also possible outside office hours in case of Improved SLA.

~~11.5~~13.5 Belgacom's liability in connection with fault reporting

116. Belgacom starts the fault localization and performs repair activities during working hours[2].

117. If The Customer has communicated to Belgacom measurements from equipment on the Customer's side that could help in solving the fault, Belgacom will analyze and verify them, and integrate them in its diagnostic process. In this event, Belgacom will only be entitled to close the repair request, possibly qualifying it as "Wrongful Repair", after analysis and verification of those measurements. The results of these will be made available to The Customer through the E-tool for repair tickets.

~~20.~~118. The Customer recognizes that:

- if necessary, the Customer is required to disconnect the terminal equipment at the End User site upon Belgacom's request to carry out its proper measurements;
- Belgacom can request to the Customer a timeframe for disconnecting the Wholesale Broadband Access VDSL2 service at the MDF so as to be able to carry out the necessary measurements. Refusal from The Customer to do so will imply that Belgacom is not in a position to verify the line and can be considered as wrongful repair request;
- The Customer's repair request must relate to the type of service for which the Wholesale Broadband Access VDSL2 service has been ordered;
- During the repair process the Customer may submit additional information in respect of a specific repair request, cancel a repair request or change a repair request on the same end-user Wholesale Broadband Access VDSL2.

~~21.~~119. Belgacom reports the result of the repair activities to the Customer immediately upon repair.

~~22.~~120. Any follow-up feedback requested by the Customer, either during the repair period, after additional tests and rejection or acceptance of the repair action, or once the fault is fixed, will be taken care of through the repair team for Wholesale Broadband Access VDSL2;

~~23.~~121. In any case of planned maintenance and repair that can affect the Wholesale Broadband Access VDSL2 service, Belgacom shall inform the Customer.

~~24.~~122. In case the Customer contacts Belgacom by phone about an ongoing repair action, Belgacom will inform the Customer of the current repair status.

~~11.6~~13.6 Special conditions in connection with Repair

~~25.~~123. When the End User connects another equipment (on its side) that the ones defined in the Annex 2 "Technical specifications", section 11 "Modem", Belgacom is entitled to disconnect the Wholesale Broadband Access VDSL2 Service after prior notification of the Customer.

~~26.~~124. In fault situations where the responsibility for the fault cannot immediately be placed, and where Belgacom makes coordinated efforts with one or more Customers, settlement is made or arranged after conclusion of the Repair.

~~27.~~125. If Belgacom repair services conclude that a complaint is related to a low performance of a line with unstable synchro, the Belgacom repair team starts the "fallback profile" process. This process can be further explained to the Customers during dedicated Technical meetings.

~~11.7~~13.7 Repair Request and Feedback

~~11.7.1~~13.7.1 Shared VLAN and OLO Access Line level

~~28.~~126. The Customer's requests for Repair at shared VLAN level and OLO Access Line level will be answered by the NCC. Communication in repair will be through phone or by e-mail. The NCC representatives will however not accept direct calls from the End User.

~~29.~~127. Any follow-up feedback given to the Customer, either during the repair period, after additional tests and rejection or acceptance of the repair action, or once the trouble is fixed, will be through CSD, again insuring continuity and consistency.

~~11.7.2~~13.7.2 End User level

~~30.~~128. The Customer's requests for Repair at End User level will be answered by "080093122@belgacom.be". Communication in repair will be through e-mail. No direct calls from the End User will be accepted.

~~31.~~129. The Customer has to provide the circuit ID that was provided in the End User line provisioning process. The Customer repair request must relate to the type of service for which this line has been ordered. If the reported problem does not match the service ordered by the Customer as documented, the repair request will be rejected. During the repair process the Customer may also submit additional information for a specific complaint, cancel a complaint or change a complaint.

Specific remark on the use of the circuit ID: whenever there is a modification on the installation of a line, the circuit id identifying the line could change. The WBA VDSL 2 XML Content Description, available on the Customer's personal page on the CWS secured site, summarises the cases where the circuit id change or remain unchanged.

~~32.~~130. It may during repair appear necessary for the Belgacom representative to contact the End User. The Customer will therefore transmit to Belgacom the contact point of the End User and his phone number together with the repair request. In case contact with the End User is necessary for repair and the Customer failed to give this information, the repair request may be rejected.

~~33.~~131. Any follow-up feedback given to the Customer, either during the repair period, after additional tests and rejection or acceptance of the repair action, or once the trouble is fixed, will be through "080093122@belgacom.be", again insuring continuity and consistency.

~~34.~~132. The escalation procedure document for the repair can be found on the Customer's personal page ~~Wholesale Broadband Access VDSL2 web site~~.

~~11.8~~13.8 Wrongful repair request

133. In case of a repair request where the fault was not caused by Belgacom and Belgacom has performed work for that repair request, useless costs are made by Belgacom. To encourage the Customer to perform a check first on the loop and on the connected equipment, Belgacom will bill an incentive fee to the Customer. There will be an indication of the trouble ticket reference and the cause of the wrongful repair.

13.9 Repair Process flows

134. The Process Flows describing the Repair Business Processes of the Wholesale Broadband Access VDSL2 at level 1, 2 and 3 can be found on the OLO Personal Page of the Belgacom Wholesale website. In case of conflict between the Process Flows and the Wholesale Broadband Access VDSL2 Services Offer, the Offer prevails.

135. The following table summarizes the parts of the Repair Business Process described in these flows, and their level of description:

Process Flow	**Level of description**	**Level of repair**
Trouble to resolution	Level 0, 1 & 2	End-User, Shared Vlan and OLO Access Line
OLO trouble intake & analysis	Level 3	End-User, Shared Vlan and OLO Access Line
BGC ticket intake	Level 3	End-User, Shared Vlan and OLO Access Line
Ticket update and dispatch	Level 3	End-User, Shared Vlan and OLO Access Line
Remote intervention	Level 3	End-User, Shared Vlan and OLO Access Line
Field intervention	Level 3	End-User, Shared Vlan and OLO Access Line
BGC ticket closure	Level 3	End-User, Shared Vlan and OLO Access Line
OLO trouble closure	Level 3	End-User, Shared Vlan and OLO Access Line
Billing	Level 3	End-User
Escalation	Level 3	End-User, Shared Vlan and OLO Access Line

~~12~~14 Phases in the provisioning of the Wholesale Broadband Access VDSL2 Service

~~1.~~136. The way of provisioning the Wholesale Broadband Access VDSL2 Service to the Customer will evolve according to the following 2 successive Phases: Friendly User Testing Phase and Full Commercial Phase.

~~12.1~~14.1 Friendly User Testing Phase

~~2.~~137. During the Friendly User Testing phase, later referred to as FUT, Belgacom will introduce and support the Customer to get acquainted with the processes and systems in scope of the Wholesale Broadband Access VDSL2 Service.

~~3.~~138. Each of the Parties will have to agree on the date of successful completion of the Friendly User Testing Phase. The FUT phase should cover a period of 10 working days.

~~4.~~139. The FUT Phase is executed at one Service PoP, linked to at maximum two LEX's enabled for VDSL2. The number of 'friendly user' End Users (to be provided by the Customer) is set at maximum 24 per Customer.

~~5.~~140. In case the Customer would intend to start separately with WBA VDSL2 shared and dedicated VLANs, two separate FUT must be organized, one for shared and one for dedicated VLANs.

~~12.2~~14.2 Full Commercial Phase

~~6.~~141. The Full Commercial Phase will entirely be based on Customer's firm orders transmitted by the Customer. The number of orders must be reasonable and progressive to avoid that the order intake services of Belgacom are overloaded by large amounts of initial orders.

15 Information on IT projects

142. For any changes initiated by Belgacom which may have a **significant impact** on the IT systems of the Customers (new types of messages or new exchange process), Customers shall be notified at least **6 months** in advance with a high level description of the impact and with a structure of the documentation. Belgacom will provide detailed impact and documentation **3 months** prior start of the modifications.

143. For **smaller changes** (additional values in existing fields), Customers shall be notified at least **3 months** in advance with a high level description of the impact and with a structure of the documentation. Belgacom will provide detailed impact and documentation **1 month** prior start of the modifications.

144. The BIPT will be informed in any case.

145. Concerning the periods of notice, the BIPT can allow exceptions.

Appendix A: Statement of requirements, template for the Customer

General

~~7.~~146. This appendix includes a non-exhaustive list of items that should be included in the Statements of Requirements (SOR). This template is only a guideline. It is the freedom of both parties to discuss the content of the SOR.

Basic information

Registered name and address of Customer

Customer name	:
Address	:
Postal code and city	:
Country	:
Telephone number	:
Fax number	:
VAT registration number	:
Trade register (*)	:

Confidentiality agreement

~~8.~~147. The Parties can choose to sign a confidentiality agreement as part of the SOR. The statements included in this agreement are to be determined by the parties.

Key Contacts list

Key project dates

	Date required by Customer	Indicative dates from Belgacom
Requested date to start Friendly User Test		
Requested bringing into service date of Wholesale Broadband Access VDSL2 ordering		

Wholesale Broadband Access VDSL2 Products and Services Customer wishes to obtain from Belgacom

~~9.~~148. Please indicate what services you wish to obtain from Belgacom in scope of Wholesale Broadband Access VDSL2.

(SD = Service Description)

Name	Interest
Wholesale Broadband Access VDSL2 with Voice on PSTN without End User visit, with shared VLANs	Yes/no
Wholesale Broadband Access VDSL2 with Voice on ISDN without End User visit, with shared VLANs	Yes/no
Wholesale Broadband Access VDSL2 with Voice on PSTN with End User visit, with shared VLANs	Yes/no
Wholesale Broadband Access VDSL2 with Voice on ISDN with End User visit, with shared VLANs	Yes/no
Wholesale Broadband Access VDSL2 without Voice without End User visit, with shared VLANs	Yes/no
Wholesale Broadband Access VDSL2 without Voice with End User visit, with shared VLANs	Yes/no
Wholesale Broadband Access VDSL2 with Voice on PSTN, with dedicated VLANs	Yes/no
Wholesale Broadband Access VDSL2 with Voice on ISDN, with dedicated VLANs	Yes/no
Wholesale Broadband Access VDSL2 without Voice, with dedicated VLANs	Yes/no

Appendix B: Description of the Forecasting Process

General Principles

~~10.~~149. This chapter describes the forecast process. The forecasts are prerequisites for the respect of SLA on Slot Availability by Belgacom. Forecasts are needed to help Belgacom to plan a reasonable capacity to fulfil customer's demand.

~~11.~~150. Beneficiaries are guaranteed that Belgacom will set-up the necessary resources for the period concerned to meet its market needs.

~~12.~~151. The forecasted volumes (new lines, change owner and convert included) are established by sub-area/area and ventilated per installation type (with or without customer visit) , all products BRUO, BROBA and WBA combined. Orders for which the installation will be executed by a Certified Technician or a subcontractor (only for Beneficiaries using the quickwin process) are not taken into account in the forecast.

	Geographic name
Sub-area 1.1	"West" Vlaanderen
Sub-area 1.2	"Oost" Vlaanderen
Sub-area 2.1	"Antwerpen"
Sub-area 2.2	"Vlaams-Brabant" & Limburg
Area 3	Brussels
Area 4	Hainaut & Brabant wallon
Area 5	Liège, Namur & Luxembourg

~~13.~~152. For the three first series of forecasts of a new ~~Beneficiary~~Customer, both Parties will enter into good faith discussions about the submitted forecasts and the feasibility to implement the forecasts concerned.

Processing of Forecasts

~~14.~~153. Belgacom will propose an individual forecast to each ~~Beneficiary~~ Customer , based on the mathematical average of the actual ordered volumes of T~~t~~he ~~Beneficiary~~ Customer over the last 6 months. By the 10th of each month at the latest, Belgacom will download on the dedicated e-libraries of each ~~Beneficiary~~ Customer the individual forecast proposal. This forecast will be elaborated per month, per customer visit / no customer visit (all products BRUO, BROBA and WBA combined) and per subarea.

15.154. The ~~Beneficiary~~ Customer is responsible for the accuracy of the forecast. Therefore, the ~~Beneficiary~~ Customer is requested to confirm or modify this forecast by e-mail (to cws.forecasting@belgacom.be), at the latest one month prior to the first forecasted period in time. Forecast modifications or confirmation shall be done through the use of the templates provided by Belgacom. These templates will only be considered as valid when they are properly completed. In case data is missing or is not correct, the forecast will be rejected (within 5 working days following its reception). In the latter case, the reasons of rejection will be indicated on the template by Belgacom.

16.155. If no confirmation or modification is received by that time, Belgacom will consider the proposed forecasted volumes as confirmed. Once confirmed , the forecasted volumes are globalized by Belgacom into one basket. Capacity reservation, and calendar dimensioning, is done accordingly to fit the needs of the entire market.

E.g.:
By 10th September, Belgacom downloads the OLO X forecast of November 2011 to January 2012 on its dedicated e-library (forecasted volume=mathematical average of the monthly volumes ordered by OLO X between March and August 2011);
OLO X may send a modified forecast by e-mail to Belgacom (cws.forecasting@belgacom.be) until 30 september 2011.
Belgacom will implement the OLO X modified forecast (or by default the Belgacom proposal) in its systems, and use it to determine global overrun and monthly deviations.

Deviations between successive forecasts

138. The globalized volumes forecasted by the entire market at month M will be compared with the volumes forecasted at month M-1. For each forecasted month common to the 2 successive forecasts, the maximum deviation between the successive forecasts of this month at month M and at month M-1 will be – 30 % to + 30 %.

Deviations between forecasted volumes and actual volumes

Underrun

139. Underrun occurs when actual ordered volumes are below forecasted volumes. Any underrun mechanism applies to the entire globalized volume of orders of the entire market.

140. A reasonable underrun of the forecasted volumes can be absorbed by Belgacom and has no direct consequences for T~~t~~he ~~Beneficiary~~Customer. A reasonable underrun is considered to be no more than a 20% deviation of the forecasted volume, considered on a monthly basis. In case of severe underrun (i.e. more than 20%) and in case this underrun was caused by a single ~~Beneficiary~~ Customer who excessively increased the volume proposed by Belgacom, Belgacom reserves the right to limit the allowed modification for the forecast of the following 3 months for that ~~Beneficiary~~ Customer to a level deemed necessary by Belgacom.

E.g.: The proposed volume for all OLO's for month X is 1000 (=average of the actual ordered volumes of the last 6 months.). Some OLO's send a modification of their forecasted volume via

CWS.forecasting@belgacom.be and the forecasted volume for all OLO's is confirmed at 1500. The realised volume for month X is finally lower than 1200 (1500-20%=underrun). If among the OLO's that had sent a modification, the realised volumes are more than 20 % under the modified volumes, they will be identified as responsible of the underrun and won't have the possibility to modify the proposed forecasting during the following 3 months.

Overrun

141. Overrun occurs when actual ordered volumes are above forecasted volumes. Any overrun mechanism applies to the entire globalized volume of orders of the entire market.
As from the first order exceeding the globalized forecasted volume, independently of which ~~Beneficiary~~ Customer might be the cause of this overrun, all orders of all Beneficiaries for the remainder of the month will be considered 'in overrun'. For any order in 'overrun', no guarantee on Slot Availability will be offered and they will be carried out by Belgacom as soon as possible, according to the remaining capacity available.

Appendix C: Forecasting templates for BRUO, BROBA and WBA End User Line orders

142. Remarks:
- M_i refers to the month in which the forecasting templates are submitted.
- All quantities (M1 to M12) are incremental values.

"Customer Operations" Forecast

Forecasting Template for BRXX Orders

Customer reference:
Edition:
Split: With or Without customer visit
Reception date:

Telephone Zone	M_1	M_2	M_3	M_4	M_5	M_6	M_7	M_8	...	M_{12}
Sub-area 1.1										
Sub-area 1.2										
Sub-area 2.1										
Sub-area 2.2										
Area 3										
Area 4										
Area 5										

Appendix D: Order Templates

End User line

143. Ordering the activation of WBA VDSL2 on an End-User line is done through XML. See for details and examples on the Belgacom CWS secured website.

Bandwidth

144. Only for WBA VDSL2 with shared VLAN: Ordering Bandwidth capacity by LEX, as well as changing or cancelling bandwidth is done through XML. See for details and examples on the Belgacom CWS secured website the document "WBA VDSL2 XML Content Description".

145. Only for WBA VDSL2 with dedicated VLAN: adapting the VLAN profile of a WBA VDSL2 with dedicated VLAN line is done through XML. See for details and examples on the Belgacom CWS secured website the document "WBA VDSL2 XML Content Description"

OLO Access Line

General

146. This document concerns the ordering of an OLO Access Line in the framework of the Belgacom Wholesale Broadband Access VDSL2 offer.

147. This offer is valid for a period of four weeks from the sending date of the fax or from the signature of this OLO Access Line order form.

Ethernet OLO ACCESS LINE (OAL):

Order Form

1. *Please complete each section of this form as accurately as possible. Grey areas are mandatory.*
2. *The instructions given at the bottom of each block will help you complete this form*
3. *Please complete one form per requested line.*

1. YOUR ADDRESS
Company name: Address: Postal code and city: Country: Telephone number: Fax number: VAT registration number: Trade register:
>> *Please complete all items in this block accurately.*

2. YOUR BILLING INFORMATION
2.1. Your billing address (if different from 1.) Company name: Address: Postal code and city: Country: Telephone number: Fax number: VAT registration number: Trade register:
2.2. References

Your customer number (this number is mentioned on your invoice)

Your own reference (up to 20 digits or letters)

>Your customer number: this is your reference number in our billing system which is stated on your invoice.

3. TYPE OF REQUEST

NEW LINE

3.1. ☐ I wish to order a **new** OAL line

I would like to have my line installed by following date (CRD): .....

ABOLITION

3.2. ☐ **I would like to cancel my OAL line on following date**:

The line code number is:

>> You are kindly requested to always enclose a plan.

4. ADDRESS OF THE OAL END POINTS

4.1. Belgacom Service PoP: .....

4.2. COLOCATION or Customer external site

Colocation room (only for colocation):
Belgacom Node (only for colocation):
Customer Name:
Address:
Building:
Floor and room no.:
Postal code and city:
Contact person (Administrative):
Phone number (or GSM):
Contact person (Technical) :
Phone number (GSM) :
Fax number:
Manned site ☐ YES ☐ NO

>> Contact: Please specify an administrative and technical person in the building who is informed about the installation.

5. TECHNICAL SPECIFICATIONS OF THE LINE

5.1. OAL type:

- 1GE / BGC sited
- 1GE / Customer sited
- 100 Mb/s Customer sited
- 10 Mb/s Customer sited
- 1+1 GE / BGC / Customer sited
- 1 GE / Backhaul

6. TECHNICAL SPECIFICATIONS OF END POINTS

6.1. Finishing

Colocation or Customer external site

New 19 " rack to be provided by Belgacom (against payment) ☐

New ETSI rack to be provided by Belgacom ☐

A rack already exists, Belgacom only has to supply the following components ☐

6.2. Patchpanel situation

Place of the patchpanels or racks of the customer on the ground, in the colocation areas :

6.3 Interface

1. Belgacom sited

   Optical : GigE type LX ; wavelength 1310nm – SC/APC 8° ☐

2. Customer sited

   Optical: GigE type LX ; wavelength 1310nm - SC/PC ☐

   LC/PC ☐

7. CONTRACT DURATION

7.1.Standard contract (minimum 1 year)

☐ 1 year ☐ 2 years ☐ 3 years ☐ 4 years ☐ 5 years

8. ADDITIONAL INFORMATION

Terms and Conditions

Belgacom shall provide the Service to the Customer under the conditions and prices set up in the Offer "WBA VDSL2" .

Drawn up at....., on. .....

Name and title of applicant.....

Signature,

Wholesale Broadband Access VDSL2

Annex ~~5~~4: Basic Service Level Agreement

Created on: 1~~3~~6 February 2012~~20~~
~~December 2011~~

belgacom

together with

1 Table of contents

2 Object

1. The present document defines the Terms and Conditions upon which Belgacom will deliver installation and maintenance of basic services for the WBA VDSL2. For all operational aspects, reference is made to the Annex ~~4~~ 3 - Planning and Operations.

2. The terms and conditions of the SLA on Slot Availability for orders submitted via the Open Calendar ordering interface and of the SLA on Total Provisioning Timer for orders submitted via the XML ordering interface are applicable within the limits of the forecasted volumes submitted by Belgacom to the ~~Beneficiary~~Customer and confirmed/corrected by the latter in line with the forecasting mechanism and deviations described in the Annex ~~4~~3 (Planning and Operations).

3. All conditions of the "BROTSoLL" in its last version are applicable to the OLO Access Lines as mentioned in this document.

3 Scope

4. The scope of this document is to set a framework for operational collaboration between Belgacom and ~~Beneficiary~~Customer that ensures the respect of the fixed deadlines and an acceptable quality of the provided services.

5. The intention is to minimize the risk of shortcomings and so motivate all parties to respect the thresholds set in this SLA and to provide an incentive to enhance the performance of both parties.

6. Both parties agree that the objective of this document is to optimize operational collaboration and all efforts should be taken to avoid compensations or penalty fees.

7. A detailed explanation on the exact calculation of all SLA measurements mentioned in this document is available on the Belgacom Wholesale website – Regulatory offers.

8. This document is an evolving document that may be adapted and revised regularly.

4 Prerequisites

9. Both parties agree to respect the content of this document and to offer services as described in this document.

10. When specific follow up or support needs to be performed, both parties are obliged to provide a SPOC with its respective name, telephone number or e-mail. An escalation procedure is foreseen and details are described in the escalation procedure document published on the Belgacom Wholesale website – Regulatory information. The version on the web site is to be considered as the most up-to-date version of the procedure and any modification in the escalation procedure will be notified to the ~~BROBA~~ WBA Beneficiaries and the BIPT and will be subject to the approval of the BIPT. Escalation is only relevant after the defined timer has been passed.

11. Timers in this document expressed in days are always working days unless specified otherwise. For a timer of x days, the action must be completed before end of working day x after reception of the order or other ~~Beneficiary~~Customer message, unless specified otherwise. Timers expressed in months consist of 21 working days. They are applicable as Belgacom receives order requests on a uniform distributed basis, meaning that in specific circumstances that cannot be qualified as reasonably normal the timers are not applicable. Under the present document, a working day for order purposes is considered as being from 8h00 to 16h30 excluding Saturday, Sunday, Belgian and Belgacom holidays. Belgacom holidays are 2 January and 26 December.

12. In case of massive orders, provisioning will be done on project-basis. In that case, planning can be negotiated between ~~Beneficiary~~Customer and Belgacom. ~~Beneficiary~~Customer must immediately inform Belgacom when communicated volume is exceeded. In that case, although SLA will not apply, Belgacom will manage, as far as possible, this increase of orders according to its best suitability.

13. In order to ensure reasonable operational work load, the ~~Beneficiary~~Customer should see to a reasonable spread of his orders during the month. For the execution of the present Contract, the maximum daily volume intake for the concerned month is defined as 10% of the volumes projected in the forecast for this month (such maximum daily volume does not allow the ~~Beneficiary~~Customer to exceed the total forecasted volume for the concerned month). The orders exceeding on a daily basis the maximum daily volume intake are exempted from the SLA conditions. Belgacom will execute these orders on a best effort basis.

14. Timer violations outside the working hours are not logged as such and shall not be used to claim service shortage.

15. The Service Level Agreement is not valid in situations of “Force Majeure” as defined in the “General Terms of Conditions”.

16. Timers that are delayed due to ~~Beneficiary~~Customer are not valid within this Basic Service Level Agreement.

5 Timers

17. This paragraph includes the most relevant timers in the operational processes framework. The purpose is that these timers will be reviewed periodically based on experience.

18. The timers included below are binding and a revision of these ~~last~~ timers is possible after BIPT approval.

5.1 Provisioning

5.1.1 Provisioning of End User Line

19. The provisioning of End User Line is the activation of the VDSL2 on the line of an individual End-User. Note that for the voice telephony of Belgacom, it is the End-User that receives a Basic Service for the provision of a normal connection to the public telephone network as well as maintenance work.

20. In scope of provisioning, 5 indicators to measure the Belgacom performance are identified:
    - Validation xml Timer
    - Done xml Timer
    - Total Provisioning Timer (XML ordering interface) or Slot Availability (Open Calendar ordering interface)
    - Appointment Kept
    - Due Date Respected

21. Vocabulary
    a. Order: assembly of all work orders needed to deliver an ordered product-.
    b. Work order: one of the different actions assigned to a technician to perform the delivery of an ordered product.
    c. Ordered product: the line ordered by the ~~Beneficiary~~Customer.

5.1.1.1 Validation xml Timer

22. As soon as an order to activate WBA VDSL2 for an individual End-User is submitted to Belgacom through the secured electronic e-mail system (XML), via the Open Calendar ordering interface or as back up procedure via non-secured electronic system and fax as described in the Annex ~~4~~3 - Planning & Operations, the order will be processed for validation. The validation xml timer will start on the receipt of the order. This receipt is the automated acknowledge message that is sent to the ~~Beneficiary~~Customer. Messages that are incorrect, due to the reasons as described in the Annex ~~4~~3 - Planning and Operations will be returned with a Not Acknowledged message. In this case, ~~Beneficiary~~Customer needs to resend the order with the corrections.

23. The validation or rejection process consists of an administrative and technical validation. The validation will be sent as soon as all validations have passed successfully. In case of not acceptance of the order, a reject message will be sent to the ~~Beneficiary~~Customer and the rejection reasons will be communicated with the respective message.

24. Belgacom will publish globalized measures of Validation XML timer, applicable to the entire market as a whole, aligned with the globalized system of Forecasting (see Annex 3 – Planning & Operations). ~~Beneficiaries~~Customers are entitled to request individual reports in order to monitor Belgacom's performance towards them. Each individual report requested will be charged at a fix fee (see Annex 5: Pricing and Billing).

~~24.~~25. Based on the current experience on similar data products, the validation timer is set at :

Validation/Rejection Timer	**Percentage of orders validated or rejected within the corresponding validation timer**
30 minutes	50%
2 working days	95%
5 working days	99%

~~25.~~26. Bi-monthly computation is as follows:

$$\%\ XML\ Validate^{i} = \frac{\text{Number of orders for which the Validate (or reject) XML is sent within timer}^{i}\ (1)}{\text{Total Number of orders}\ (2)}$$

With i= {30 minutes;2 working days;5 working days}

(1) Total number of orders, for the considered bi-monthly period, having the validate or reject XML sent within the i timer.

(2) Total number of orders confirmed or rejected during the considered bi-monthly period.

~~26.~~27. For every order submitted to Belgacom via the Open Calendar ordering interface, and validated by Belgacom, the Due Date of the order may only be adapted by Belgacom when, during the installation, the end-user was directly the cause of the change (e.g.: Customer Absent) or after payment by Belgacom to the OLO of the Change Date Fee mentioned in the Annex ~~6~~5 Pricing and Billing.

5.1.1.2 Done xml Timer

~~27.~~28. As soon as the implementation is done, Belgacom will notify the ~~Beneficiary~~Customer of the completion of the order. This confirmation is done by sending a message through the electronic e-mail system or by fax as a back-up procedure. Each closure of an order triggers computation of the done timer. Done timer per order is computed as the elapsed time between actual completion date ~~This timer includes the number of days the requested~~ and Ready for Service Date ~~was~~ passed to the ~~Beneficiary~~Customer via Done XML.

29. Belgacom will publish globalized measures of Done XML Timer, applicable to the entire market as a whole, aligned with the globalized system of Forecasting (see Annex 3 – Planning & Operations). ~~Beneficiaries~~Customers are entitled to request individual reports in order to monitor Belgacom's performance towards them. Each individual report requested will be charged at a fix fee (see Annex 5: Pricing and Billing).

~~28.~~30. The Done xml timer is set at **1 working day for 98% of the orders**.

~~29.~~31. Bi-monthly computation is as follows:

$$\%\ \text{XML Done} = \frac{\text{Number of orders for which the Done (reject) XML is sent within timer}}{\text{Total Number orders}}$$

5.1.1.3 Slot Availability

~~30.~~32. Slot availability is only applicable for ordered products introduced via the Open Calendar interface.

~~31.~~33. Belgacom will publish ~~Slot availability is a~~ globalized measures of Slot Availability, applicable to the entire market as a whole, aligned with the globalized system of Forecasting (see Annex ~~43~~ – Planning & Operations). ~~Beneficiaries~~Customers are entitled to request individual reports in order to monitor Belgacom's performance towards them. Each individual report requested will be charged at a fix fee (see Annex ~~6~~5: Pricing and Billing).

~~32.~~34. If a SNA is required, then it will be planned between Belgacom and ~~Beneficiary~~Customer within 20 working days as from receipt of the WBA VDSL2 end-user line order if no further delay because of public domain obligations. These cases fall out of the application of SLAs.

~~33.~~35. This indicator will not apply for all lines installed by a certified technician.

~~34.~~36. Slot availability will be measured in two (2) parts:

- for ordered products not exceeding the volume forecast.
- for ordered products exceeding the volume forecast.

Only the ordered products not exceeding the forecasted volumes are subject to SLA.

~~35.~~37. For each work order of an ordered product not exceeding the volume forecast, the first timeslot proposed must be within the following timer.

Type %	Slot Availability Without Visit In Working days	Slot Availability With Visit In Working days
95%	9	11
99 %	19	22
100 %	45	45

If a due date outside the above-mentioned timer is requested, the first proposed timeslot must be at the latest on the requested SRD date.

~~36.~~38. Bi-monthly computation is as follows:

$$\frac{\text{Number of confirmed ordered products for which the first timeslot proposed is within timer (or at latest on SRD if SRD>timer) for all work orders}}{}$$

% Slot availability = ----------

Total Number of confirmed ordered products

The timers are defined in table of §~~35~~37.

~~37.~~39. For every order submitted to Belgacom via the Open Calendar ordering interface, and validated by Belgacom, the Due Date of the order must fulfil the SLA slot availability. If the SRD is outside the above-mentioned timers, the Due Date of the order must be at the latest on the requested SRD date.

5.1.1.4 Total Provisioning Timer

~~1.~~40. Total Provisioning Timer is only applicable for ordered products introduced directly via an XML.

41. Belgacom will publish globalized measures of Total Provisioning Timer, applicable to the entire market as a whole, aligned with the globalized system of Forecasting (see Annex 3 – Planning & Operations). ~~Beneficiaries~~Customers are entitled to request individual reports in order to monitor Belgacom's performance towards them. Each individual report requested will be charged at a fix fee (see Annex 5: Pricing and Billing).

~~2.~~42. The total provisioning timer is the elapsed time between reception of order XML from ~~Beneficiary~~ and ready for service date passed to the ~~Beneficiary~~Customer through a XML Done message. ~~frame to be respected for booking in working days taken as from the order date of the Beneficiary to the date of the Done Message.~~ The Total provisioning Timer includes the validation of an order, the implementation and the Done notification. The total provisioning timer consists of a timer range wherein the ~~Beneficiary~~Customer can ~~determine~~ request its Ready for Service date. ~~Beneficiary~~Customer provides the implementation day (also referred to as CRD Customer Requested Date, Due Date or Ready for Service Date) taken into account the minimum and maximum total provisioning timer. The minimum provisioning timer is indicated below. The maximum provisioning timer is set at 42 calendar days (corresponding to the maximum CRD Customer Requested Date).

~~3.~~43. The timers are valid in case all needed infrastructure is in place (OLO Access Line and shared VLANs). If it is not the case, timers of shared VLAN provisioning as defined in section 5452 have to be added to this timer. If a SNA is required, then it will be planned between Belgacom and ~~Beneficiary~~Customer within 20 working days as from receipt of the WBA VDSL2 end-user line order if no further delay because of public domain obligations. These cases fall out of the application of SLAs.

Total provisioning timers to be respected by Belgacom:

Service	Timers	
WBA VDSL2 without customer visit	8wd 95% incl "done"	18wd 99% incl "done"
WBA VDSL2 with customer visit	10wd 95% incl "done"	20wd 99% incl "done"

~~4.~~44. The total provisioning timer will be the basis for the calculation of compensations. Compensations are only due within the limits of the forecasted volumes that have been submitted according to the rules described in Annex ~~4~~3 Planning & Operations of the present offer and for which the deviation rules are respected.

5.1.1.5 Appointment Kept

~~5.~~ This indicator will not apply for all lines installed by a certified technician.

45. Appointment Kept ~~is measured per Beneficiary~~. will be measured and published at market level~~-~~. Individual reports per ~~Beneficiary~~Customer will be developed. ~~Beneficiaries~~Customers can request to receive individual reports in order to monitor Belgacom's performance towards them. For each individual report requested by the ~~Beneficiary~~Customer Belgacom will charge a fix fee (see Annex 5: Pricing and Billing).
Appointment Kept ~~It~~ measures the number of orders with Customer Visit that have respected all their Customer Visit appointments. In case of an order with multiple customer visits, ~~I~~if one Customer Visit appointment has not been respected, the full order is considered as out of SLA.

~~6.~~46. Bi-monthly computation is as follows:

$$\% \text{ Appointment kept} = \frac{\text{Number of orders for which all Customer Visit appointments are kept}}{\text{Number of orders having at least one Customer Visit}}$$

The bi-monthly percentage is set at **95 %.**

~~7.~~47. Belgacom reserves the right to adapt this value at the level of the performance reached by its own retail broadband services

5.1.1.6 Due Date Respected

48. This indicator will not apply for all lines installed by a certified technician.
~~8.~~

~~9.~~49. Due Date Respected will be measured and published at market level. ~~is measured per Beneficiary~~. Individual reports per ~~Beneficiary~~Customer will be developed. ~~Beneficiaries~~Customers can request to receive individual reports in order to monitor Belgacom's performance towards them. For each individual report requested by the ~~Beneficiary~~Customer Belgacom will charge a fix fee (see Annex 5: Pricing and Billing).
Due Date Respected ~~It~~ measures the number of orders for which the last Due Date was respected by Belgacom.

~~10.~~50. An order has respected the Due Date if the closure date (xml actual completion date) is on the same day as the last Due Date communicated to the ~~Beneficiary~~Customer for this order.

~~11.~~51. Bi-monthly computation is as follows:

$$\textbf{\% Due date respected} = \frac{\textbf{Number of orders for which the last due date was respected}}{\textbf{Total Number of orders}}$$

The bi-monthly percentage is set at **95 %.**

~~12.~~52. Belgacom reserves the right to adapt this value at the level of the performance reached by its own retail broadband services.

5.1.2 Provisioning of Shared VLAN or Service Qualities

~~13.~~53. The provisioning of shared VLANs/Service Qualities covers the set-up and configuration of shared VLANs/ Service Qualities and the modification of the existing shared VLANs/ Service Qualities parameters.

5.1.2.1 Set-up and configuration of shared VLAN/ Service Quality Timer

~~14.~~54. The set-up and configuration of shared VLAN/ Service Quality timer is related to the creation of a new shared VLAN/Service Quality between an IP-DSLAM and the ~~Beneficiary~~Customer. The set-up and configuration of shared VLAN/Service Quality timer will start on the receipt of the order, submitted to Belgacom through the secured electronic e-mail system that is automatically sent by Belgacom to the ~~Beneficiary~~Customer if this automatic receipt sending is activated, if this is not so, the date of sending by ~~Beneficiary~~Customer prevails (XML) or as backup procedure via non-secured electronic system and fax as described in the Annex ~~4~~3. This receipt is the automated acknowledge message that is sent to the ~~Beneficiary~~Customer. Messages that are incorrect, due to the reasons as described in the Annex ~~4~~3 - Planning and Operations will be returned with a Not Acknowledged message. In this case, ~~Beneficiary~~Customer needs to resend the order with the corrections. The set-up and configuration of shared VLAN/Service Quality timer is set at:

	Timer
Set-up & configuration timer (to be respected by Belgacom)	10 working days

5.1.2.2 Modification of shared VLAN/Service Quality parameters Timer

~~15.~~55. The modification of a shared VLAN/Service Quality parameters timer is related to the modification of the parameters of an existing shared VLAN/Service Quality between a IP-DSLAM and the ~~Beneficiary~~Customer. The process consists of an administrative treatment and a technical treatment of the order and requires a synchronization with the ~~Beneficiary~~Customer.

~~16.~~56. The modification of a shared VLAN/Service Quality parameters timer will start on the receipt of the order. This receipt is the confirmation by e-mail system that is sent automatically by Belgacom to the ~~Beneficiary~~Customer if this automatic receipt sending is activated, if this is not so, the date of sending by ~~Beneficiary~~Customer prevails or the fax transmission date (if fax was used as back-up procedure). The modification of a shared VLAN/Service Quality parameters timer is set at:

	Timer
Modification of Shared VLAN/service qualities parameters timer (to be respected by Belgacom)	3 working days

5.1.3 Provisioning of OLO Access Line

~~17.~~57. The provisioning of OLO Access Line timers follows the timers described into the section 11.2 “Provisioning Services” in the document “BROTSoLL Main Body".

5.2 Repair

5.2.1 Repair Time on the End User line timer

~~18.~~58. The repair time on the End User line timer starts when Belgacom receives a Trouble mention based on the issue description communicated by the ~~Beneficiary~~Customer and ends at the closure of this Trouble Ticket after the feedback has been given by Belgacom to the ~~Beneficiary~~Customer. If an appointment is needed at the End-User address and the problem resides at the high bandwidth part, it is the ~~Beneficiary~~Customer that arranges an appointment at the End-User premises.

~~19.~~59. This timer is ~~not subject to this Service Level Agreement~~frozen by a stop clock in the following cases:

- An appointment (if absolutely needed) is not accepted at the proposed date[1], in case of absence of the End-User at appointment date, in any case of incomplete[2] or incorrect information to be provided by the ~~Beneficiary~~Customer with relevance for the repair process.
- Limitation/degradation of service due to spectrum management if Belgacom applied the correct rules.

	Timer
Repair timer End User line (to be respected by Belgacom)	Day of trouble ticket opening + 1 (before end of the following second half working day)

~~20.~~60. If an appointment is needed at the end-user address, the repair timers will only apply if the ~~Beneficiary~~Customer specifies in the Trouble Ticket its end-user availability.

~~21.~~61. Note that the application of the "Trouble Ticket Resolution Timer" is ~~not applicable~~deferred in case appointment is ~~scheduled~~ requested ~~with client~~by ~~Beneficiary~~Customer ~~on day~~ later than the second half working day following opening of the trouble ticket. For such cases Belgacom will apply the stop clock principle and will resume the counting of repair timer as of the beginning of the chosen slot. For a detailed definition of the stop clock principle, reference is made to the annex 4a "Improved SLA". ~~d+1 or d+2. In this case, the timers will be applicable as from that date.~~

5.2.2 Repair Time on the Ethernet Transport Timer

~~22.~~62. The repair time window for Ethernet transport is done by trouble ticket handling during working days.

~~23.~~63. The repair time on the Ethernet Transport timer starts when Belgacom receives a Trouble mention based on the issue description communicated by the ~~Beneficiary~~Customer and ends at the closure of this Trouble Ticket after the feedback has been given by Belgacom to the ~~Beneficiary~~Customer.

	Timer
Repair time Timer Ethernet Transport (at LEX level) (to be respected by Belgacom)	Day of trouble ticket opening + 1 (before end of the following second half working day)

~~[1] The intervention on the End User line timer is not applicable in case appointment is scheduled with client on day later than d+1 or d+2. In this case, the timers will be applicable as from that date.~~

[21] Belgacom refers to Annex 54A "Improved SLA", section 67, for the complete set of information.

	Timer
Repair time Timer Ethernet Transport (at Service PoP level) (to be respected by Belgacom)	4 working hours after trouble ticket opening

5.2.3 Repair Time on the OLO Access Line Timer

~~24.~~64. The repair of OLO Access Line timers follows the timers described into the section 11.3 “Repair Services” in the document “BROTSoLL Main Body".

5.3 IT SLA’s

~~25.~~65. This section includes the SLA’s relating to the IT applications that Belgacom puts at disposal of the ~~Beneficiary~~Customer for ~~pre-provisioning or~~eligibility, ordering or repair of its WBA VDSL2 lines.

5.3.1 Open Calendar response time

~~26.~~66. The response time of the Open Calendar ordering interface used by the ~~Beneficiary~~Customer for ordering of its WBA VDSL2 lines is subject to SLA.

~~27.~~67. This response time relates to the 2 following steps of ordering a WBA VDSL2, BROBA or BRUO line through the Open Calendar interface, i.e.:

I. get an overview of the work orders needed to provision the line,
II. get the available time slot per work order.

~~28.~~68. For each individual order, the response time of the Open Calendar interface is the sum of the response times for the first iteration of each of the ordering steps defined in §~~67~~65 of this document. The incomplete orders where the ~~beneficiary~~Customer did not perform the second step of the ordering steps defined in §~~67~~65 – although needed for submitting the order –are excluded from the SLA calculation.

~~29.~~69. The response time of the Open Calendar interface will be measured by Belgacom from Monday to Saturday (excluding Belgian and Belgacom holidays), between 08:00 AM and 08:00 PM. Following cases will be excluded from the calculation:

- “Force majeure”,
- Maintenance works that are announced by Belgacom via the communication channel FLASH or any equivalent mean,
- Unavailability of the Open Calendar announced to the ~~Beneficiary~~Customer by Belgacom Service Impact Flash,
- Unavailability/~~unstability~~ instability of the Open Calendar interface due to misuse (*) performed by a ~~Beneficiary~~Customer or overload (**) caused by one or several ~~Beneficiary~~Customers.

(*) Misuse: Beneficiaries should use a GUI interface to access the Open calendar interface, should not call the interface via robotic or similar simulations (massive calls to the interface via a batch mechanism), and the access via certificates should not be used to send potential malicious malware into Belgacom systems.

(**) Overload: Open Calendar is able to support a maximum of 35 requests per minute, for all Beneficiaries together. This limit will be reconsidered once the interface will be used in production by all Beneficiaries.

~~30.~~70. For the orders entered through Open Calendar, Belgacom will endeavour to reach the response times mentioned in the following table, in function of the order action type (“Provide new”, or “Change Owner & Convert”):

	Provide New	Change Owner / Convert
SLA Maximum Response Time Open Calendar	2~~:20~~ minutes 20 seconds	2 minutes~~:~~ 50 ~~min~~seconds

Initially, an SLA of 75% will apply, subject however to a minimum volume of 1500 orders:
- If the ordering level exceeds 1500 orders per month, the SLA will be calculated on a bi-monthly basis.
- If the ordering level does not reach 1500 orders per month but exceeds 1500 orders per year, the SLA will be calculated on a yearly basis.

As from the moment that 50% of the orders are placed via the Open Calendar interface, the SLA will then be applicable according to the following transition period:
First 1-3 months: 75 %
Following 3-6 months: 85 %

At the end of the transition period, Belgacom will guarantee an SLA respect of 95%.

71. The SLA "Open Calendar response time" will be calculated as follows for WBA VDSL2, BROBA and BRUO together , and for the whole market, but separately for orders with action type "Provide New" and for orders with action type "Change Owner / Convert":

$$\% \text{ Response Time respected} = \frac{\text{Number of orders within Maximum Response time}}{\text{Total number of orders entered through Open Calendar}}$$

The cases defined in §6866 and 7370 of this document will be excluded from the calculation.

5.3.2 E-tools availability

~~62.~~72. The following e-tools used by the ~~Beneficiary~~Customer for eligibility, ordering or repair of its WBA VDSL2 lines are subject to an Availability SLA:

- LLU Inquiry tool,
- XDSL availability tool,
- Ordering XML (ordering through MTS interface),
- E-troubleshooting tool,
- Open Calendar (ordering through AHS interface).

The Availability SLA will be measured individually by Belgacom for each of these e-tools and - when relevant- separately for access by the ~~Beneficiary~~Customer through CWS portal and through XML .

~~63.~~73. Belgacom will endeavour to reach a maximum of **12~~4~~ hours** of unavailability per month, per e-tool and per type of access, excepted in the following cases, which will be excluded from the calculation:
- "Force majeure", or maintenance works that are announced by Belgacom at least 3 working days in advance via the communication channel FLASH or any equivalent mean,
- Unavailability of the e-tool due to misuse (*) performed by a ~~Beneficiary~~Customer.

(*) Misuse: Beneficiaries should use the correct standards to access the e-tools, should not access the tools by method other than the interfaces defined in function of each e-tools (web, MTS, AHS), should not call the interfaces via robotic or similar simulations (massive calls to the e-tools via a batch mechanism), and the access via certificates should not be used to send potential malicious malware into Belgacom systems.

~~64.~~74. The Availability of each e-tool and of each access type will be measured by Belgacom from Monday to Saturday (excluding Belgian and Belgacom holidays), between 08:00 AM and 08:00 PM.

~~65.~~75. The Availability SLA will be calculated by Belgacom at the level of access to each e-tool, separately for each access type, using robotic simulation of user transactions.

6 Wrongful Repair Requests

~~66.~~76. Belgacom will charge the ~~Beneficiary~~Customer with the fee related to Wrongful Repair Requests (see Annex ~~6~~5 – Pricing and Billing) if the fault is not attributable to Belgacom or if the fault results from the abnormal use of the line or any other ~~Beneficiary~~Customer - or end user of the ~~Beneficiary~~Customer - fault.

~~67.~~77. In case during the repair process, Belgacom performed useless actions further to ~~Beneficiary~~Customer's request, i.e. in case of absence of end-user at the appointment, incorrect information provided, Belgacom ~~will~~ reserves the right to charge the ~~Beneficiary~~Customer with the costs of those actions.

7 Documented reports

~~68.~~78. Belgacom will ~~provide~~publish, on a bi-monthly basis, reports with performance at market level. Performance will be reported per product: BRUO (with visit/without visit), BROBA (with visit/without visit), and WBA (with visit/without visit). ~~every two months the BIPT and each Beneficiary with documented reports on the lines ordered by this Beneficiary during these two months, containing all information needed to calculate the provisioning KPI's described in this document.~~

79. Customers will be entitled to request bi-monthly individual reports on the lines ordered during the two previous months, containing all information needed to calculate the provisioning KPI's and monitor Belgacom's performance towards them. For each individual report requested by the Customer Belgacom will charge a fix fee (see Annex 5: Pricing and Billing).
Results in individual reports will be aggregated at BRXX level in order to have statistically relevant volumes. While these results will be delivered on a bi-monthly basis, they do not trigger the application of SLA/penalties on a bi-monthly basis. The application of SLA/penalties at individual level is set out in the point 8 "Terms and Conditions for Compensations".

~~69.~~80. For ~~Beneficiaries~~Customers having requested individual reports, ~~This information will be transmitted to~~ the ~~each Operator individually,~~transmission of reports will be done on a confidential basis.

~~70.~~81. This information will be provided under the form of a structured file (Excel or CSV format), and will include at least the following data's:

- For each order: ~~Beneficiary~~Customer, CID, Order ID, product, date of order, end-user visit needed (y/n), Service Requested Date (SRD), Validate XML date, Done XML date.
- For each workorder part of an order: with/without visit (y/n), work order description, first proposed timeslot, chosen timeslot (if with visit), confirmed date, date of execution of work order. In case of workorder adaptation without new workorder, new proposed date, new chosen timeslot and reason of modification.

8 Terms and Conditions for Compensations

8.1 General

~~71.~~82. Compensations are applicable in the cases that Belgacom has not respected its commitment ~~within the delay or~~ on the delivery date agreed with the ~~Beneficiary~~Customer, excluding the cases in which the ~~Beneficiary~~Customer is responsible for the delay or in the case of force majeure.

~~72.~~83. This SLA guarantees 100 % of timers. However all troubles can not be solved within these timeframes. Compensation request will never be applicable in :

- 5 % of worst cases for the provisioning;
- 10 % of worst cases for the repair.

These percentages of cases are identified on basis of the cases over one calendar month.

~~73.~~84. Compensations will be settled through a ~~Beneficiary~~Customer's invoice without VAT.

85. Compensations are only applicable if the volumes per month are below the defined limits in the forecasting process as describe in the Annex ~~4~~3 – Planning and Operations.

86. Compensations are only applicable if the yearly ordered volumes of the ~~Beneficiary~~Customer exceed 200 orders. This threshold is necessary in order to minimize statistical risks due to a too low ordering level.

87. Compensations will be computed based on performance aggregated at BRXX level. This aggregation is necessary in order to have volumes that are statistically relevant.

88. Even though reports will be transmitted on a bi-monthly basis, the computation of compensations will be done on a yearly basis, except for Customers with a volume of above 1500 orders per month for whom the computation of the compensation will be done on a bi-monthly basis.

~~74.~~89. In case of timer escalations, the consequences as described further in this paragraph shall be applicable to Belgacom taking into account the concerned item (end-user line, Ethernet Transport and OLO Access Line). Compensations are calculated per timer without cascade effect, meaning that if a timer has been exceeded, compensations will only be due for this single timer (e.g. If a problem occurs on the access line, compensation will be paid only for the OLO Access Line and not for the Ethernet Transport and for not for the End Users).

~~75.~~90. The ~~Beneficiary~~Customer needs to provide Belgacom with the necessary information in case of a delayed repair or any shortage of Belgacom that give cause for the compensations described in this Service Level Agreement. Belgacom will upon receipt verify this information. When this verification appears that the information of the ~~Beneficiary~~Customer shows a shortcoming of Belgacom that gives cause for paying compensation, this payment will be done immediately and automatically.

~~76.~~91. The ~~Beneficiary~~Customer will submit a detailed request for compensation to Belgacom including for every repair requested at least date and hour notified/resolved, circuit id, problem on line and product type. The validity of each request for compensation will be examined by Belgacom and motivated in case of rejection for one or more repair records of this compensation request.

77.92. Quarterly quality meetings will be organized between Belgacom and the ~~Beneficiary~~Customer in order to compare the amounts of compensation that have been assessed by both parties.

8.2 Provisioning Escalations

8.2.1 Compensations Total Provisioning timer

93. These compensations are only applicable for ordered products introduced via the MTS interface (by XML).

94. Compensations are only applicable if the yearly ordered volumes of the ~~Beneficiary~~Customer exceed 200 orders. This threshold is necessary in order to minimize statistical risks due to a too low ordering level.

95. Compensation will be computed based on performance aggregated at BRXX level. This aggregation is necessary in order to have volumes that are statistically relevant.

96. Even though reports will be transmitted on a bi-monthly basis, the computation of compensations will be done on a yearly basis, except for Customers with a volume of above 1500 orders per month for whom the computation of the compensation will be done on a bi-monthly basis.

~~78.~~97. In cases where ~~P~~provisioning of the ordered product was not completed on the agreed Due Date~~.~~ e~~E~~xcept in the event of other deadlines being agreed with the ~~Beneficiary~~Customer, Belgacom undertakes to take all steps to establish a new connection. If this deadline communicated to the ~~Beneficiary~~Customer cannot be respected, Belgacom undertakes to inform the ~~Beneficiary~~Customer of the reasons for the delay and ~~also~~ to communicate the new deadline for meeting his request.

~~79.~~98. In cases that Belgacom has not respected its commitment to provision the ~~Beneficiary~~Customer within the agreed lead time ~~delay or on the date agreed with the Beneficiary~~, the ~~Beneficiary~~Customer will be entitled to a compensation per end-user line and per ~~calendar~~ working day, according to the rules presented in the following table~~:~~.

	Compensation
Provisioning Timer Escalation	10 € per working day with a maximum of 120 €

8.2.2 Compensations Appointment Kept

99. These compensations are only applicable for ordered products introduced via the Open Calendar interface.

100. Compensations are only applicable if the yearly ordered volumes of the ~~Beneficiary~~Customer exceed 200 orders. This threshold is necessary in order to minimize statistical risks due to a too low ordering level.

101. Compensation will be computed based on performance aggregated at BRXX level. This aggregation is necessary in order to have volumes that are statistically relevant.

102. Even though reports will be transmitted on a bi-monthly basis, the computation of compensations will be done on a yearly basis, except for Customers with a volume of above 1500 orders per month for whom the computation of the compensation will be done on a bi-monthly basis.

~~38.~~103. In cases that Belgacom has not respected the committed percentage as indicated in the definition of the SLA, the ~~Beneficiary~~Customer will be entitled to a compensation per Appointment not kept in the relating month.

Compensation due by Belgacom per Appointment not kept = 20€

8.2.3 Compensations Due Date Respected

104. These compensations are only applicable for ordered products introduced via the Open Calendar interface.

105. Compensations are only applicable if the yearly ordered volumes of the ~~Beneficiary~~Customer exceed 200 orders. This threshold is necessary in order to minimize statistical risks due to a too low ordering level.

106. Compensation will be computed based on performance aggregated at BRXX level. This aggregation is necessary in order to have volumes that are statistically relevant.

107. Even though reports will be transmitted on a bi-monthly basis, the computation of compensations will be done on a yearly basis, except for Customers with a volume of above 1500 orders per month for whom the computation of the compensation will be done on a bi-monthly basis.

~~39.~~108. In cases that Belgacom has not respected the committed percentage as indicated in the definition of the SLA, the ~~Beneficiary~~Customer will be entitled to a compensation per Due Date not respected in the relating month.

Compensation due by Belgacom per Due Date not Respected = 5€

8.2.4 Provisioning Shared VLAN/Service Quality Timer Escalations

~~40.~~109. The provisioning of shared VLAN/Service Qualities timer escalation includes the provisioning of new shared VLANs/Service Qualities and the modification of existing shared VLANs/Service Qualities when the provisioning of a new shared VLAN/Service Quality or the modification of an existing shared VLAN/Service Quality was not completed on the agreed date. Except in the event of other deadlines being agreed with the ~~Beneficiary~~Customer, Belgacom undertakes to take all steps to set-up or to modify the shared VLAN/Service Quality. If this deadline cannot be respected, Belgacom undertakes to inform the ~~Beneficiary~~Customer of the reasons for the delay and also to communicate the new deadline for meeting his request.

~~41.~~110. The ~~Beneficiary~~Customer will be entitled to a compensation that corresponds to the values per shared VLAN/Service Quality presented in the following table.

	Compensation
Provisioning of shared VLAN/ Service Qualities Timer Escalation (to be respected by Belgacom)	€ 10 per shared VLAN/ Service Quality per working day delayed with a maximum of 120€

8.2.5 Provisioning Access Line Timer Escalations

~~42.~~111. The ~~Beneficiary~~Customer will be entitled to the same compensation as described into the section 11.5.1 "Compensation - Provisioning" in the document "BROTSoLL Main Body".

8.3 Repair Timer Escalations

8.3.1 Repair End User line Timer Escalations

~~43.~~112. Interruptions of service which last more than the timers defined in Section 4.2.1 "Repair Timer on the End-User line", §33, and are the fault of Belgacom shall entitle the ~~Beneficiary~~Customer to a reimbursement of the rental fee corresponding to the duration of the interruption, provided he cannot claim compensation due to a

case of "force majeure" where Belgacom is unable to establish the connection or repair the breakdown within the agreed timeframe. In these cases, Belgacom shall notify the ~~Beneficiary~~Customer of the timeframe in which his request will probably be carried out. The timeframe taken into consideration for calculating the reimbursement amount goes from the day that the interruption is reported up to and including the day that service is restored.

~~44.~~113. The ~~Beneficiary~~Customer will be entitled to a compensation that corresponds to a percentage of the daily recurring fee per end-user line.

	Compensation
Repair Timer Escalations (to be respected by Belgacom)	150 % of daily rental fee per working day

8.3.2 Repair Ethernet Transport Timer Escalations

~~45.~~114. Interruptions of service where Belgacom did not intervene within the timeframes as defined in section 5.2.2 and are not the fault of the ~~Beneficiary~~Customer shall entitle the ~~Beneficiary~~Customer to a reimbursement that corresponds to the value presented in the following table, provided he cannot claim compensation due to a case of force majeure where Belgacom is unable to act within the agreed timeframe. In these cases, Belgacom shall notify the ~~Beneficiary~~Customer of the timeframe in which his request will probably be carried out.

	Compensation
Repair Timer Escalations Ethernet Transport (to be respected by Belgacom)	€100 per working day delayed

8.3.3 Repair OLO Access Line Timer Escalations

~~46.~~115. The ~~Beneficiary~~Customer will be entitled to the same compensation as described into the section 11.5.2 "Compensation - Repair" in the document "BROTSoLL Main Body".

9 Escalation procedure

~~47.~~116. By default Internal Escalations are performed automatically. The target of departments is to limit the number of external escalations by launching pro-actively internal escalations as soon as timers are exceeded.

~~48.~~117. Escalation is possible when a trouble ticket has been created.

~~49.~~118. External Escalation is done to level 1 after the defined timer has been passed. Further escalation can be requested to level 2 at day of first external escalation submitted +1 day. Escalation to level 3 can be requested at day of first external escalation submitted + 2 days.

~~50.~~119. Immediately External Escalation to Level 2 and Level 3 is accepted from persons at the same level in the Beneficiaries Organization in case the Level 1 escalation is done before and the level 1 escalation shows structural problems or unavailability. Level 2 and 3 will first check whether lower escalation steps have been taken, before proceeding.

~~51.~~120. The escalation matrix is available on the Belgacom Wholesale website, on the Customer's personal page.

Wholesale Broadband Access VDSL2

Annex ~~5a~~4a: Improved Service Level Agreement

Created on: 1~~3~~6 February 2012~~20~~
~~December 2011~~

belgacom

1 Table of contents

2 Object

1. The present document defines the Terms and Conditions upon which Belgacom will deliver repair services in the framework of WBA VDSL2. The elements included in this document replace those in the basic service level agreement, unless otherwise stated.

3 Scope

2. The scope of this document is to set a framework for operational collaboration between Belgacom and Beneficiary that ensures the respect of the fixed deadlines and an acceptable quality of the provided services.

3. The intention is to minimize the risk of shortcomings and so motivate all parties to respect the thresholds set in this SLA and to provide an incentive to enhance the performance of both parties.

4. Both parties agree that the objective of this document is to optimize operational collaboration and all efforts should be taken to avoid compensations or penalty fees.

5. ~~The working of this Service Level Agreement is subject to a learning curve, i.e. the current values included are target values that are to be evaluated on a regular basis and excessive peaks in ordering, i.e. very concentrated ordering in a very short period of time, must be analyzed when happening.~~

4 Prerequisites

~~6.~~5. This Improved Service Level Agreement is signed between two parties being Belgacom and Beneficiary concerned.

~~7.~~6. Belgacom will provide a SPOC with its respective name, telephone number or e-mail for the purpose of follow up or support. An escalation procedure is foreseen as described in the escalation procedure document published on Belgacom secured website. Escalation is only relevant after defined timer has been passed.

~~8.~~7. The document reflects only the service indicated. Any future interference due to synchronization with any other product is out of scope.

~~9.~~8. The Improved Service Level Agreement is not valid in situations of "Force Majeure" as defined in the "General Terms and Conditions".

~~10.~~9. In case of incomplete information in ticket creation (see point 7) by Beneficiary, the timer of the ticket concerned will ~~not be taken into account for the timers respect and compensations as further specified in this document~~be frozen by a stop clock. The timer will be unfrozen after Beneficiary has provided the necessary information.

~~11. Only service interruptions are covered by the current service. Degraded service (if any Bitstream activity is detected – see point 9) is not covered by the present ISLA.~~

10. If an appointment is needed at end user address, access is authorized without negotiation. It is the responsibility of the Beneficiary to inform its end user about it. This timer will be frozen by a stop clock ~~is not subject to the ISLA~~ in case an appointment is not accepted by the Beneficiary or its end user at the proposed date and/or hour, in case of absence of the end user at the appointment date and time, and in any case of incomplete or incorrect information provided by the Beneficiary with relevance for the repair process.

11. The principle of stop clocks penalises Belgacom in the sense that less effective repair time is available for its technicians (e.g. due to useless transport time). In case of repetitive situations (*) where the Belgacom's technician loses repair time or is forced to redo some activities due to failures of the Beneficiary or its end-user, Belgacom reserves the right to not take into account the ticket concerned for the timers respect and compensations as further specified in this document.

    (*) repetitive situations: when Belgacom's technician goes on site for the second time but cannot perform its work for the following reasons: end-user absent, site inaccessible or not ready, Beneficiary's technician absent,... while one of these negative situations had already occurred the first time for the same ticket.

5 Conditions

12. The services offered in virtue of this Improved SLA are to be described as follows:
    - Single helpdesk for all access lines & backbone & end-user lines issues
    - Improved timers for repair
    - Improved availability level
    - Higher compensations in case of default (compared to Basic SLA)

13. Belgacom is committed to achieve for the WBA VDSL2 services the best possible quality standards; as such the timers indicated in this document are maximum time intervals.

14. Belgacom confirms that it is applying normal network monitoring tasks and as such may already correct any fault detected without waiting for the Beneficiary to detect a fault. On lines without voice, Belgacom has no view on the end-user lines: this is where Belgacom's obligation for "normal network tasks" ends.

15. This Improved SLA is valid if for every trouble ticket the following conditions are applicable:

    - Delivery of forecasts on a range of active lines subject to ISLA is desirable but not mandatory. This delivery of forecasts will never prevent the putting into effect of the signed WBA VDSL2 ISLA. In any case, at the latest at the signing of the WBA VDSL2 ISLA, the Beneficiary will provide Belgacom with a list of lines to start the ISLA. In case the Beneficiary gives forecasts for new lines (or change SLA type), the forecasting method must be agreed upon by Beneficiary and Belgacom. In case no forecast is given by the Beneficiary for new lines (or change SLA type), the maximum increase per month of the number of active lines in the ISLA is fixed by BIPT at 30% per month, calculated on the number of active lines in the ISLA in the preceding month.
    - The Beneficiary reports by e-trouble ticketing, phone (0800/93122)~~, fax (02/540.46.69)~~ or e-mail (080093122@belgacom.be).
    - Overall authorization from the Beneficiary to access User premises without negotiation if needed for repair. A prior notification is to be given for any particular case. The overall authorization is considered to be not applicable if there is no prior notification. This is needed to give the Beneficiary the opportunity to inform the user prior to the access by Belgacom. Belgacom has to be informed when the end-user will be available on site.
    - Test and repair are actions authorized without negotiation or warning.
    - The repair timer will start after the validation of the information provided described in the diagnoses below in the trouble ticket.

6 Terminology

16. Trouble Ticket: The file created in Belgacom's computer system by a front-end helpdesk officer or an e-tool when a Beneficiary reports a problem. This file contains the information already available in the computer systems, the information provided by the Beneficiary and the information added by technicians during the repair process.

17. Trouble Intake: The creation of the Trouble Ticket in the computer systems for the repair of Belgacom services.

18. Gross Repair Time: Time needed to restore the service to the Beneficiary. This runs from the Trouble Intake to the close of the Trouble Ticket - i.e., the time when the service is re-established and after feedback has been given by Belgacom to the ~~beneficiary~~ Beneficiary and after the ~~beneficiary~~ Beneficiary has agreed with the closure of the ticket.

19. Stop-Clock Time: Time during which the timer is stopped during repair activities for reasons not attributable to Belgacom or one of its subcontractors or suppliers, e.g., inability to access certain sites, delay by third parties in carrying out work to be performed before Belgacom can act, performance of line measurements, etc.

20. Net Repair Time: Difference between the Gross Repair Time and the Stop-Clock Time.

21. Time to First Intervention: Interval between the trouble being reported by the Beneficiary and the first action taken by a Belgacom technician to repair the service via either a remote operation or on-site intervention.

22. Clock Hours: Target Repair Time, expressed in Clock Hours, i.e. where the service to be provided by Belgacom is available 24 hours per day, 7 days a week.

23. Working Hours: Target Repair Time expressed in Working Hours, i.e., where the service is available during Working Days from 8h00 to 16h30, excluding Saturday, Sunday, Belgian holidays and Belgacom holidays.

7 Information and test results

24. It is mandatory that the Beneficiary ~~gives~~ performs tests ~~results when~~ before opening a Trouble Ticket. ~~Belgacom delivers the form of standardization of these test results.~~ The applicable test methods are proposed by Belgacom and are mandatory.

25. The following information has to be included in the ticket:
    - Circuit identity number
    - Is service fully interrupted or degraded?

    The Circuit identity number will allow Belgacom to perform an automatic check on the administrative information.
    ~~Reference is made to the Belgacom template.~~

~~24.~~26. The transmission of test results by the Beneficiary is optional but in case the latter provides such information to Belgacom, reference is made to the diagnose information below.

~~**The following administrative info has to be included in the complaint template:**~~

- ~~Circuit identity number~~
- ~~Voice phone number (NA) -> lines with voice only~~
- ~~Installation address of the line~~
- ~~End-user contact person and contact phone number in case of field intervention~~
- ~~Leased line codification number of the OLO Access Line~~
- ~~End-user VDSL2 line profile~~
- ~~Ethernet Service Qualities (for WBA VDSL2 with shared VLANs)~~
- ~~Dedicated VLAN profile (for WBA VDSL2 with dedicated VLANs)~~
- ~~VLAN ID~~
- ~~WBA VDSL2 first use or not (bad provisioning or not)~~
- ~~Single user affected or several users affected~~

Diagnose info to be included by the Beneficiary in the complaint template for WBA VDSL2 with voice lines:

- ~~Is service fully interrupted or degraded~~
- Is End User VDSL2 line synchro present or not
- Confirm if VDSL2 modem or router is powered on
- Confirm if Computer is powered on
- Confirm if splitter(s) is(are) connected and checked
- Confirm if End User internal cabling is checked
- Is end-to-end Loop back Cell test successful or not

Diagnose info to be included by the Beneficiary in the complaint template for WBA VDSL2 without voice lines:

- Is line “open” or “short-circuited”?
- Measurement of the length of the line
- Measurement of the insulation between wires and wire/earth
- ~~Is service fully interrupted or degraded?~~
- Is End User VDSL2 line synchro present or not?
- Confirm if VDSL2 modem or router is powered on
- Confirm if Computer is powered on

- Confirm if End User internal cabling is checked
- Is end-to-end Loop back Cell test successful or not?

8 Set-up of service

~~25.~~27. Activation of the WBA VDSL2 ISLA per line can be done at ordering, the process needed to activate the ISLA will start immediately after the implementation of the WBA VDSL2 service. When ordering through the Open Calendar interface as well as through XML ~~T~~the request will be included in the remarks field of the XML ~~when ordering.~~ ~~if~~ If this remark field appears to be too small to include all information (because this field has also to be used to mention other kind of information), a second XML order for the same line can be issued by Beneficiary, where ~~beneficiary~~ Beneficiary will precise in the remarks field that it is a second order issued for the purpose of completing the information. At first, no change is possible through XML. Changing users already connected will be treated on a case-by-case basis within maximum two working days. In any case, each individual request can also be sent by fax, following the rules defined in the backup procedure, if XML is not available. The Beneficiary will provide Belgacom with a list of lines at the latest two working days before the bringing into service of the ISLA.

9 Nature of the service disruption

~~26.~~28. When reporting a disruption, it is essential that the Beneficiary clearly identifies the nature of the problem, i.e., to distinguish disruptions that have an impact on traffic from those that do not.

- Impact on traffic: A problem is presumed to have an impact on the traffic when it requires immediate action by Belgacom to effect a repair, i.e., in case of a complete line disruption.
- No impact on traffic: A problem is not considered to impact on traffic when it does not require immediate action by Belgacom to effect a repair, e.g., recurrent temporary disruption, quality problems, etc.

~~27.~~29. Service disruptions that do not impact on traffic are reported in the same manner as those that do. However, since long-term analysis is generally required to resolve such problems, Belgacom shall not be able to guarantee the Repair Time as for problems resulting in full line disruption.

~~28.~~30. In case of quality problems and recurrent temporary disruption where there is no impact on traffic, Belgacom will cooperate in good faith with the Beneficiary to find the cause of the problem. Information of the findings and results of the research about the causes are to be exchanged between Belgacom and the Beneficiary. Where such a decision is taken, the Beneficiary shall authorize Belgacom to interrupt the troubled line where necessary to effect immediate repairs within the requisite deadline.

10 Stop-Clock or freeze rules

~~29.~~31. The clock for repair starts when the complaint ticket is valid, i.e. in line with the conditions described in point 7.

~~30.~~32. There are four scenarios in which Belgacom may use the stop-clock procedure:

- Cooperation with the Beneficiary is impossible due to the absence of staff on the local site, there is no possibility of accessing the site or, despite several attempts, the Beneficiary contact point has proved impossible to contact by telephone, provided that those cases can be proved by e-mail evidence;
- The Beneficiary asks for the repair to be postponed or an appointment if applicable to be rescheduled;
- A Trouble Ticket is opened and the Beneficiary does not allow Belgacom to interrupt the line in order to perform tests.
- Awaiting feedback, input or confirmation of the Beneficiary that prevents Belgacom to proceed to the repair process

~~31.~~33. If the stop-clock procedure is used, this shall be fully documented in the System, which will set out the:

- Reason for stop-clock;
- Action to be undertaken;
- Timing;
- Name of the contact person in the Beneficiary's organization who was informed (except when the Beneficiary cannot be contacted by phone) or requests the stop clock.

11 Wrongful Repair Requests

~~32.~~34. Belgacom will charge the Beneficiary with the fee related to Wrongful Repair Requests (see Annex ~~6~~ 5 – Pricing and Billing) if the fault is not attributable to Belgacom or if the fault results from the abnormal use of the line or any other Beneficiary - or end user of the Beneficiary - fault.

35. In case during the repair process, Belgacom performed useless actions further to Beneficiary's request, i.e. in case of absence of end-user at the appointment, incorrect information provided, Belgacom ~~will~~ reserves the right to charge the Beneficiary with the costs of those actions.

12 Beneficiary's obligations

12.1 Contact persons

~~33.~~36. It is highly recommended that the Beneficiary provides a helpdesk. Belgacom may be unable to guarantee the repair time and feedback deadlines where it is unable to inform the Beneficiary of the status of repair operations.

~~34.~~37. It is highly recommended that the Beneficiary guarantees the availability of a 24/24, 7/7 helpdesk.

~~35.~~38. A technical contact with the Beneficiary will be available 24/24, 7/7.

~~36.~~39. Beneficiary will provide a SPOC with its respective name, telephone number and e-mail address for the purpose of follow up or support.

12.2 Site access

~~37.~~40. When calling the Belgacom Helpdesk, the Beneficiary will communicate the site access procedure..

~~38.~~41. If an appointment is needed at end user address, access is authorized without negotiation. It is the responsibility of the Beneficiary to inform its end user about it.~~.~~

~~39.~~42. The appointment date and time proposed by Belgacom will be agreed between the Beneficiary and Belgacom.

~~40.~~43. The end user or site contact person communicated is present at the proposed date and/or hour

~~41.~~44. Any failure to comply with these procedures shall result in a stop clock / freeze rule.

~~42.~~45. If necessary, the Beneficiary shall also undertake to provide the necessary staff during the repair process.

12.3 Required Information

~~43.~~46. Beneficiary will provide correct information with relevance for the repair process.

~~44.~~47. In case of incomplete information in ticket creation by the Beneficiary, the stop clock / freeze rule is applicable and the timer will be unfrozen after the Beneficiary has provided the necessary information.

13 Timers

13.1 Preliminary

13.1.1 Timers

~~45.~~48. All timers in present document are net timers. Delays due to Beneficiary are not taken into account and lead to stop clock. Net time is gross time minus stop clock times.

13.1.2 General Feedback Timer

~~46.~~49. Belgacom will give feedback to the Beneficiary within one hour after trouble ticket validation. In any case, a trouble is only to be considered as being closed after Belgacom has given feedback to the Beneficiary.

13.1.3 Note

~~47.~~50. The Repair Timer will be frozen in case appointment needed for the intervention proposed by Belgacom is scheduled later on demand of the Beneficiary and at that time the repair timer will be unfrozen and continued.

13.2 Repair

13.2.1 End-user line Trouble Ticket Resolution timer

~~48.~~51. The Trouble Ticket Resolution timer starts when Belgacom receives a trouble mention based on the issue description communicated by the Beneficiary and ends at the repair done permanently or identified as being definitely non-Belgacom originated of this Trouble Ticket. If an appointment is needed at the User address, access is authorized without negotiation. It is the responsibility of the Beneficiary to inform its User in those cases. This timer will be frozen in case an appointment is~~f~~ needed and is not accepted by the Beneficiary at the proposed date, in case of absence of the User at appointment date, and in any case of incomplete or manifest incorrect information provided by the Beneficiary with relevance for the repair process.

	Trouble Ticket Creation
Trouble Ticket Handling (to be respected by Belgacom)	24/24 hours, 7/7 days

	Repair Window
Repair Window (to be respected by Belgacom)	24/24 hours, 7/7 days

13.2.1.1 Trouble ticket resolution timer

	Repair Timer
Repair timer of WBA VDSL2 end user line (to be respected by Belgacom)	4 hours (60% of the trouble tickets resolved) 6 hours (80% of the trouble tickets resolved) 8 hours (95% of the trouble tickets resolved)

These percentages relates to the total number of trouble tickets opened by the Beneficiary per month for WBA VDSL2, ~~wrongful repair requests~~splicer interventions excluded, which Belgacom guarantees to resolve within the specified timers when the fault is under its responsibility.

13.2.1.2 Availability

~~49.~~52. Availability is equal to net timer of interruption due to Belgacom fault divided by the total time per year of availability committed to end user from the date of signing the agreement of theWBA VDSL2 service, taking into account the total number of lines from a Beneficiary subject to this ISLA. The time of interruption is defined as from the trouble ticket start resolution timer for a trouble that has been sorted out as being a Belgacom fault, excluding conditions of "Force Majeure" and wrongful repair requests up to the moment of the ticket closure, mentioned to the Beneficiary with information about the reason of outage.

	Average yearly availability
Availability	99,4% for < 1500 lines in improved SLA 99,5% for 1500 lines in improved SLA 99,6% for 2500 lines in improved SLA 99,7% % for > 5000 lines and conditions see below in improved SLA

~~50.~~53. For a volume of more than 5000 lines, availability is set at 99,7 % if all of the following conditions are fulfilled. Cases where this condition is not achieved will be out of scope of this availability improvement.

- The Beneficiary will perform its own proactive measurements following a measurement procedure agreed with Belgacom and communicate the results of these measurements on a regular basis. Belgacom will analyze and could perform pro-active repair actions on the Beneficiary's loops based on these results. Note that it should be defined how Belgacom can recover the costs for these actions.
- Give Belgacom technically, the possibility to make the intervention on the pair (ensure continuity) till a demarcation point between Belgacom and the Beneficiary collocation, if any (without dismantlement of the pair at the Beneficiary equipment). For this, no fast test procedure can be done, as it is always a test between Belgacom and Beneficiary technician. If this is not possible, i.e. the inclusion and full conversion from all lines to an Handover Distribution frame is needed, this cases will be excluded
- Mention for every demand of repair, what type of signal is coming to the User.

~~51.~~54. The volume for applicability of case 1) can be agreed bilaterally between Belgacom and the Beneficiary.

14 Prices

~~52.~~55. Reference is made to Annex ~~6~~5 Pricing and Billing

15 Compensations

15.1 General

~~53.~~56. Belgacom shall pay compensation to the Beneficiary for any delay not respecting the ISLA date or time otherwise agreed with Beneficiary. Belgacom shall not pay compensation to the Beneficiary for periods of delay, resulting from circumstances beyond its reasonable control, like a force majeure event or a delay caused by Beneficiary or the end-user (i.e. during which the timer "clock" is stopped). Belgacom shall notify Beneficiary as soon as possible when such circumstances arise and inform Beneficiary of the details of the events and the estimated duration. In case of "Force Majeure", Belgacom will try to soften the effects of the events and to continue to fulfil its contractual obligations as soon as reasonably possible.

57. Compensations will be settled through a Beneficiary's invoice without VAT.
~~54. Payment will be expressed in a discount on next provisioning and rental bill(s) for the respective service.~~

~~55.~~58. The Beneficiary has to provide Belgacom with the necessary information in case of a delayed repair or any shortage of Belgacom that gives cause for the compensations described in this ISLA. Belgacom will upon receipt verify this information. When this verification shows a shortcoming of Belgacom that gives cause for paying compensation, this payment will be done immediately and automatically.

~~56.~~59. The Beneficiary will submit a detailed request for compensation to Belgacom including for every repair requested at least date and hour notified/resolved, circuit id, problem on line and product type. The validity of each request for compensation will be examined by Belgacom and motivated in case of rejection for one or more repair records of this compensation request.

~~57.~~60. In case of repair timer escalations, the consequences as described further in this paragraph shall be applicable to Belgacom.

15.2 End-user line Repair Timer Escalations

~~58.~~61. Troubles which last more than the timers described in point 13.2.1 and are the fault of Belgacom shall entitle Beneficiary to receive payment of compensation by Belgacom, provided he cannot claim compensation due to a case of force majeure where Belgacom is unable to respect the timers. In these cases, Belgacom shall notify Beneficiary of the probable timeframe. The timeframe taken into consideration for calculating the compensation goes from the day on which the trouble is reported to the day of closing the trouble ticket included. The calculation of the % is done on a monthly basis.

15.2.1 Trouble ticket resolution timer

Type of repair timer	Compensation
< 60% in 4 hours	50% of the line monthly rental fee per trouble ticket closed in more than 4 hours
Between 60% and <80% in 6 hours	100% of the line monthly rental fee per trouble ticket closed in more than 6 hours
Between 80% and <95% in 8 hours	150% of the line monthly rental fee per trouble ticket closed in

	more than 8 hours

15.2.2 Availability

~~59.~~62. In case the guaranteed minimum yearly availability of the line is not respected due to a cause that is not external to Belgacom, the Beneficiary is entitled to a compensation as described in the table hereunder. The definition of the availability is given at the section 0

Availability Compensation	
Number of related pairs	**Compensation (in EUR)**
< 100 or < 2 LEX/LDC concerned	0
> 100 and > 1 LEX/LDC concerned	5% of yearly rental fee Improved SLA

Wholesale Broadband Access VDSL2

Annex ~~5~~4b: Improved Service Level Agreement for Provisioning

Created on: 1~~3~~ 6February 2012~~20~~
~~December 2011~~

belgacom

1 Table of contents

2 Object

1 The present document defines the specific Terms and Conditions upon which Belgacom will provision WBA VDSL2 lines in case ISLA on provisioning for those lines was requested. The elements included in this document replace those in the basic service level agreement, unless stated otherwise.

3 Prerequisites

2 This Service Level agreement is signed between two parties being Belgacom and Beneficiary concerned.

3 Belgacom will provide a SPOC with telephone number and e-mail (CAR_LLU), for the purpose of follow up or support.

4 The document reflects only the service indicated. Any future interference due to synchronization with any other product is out of scope.

5 The Service Level Agreement is not valid in situations of force majeure. The term “Force Majeure” as used in this ISLA shall include, without limitation, earthquake, fire, flood, epidemic, act of war, strikes, whether declared or undeclared, blockade, insurrection, riot or other cause(s) beyond the reasonable control of either of the parties, these other causes being duly agreed as such by the other party.

6 The ISLA on provisioning applies only for lines installed by Belgacom, and does not apply to any line installed by a certified technician.

4 Conditions

7 The services offered in virtue of this Improved SLA on Provisioning are to be described as follows:

- Improved validation timers compared to Basic SLA Validation XML timer,
- Improved percentages compared to basic SLA on Appointment Kept,
- Higher compensations in case of default (compared to basic SLA on Appointment Kept),
- ~~Free of charge modification of the Service Requested Date by the Beneficiary, in case that the Due Date provided by Belgacom differs from the initial Service Requested Date of the Beneficiary.~~
- Free of charge modification of the due date, in case that the due date provided by Belgacom after the validation differs from the date scheduled by Beneficiary via Open Calendar.

4.1 Terminology

- Order: assembly of all work orders needed to deliver an ordered product .
- Work order: one of the different actions assigned to a Belgacom technician to perform the delivery of an ordered product.
- Ordered product : the line ordered by the Beneficiary
- Appointment: Date for the customer visit which was communicated by Belgacom to the Beneficiary by means of XML.

4.2 Description

8 For an order for which ISLA for Provisioning has been requested by the Beneficiary via the ~~electronic~~ Open Calendar ordering system, Belgacom will take all necessary actions to follow-up this order in the provisioning chain and ensure the appointment on which Belgacom has committed ~~via xml~~ is kept.

4.2.1 Validation xml Timer

9 As soon as an order to activate WBA VDSL2 for an individual End-User ~~with ISLA on Provisioning~~ is submitted to Belgacom through the secured electronic e-mail system (XML), via the Open Calendar ordering interface or as back up procedure via non-secured electronic system and fax as described in the Annex ~~4~~3 - Planning & Operations, the order will be processed for validation. The validation xml timer will start on the receipt of the order. This receipt is the automated acknowledge message that is sent to the Beneficiary. Messages that are incorrect, due to the reasons as described in the Annex ~~4~~3 - Planning and Operations will be returned with a Not Acknowledged message. In this case, Beneficiary needs to resend the order with the corrections.

10 The validation or rejection process consists of an administrative and technical validation. The validation will be sent as soon as all validations have passed successfully. In case of not acceptance of the order, a reject message will be sent to the Beneficiary and the rejection reasons will be communicated with the respective message.

11 For all orders for which ISLA on Provisioning has been requested by the Beneficiary via the Open Calendar Interface ~~electronic ordering message~~, Belgacom will endeavour to validate the orders in the timers mentioned in the following table :

~~Type of treatment of the order~~ Validation/Rejection Timer	~~Validation Timer~~ Percentage of orders validated or rejected within the corresponding validation timer
~~Flowthrough treatment of the order~~30 minutes	~~30 minutes~~50 %
2 Working Days	98 %
~~Manual treatement of the order~~5 Working Days	~~2 working days~~100 %

12 Since the 100% timer is actually not feasible because of the orders requiring factual spot checks or site surveys, Belgacom will provide twice a year to BIPT a reporting on the cases being validated beyond 5 working days.

~~12~~13For every order submitted to Belgacom via the Open Calendar ordering interface, and validated by Belgacom, the Due Date of the order may only be adapted by Belgacom when, during the installation, the end-user was directly the cause of the change (e.g.: Customer Absent) or after payment by Belgacom to the OLO of the Change Date Fee mentioned in the Annex ~~6~~ 5 Pricing and Billing.

4.2.2 Appointment Kept timer

~~12~~14This indicator is ~~will~~ not applicable ~~apply~~ for ~~all~~ lines installed by a certified technician.

15 Belgacom will publish globalized measures of Appointment Kept. ~~is measured per Beneficiary.~~ Beneficiaries are entitled to request individual reports in order to monitor Belgacom's performance towards them. Each individual report requested will be charged at a fix fee (see Annex 5: Pricing and Billing).

16 Appointment kept~~It~~ measures the number of orders with Customer Visit that have respected all their Customer Visit appointments. In case of an order with multiple customer visits, if ~~If~~ one Customer Visit appointment has not been respected, the full order is considered as out of SLA.

~~13~~17The bimonthly computation of the ISLA for Provisioning is defined as follows:

$$\% \text{ Appointment kept} = \frac{\text{Number of ISLA orders for which all Customer Visit appointments are kept}}{\text{Number of ISLA orders having at least one Customer Visit}}$$

For all products ordered with an ISLA on Provisioning, this bi-monthly percentage is set at **99 %**.

~~14~~18 An appointment is considered as "kept" if the technician is "on site" on the day of the appointment as it was communicated to the Beneficiary.

~~15~~19If multiple customer visits are scheduled on the same date for installation of a line, the appointment is considered as kept if at least 1 intervention has started on the scheduled date. E.g. Splicer intervention followed by a standard installation

~~16~~20 Notwithstanding the provisions of points 17~~9~~ and 18~~10~~ above, if the Belgacom technician was present on the appointment date but the end user was not present ("customer absent"), refused or asks to postpone the installation, the appointment is considered as kept and the applicable fee will be charged. For the necessary second intervention the applicable fee will also be charged

4.3 Set-up of service

~~17~~21 Activation of the improved SLA per line can be done at ordering via the Open Calendar Interface~~electronic ordering system~~.

5 Beneficiary 's obligations

5.1 Contact persons

~~18~~22 A contact person who will be present on site at the date of the appointment and whose contact number needs to be communicated in the xml.

5.2 Required Information

~~19~~23 Beneficiary will provide in the order correct contact information with relevance for the provisioning process: Contact person who will be present on site at the day of the appointment, contact number, address.

~~20~~24 In case of incomplete or incorrect information given in the order by Beneficiary, the ISLA on provisioning target can not be guaranteed.

6 Prices

~~21~~25 Reference is made to Annex ~~6~~5 Pricing and Billing.

~~22~~26 For any WBA VDSL2 line ordered with ISLA on Provisioning, if the Due Date provided by Belgacom in the Validate XML differs from the date scheduled by the Beneficiary via Open Calendar ~~initial Service Requested Date submitted initially by the Beneficiary~~, then any reasonable request of the Beneficiary to modify the ~~SRD~~Due Date will be free of charge.

7 Compensations

27 Compensations are applicable in the cases that Belgacom has not respected its commitment on the date agreed with Beneficiary, excluding the cases in which Beneficiary or its End user is responsible (e.g. customer absent) or in the case of force majeure.

28 Compensations are only applicable for ordered products introduced via the Open Calendar interface.

29 Compensations are only applicable if the yearly ordered volumes of the Beneficiary exceed 500 orders. This threshold is necessary in order to minimize statistical risks due to a too low ordering level.

30 Compensation will be computed based on performance aggregated at BRXX level. This aggregation is necessary in order to have volumes that are statistically relevant.

31 Even though reports will be transmitted on a bi-monthly basis, the computation of compensations will be done on a yearly basis, except for Beneficiaries for whom the computation of the Basic SLA compensations will be done on a bi-monthly basis and subject to a minimum of 500 ISLA orders by period of two months.

~~23~~32 Payment will be made via a credit note on next provisioning and rental bill(s) for the respective service.

~~24~~33 The Beneficiary needs to provide Belgacom with the necessary information in case of any shortage of Belgacom that might give cause for the compensations described in this Improved Service Level Agreement. Belgacom will upon receipt verify this information. When at this verification appears that the information of the Beneficiary shows a shortcoming of Belgacom that gives cause for paying a compensation, this payment will be done immediately and automatically on the next invoice relevant to the service concerned.

~~25~~34 The Beneficiary will submit a detailed request for compensation to Belgacom. The validity of each request for compensation will be examined by Belgacom and motivated in case of rejection within a delay of maximum 20 working days, if the request is related to orders submitted during the 3 months preceding the request. If Belgacom has not rejected the request within the delay of 20 working days, the request will automatically be considered as approved by Belgacom. If the request is related to orders submitted before the 3 months preceding the request, the delay of 20 working days does not apply.

	Compensation
Per appointment missed	€40

Amendment to the WBA VDSL2 Agreement between .../... and Belgacom

Between

.../... a limited liability company incorporated under the laws of .../... , having its registered office at .../...

(hereafter referred to as ".../...")

and

Belgacom N.V./S.A., a Belgian autonomous public enterprise organized under the Law of March 21, 1991 and the Royal Decree of August 19, 1992, with registered office and place of business at 1030 Brussels, 27 Boulevard du Roi Albert II, registered with the Brussels Register of Legal Entities under number VAT BE 0202 239 951 (hereafter referred to as "Belgacom")

Whereas .../... and Belgacom (jointly referred to as the "Parties") have entered into Agreement for the Provisioning of ...WBA VDSL2... in the Local Loops of Belgacom on ...Date... (hereafter referred to as the "WBA VDSL2 Agreement");

Whereas the Parties have agreed to define improved service levels guarantees in the frame of the Service;

Now, therefore, it is hereby agreed as follows:

Article 1 - Adjunction of the Improved Service Level Agreement

By the present Amendment, the Parties agree to add the Improved Service Level Agreement for Provisioning as enclosed to the present Amendment.

Article 2 - General provisions

The provisions of a general nature of the WBA VDSL2 Agreement including, in particular but without limitation, those on liability, confidentiality, choice of law and dispute resolution are incorporated by reference into and are fully applicable to the present Amendment to the WBA VDSL2 Agreement.

The present amendment constitutes, at the time of signature of this amendment, the only changes to the existing WBA VDSL2 Agreement.

In witness whereof, .../... and Belgacom have caused this Amendment to the WBA VDSL2 Agreement to be executed in two original copies, each Party acknowledging having received one original copy, by the hands of their duly authorized officers, on the date and year written below.

Brussels, _____ .

For Belgacom:	For .../...
_____	_____
By : Title : Date :	By : Title: Date :
_____	_____


belgacom
together with
proximus
telindus

Wholesale Broadband Access VDSL2

Annex ~~6~~5: Pricing & Billing

Created on: ~~13~~16 February 2012~~20 December 2011~~

1 Table of contents

Preliminary notes

All prices included in this Price List are expressed in Euro, VAT excluded.
Structure and prices of the below Price List are subject to further adaptations.
Unless specified otherwise, the word "WBA VDSL2" equally refers to the two types of service: with shared or with dedicated VLANs.

1 Prices overview

This section presents an overview of all the prices of the WBA offer. It contains no additional information to the following sections, which present additional information on the prices. In case of inconsistency between the prices in the overview and the following sections, the latter will prevail.

1.1 End user line

	Shared VLAN		Dedicated VLAN	
	With voice	Without voice	With voice	Without voice
Rental				
Monthly fee	8,67	14,09	8,83	14,25
Activation				
DIY	*Activation without end-user visit (only possible for WBA with Shared VLAN)*			
New installation - installed by Belgacom - installed by CT	74,24 -	72,59 10,88	- -	- -
Migration *(from other owner or from other product)* - installed by Belgacom - installed by CT	88,81 -	90,48 13,14	- -	- -
Telecom	*Activation with end-user visit*			
New installation - Installed by Belgacom - Installed by CT	120,18 -	118,34 10,88	159,63 -	157,99 45,13

Migration *(from other owner or from other product)* **- installed by Belgacom** **- installed by CT**	134,08 -	135,69 13,14	172,72 -	174,33 44,96
Others	*Other fees related to activation*			
De-activation of an end-user line	4,47	4,64	9,13	9,30
Rush order	2 x (Activation fee)			
SNA – Small Network Adaptations *(Additional fee to the installation by Belgacom)*	447,63			

Service quality

Service quality: activation, modification, de-activation	14,32	-
Modification of a dedicated VLAN profile	-	33,47

1.2 Ethernet transport

	Shared VLAN	Dedicated VLAN
Rental		
Monthly fee (€ per Mbps)	*Shared VLAN are symmetrical*	*Max(upstream, downstream) per p-bit taken into account*
Best Effort (p=0)	1,96	Pp0=2,45
Low Priority (p=1)	2,61	Pp1=3,26
Medium Priority (p=3)	3,27	Pp3=4,09
Highest Priority (p=5)	3,92	Pp5=4,90
One-time fees		
Activation Ethernet transport *(per shared VLAN)*	49,40	-
Modification of VLAN Bandwidth *(per shared VLAN)*	30,28	-
De-activation of shared VLAN *(per shared VLAN)*	2,68	-

1.3 OAL

OLO Access Lines

Customer-Sited OAL	See BROTSoLL Ethernet pricing
1GE Belgacom-Sited OAL **- Enquiry** **- Cable and tray installation** **- Small building Works** **- Monthly rental: cable and tray**	 112 6,74 *(per meter, min 20m)* Case by case *(if necessary)* 38,47 + 0,17 per meter *(min 5m)*
1+1 GE Belgacom / Customer-Sited OAL	Sum of tariffs applicable to both OALs.
1 GE Backhaul OAL	See BROTSoLL Ethernet pricing

1.4 SLA and ISLA

Basic SLA

Basic SLA fee	0
SLA documented reports *(unit price per report)*	25,14

ISLA on repair

Setup fee *(paid once for the first ISLA: shared or dedicated VLAN)*	2000,47
Setup fee *(on a new line)*	8,23
Change SLA type *(SLA to ISLA or ISLA to SLA)*	8,23
Monthly fee per end user	8,74

ISLA on provisioning

Fee *(per customer visit)*	**10**

1.5 Others

	Shared VLAN		Dedicated VLAN	
	With voice	Without voice	With voice	Without voice
Other fees (related to activation)				
Coordinated move	78,71	-	168,76	-
Conversion PSTN/ISDN	36,82	-	36,82	-
Incorrect installation by CT *(additional fee to repair)*	-	140,36	-	145,76
Incorrect migration by CT *(additional fee to repair)*	-	155,45	-	162,27
End user visit detected during repair (if installed by Belgacom) *(additional to activation fee without end-user visit)*	0	78,21	-	
Change on Belgacom Voice Service - with > without voice (asked by OLO) - with > without voice (others) - without > with voice	5,42 0 0			
Change implementation date *(before DD-1 12PM)*	6,78			
Cancel order *(before DD-1 12PM)*	7,20			
Useless end-user visit	20,59			
Wrongful repair request	107,62			

Compensation for Non First Time Right Installation *(paid by Belgacom)*	=Activation fee of WBA VDSL2 service on this user line
WBA startup: rate per hour of Belgacom person	102,49
e-tools	0

1.6 Databases use

Street information

First KVD	17,75
Extra KVD	0,59
For every extra 20' started	17,16 A maximum of 17,25 * [# of requested KVD's] will be billed

Network Street relation database

Initial License Fee	16 660
1 update/year *(anual fee)*	2 000
6 updates/year *(anual fee)*	5 000

~~Preliminary notes~~

~~All prices included in this Price List are expressed in Euro, VAT excluded.~~
~~Structure and prices of the below Price List are subject to further adaptations.~~
~~Unless specified otherwise, the word "WBA VDSL2" equally refers to the two types of service: with shared or with dedicated VLANs.~~

2 Pricing

2.1 Startup fee

1 The start-up fee is charged to Customer, operator, consultant or other that requires explanations by Belgacom WBA VDSL2 specialists (Product Management and/or Customer Care service) on the offer content (e.g. this fee is not charged for negotiation meetings). This fee is due until the first installation of the Customer of a VLAN on a LEX (in case of WBA VDSL2 with shared VLAN) or until ordering of the first WBA VDSL2 end-user line (in case of WBA VDSL2 with dedicated VLAN).

Information on WBA VDSL2	**Price**
Rate per hour per Belgacom person	€102,49

2.2 Tariffs applicable for the End User line for WBA VDSL2 line with shared VLANs

2 In section 2.2, the word "WBA VDSL2" refers systematically to the service with shared VLANs.

2.2.1 One time fees

2.2.1.1 LLU Inquiry Tool

3 The Customer will be invoiced the following amount per inquiry done (either by Web interface or by XML).

	Euro
Per inquiry done	€0,00

2.2.1.2 Activation Fee of WBA VDSL2 Service on an End User Line

4 The following activation fees are inclusive the price of the activation of the first Service Quality on the End User Line.

Activation Fee per line without End-User Visit	**Price**
Activation fee for WBA VDSL2 with voice	€74,24
Activation fee for WBA VDSL2 without voice, installed by Belgacom	€72,59

Activation fee for WBA VDSL2 without voice, installed by certified technician	€10,88

5 In case of request by the Customer of a "with End-User visit" together with the Activation of an End User Line, the additional fee for "with End-User visit" is added to the Activation Fee without End-User Visit.

Additional fee per line for with End-User Visit	**Price**
WBA VDSL2 with voice	€45,94
WBA VDSL2 without voice, installed by Belgacom	€45,75
WBA VDSL2 without voice, installed by certified technician	€0,00

6 If an activation for WBA VDSL2 without voiceis ordered with installation by Belgacom and without visit but that during the activation process of the line, Belgacom finds that a End-User visit is required, the additional fee for "with End-User visit" will be added to the Activation Fee without End-User Visit, independently of the initial request of the Customer.

7 If during a repair action performed by Belgacom on a newly installed WBA VDSL2 without voice line **installed by Belgacom**, when the provisioning process allowed to determine that the installation of a NTP by a Belgacom technician was not necessary, in case the trouble covered by the Trouble Ticket was due to the absence of the Network Termination Point, an additional fee for with End-User Visit detected during a repair action will be due. This fee will be invoiced on top of the Activation Fee without End-User Visit.

Additional fee for End-User visit detected during repair	**Price**
WBA VDSL2 without voice	€78,21

8 Both the 2 additional fees for the "with End-User visit" installation on WBA VDSL2 without voice end-user line installed by Belgacom and the additional fee for the "with End-User visit" installation on WBA VDSL2 with voice end-user line installed by Belgacom include the Network Termination Point installation, travel to the end-user and hardware costs.

9 If during a repair action performed by Belgacom on a newly installed WBA VDSL2 without voice line installed by a certified technician, in case the trouble covered by the Trouble Ticket was due to an incorrect installation performed by the certified technician, an additional fee for repair will be due. This fee will be invoiced on top of the Activation Fee for WBA VDSL2 without voice, installed by a certified technician.

Additional fee for repair due to the incorrect installation by certified technician	**Price**
WBA VDSL2 without voice	€140,36

2.2.1.3 Rush Order

10 When Rush order has been requested the standard activation fee will be doubled.

2.2.1.4 Service Quality Configuration Fee on an End User Line

	Euro
Activation/Modification/ De-activation fee per Service Quality	€14,32

11 For the first Service Quality activated together with the activation of the End-User Line, the above-mentioned fee for the Service Quality Activation must not be added to the Activation Fee per line.

12 For the last Service Quality de-activated together with the de-activation of the End-User Line, the above-mentioned fee for the Service Quality de-activation must not be added to the De-activation Fee per line.

2.2.1.5 Coordinated Move

Coordinated Move Fee	Price
Move of the WBA VDSL2 with voice service from location A to location B in coordination with move of the Voice service	€78,71

13 This fee remunerates the coordination of the move of the Customer's data service together with the Belgacom Voice service, in the framework of a WBA VDSL2 with voice. The coordinated move fee includes both the activation and the de-activation part of the move.

2.2.1.6 Conversion PSTN/ISDN

14 Conversion is the change from WBA VDSL2 with voice over PSTN toward WBA VDSL2 with voice over ISDN and vice versa.

Conversion Fee	Price
WBA VDSL2 with voice	€36,82

2.2.1.7 De-activation fee of an End User line

15 This is the fee that the customer has to pay in case the customer wants to stop an already activated service.

	Euro
De-activation fee for WBA VDSL2 line with voice	€4,47
De-activation Fee for WBA VDSL2 line without voice	€4,64

16 The above-mentioned fees are inclusive the price of the de-activation of the last Service Quality on the End User Line.

2.2.1.8 Change Date Fee

17 When a Customer requests to change the date of implementation, Belgacom will invoice this Customer the following Change Date fee:

Change Date Fee	Euro
Change before DD-1 (12 pm)	€6,78

2.2.1.9 Cancellation Fee

18 The Customer requesting the cancellation of an order shall pay to Belgacom the administrative fee mentioned in the table below:

Cancellation Fee	Euro
Cancellation before DD-1 (12 pm)	€7,2

19 In case cancellation is requested after DD-1 (12 pm), the related activation fee and the de-activation fee (instead of the cancellation fee) will have to be paid by the Customer (refer to point 2.2.1.2 and 2.2.1.7~~2.2.1.7~~ of this section).

2.2.1.10 Pending order due to useless end-user visit

Pending order due to useless end-user visit	Euro
Per intervention	€20,59

20 ~~This fee is due when an end-user of the Customer is not present at his premises on the appointment date, and if the installation is performed by Belgacom.~~This fee is due when the technician performs a useless end-user visit on the appointment date, and if the installation is performed by Belgacom. A useless end-user visit can happen for the following reasons:

- End-user refuses the installation,
- End-user is absent,
- End-user is not ready for the installation,
- End-user cancels the order.

2.2.1.11 Improved SLA on repair

~~20~~21 One-time fee for configuration of systems and resources. The setup fee is to be paid one time only, for the first Improved SLA WBA VDSL2 ("Improved SLA WBA VDSL2 shared VLAN" or "Improved SLA WBA VDSL2 dedicated VLAN").

	One-time fee
Setup fee	€2.000,47

~~21~~22 One-time fee per line for setup of ISLA in case of a new line.

	One-time fee
Activation fee	€8,23

~~22~~23 One-time fee per line for change of the SLA from Basic to Improved (or reverse) in case of an existing line.

	Per local loop
Change SLA type fee	€8,23

~~23~~24 Rental fee per local loop with the ISLA type in addition to the monthly fee.

	Monthly Rental
Extra Rental Fee	€8,74

2.2.1.12 Improved SLA on provisioning

~~24~~25 For application of the ISLA, a one-time fee for follow-up and coordination will be applicable per customer visit.

	One-time fee
Per customer visit	€10,00

2.2.1.13 Small Network Adaptations

~~25~~26 In case Belgacom needs to perform additional work, also called Small Network Adaptations, both the Small network Adaptations and the installation of the line will always be performed by Belgacom, according to the terms and definitions as defined in this Offer. The following fee will apply in surplus of the Activation fee relevant to an installation by Belgacom.

	Euro
Small Network Adaptations	€447,63

2.2.1.14 Wrongful repair request

~~26~~27 In case of wrongful repair request by a Customer, as defined in section ~~8~~13. 8 (“Wrongful Repair Requests”) of Annex ~~4~~3 (Planning and Operations), Belgacom will invoice this Customer a fee of 107,62 Euro.

~~27~~28 Belgacom will provide the following information to the Customer: the ticket number, the date and hour of opening and closing of the ticket, the identification number (e.g. directory numbers) and the cause of the wrongful repair.

2.2.2 Monthly Recurring fee per End User line

WBA VDSL2 With voice	
BRUO Shared Pair (excl. Splitter maintenance cost)	€0,52
Passive part	€4,46
Active part	€3,07
Transport Rental ETH	€0,62
Total Monthly Rental	**€8,67**

WBA VDSL2 Without voice	
BRUO Raw Copper	€5,94
Passive part	€4,46
Active part	€3,07
Transport Rental ETH	€0,62
Total Monthly Rental	**€14,09**

2.3 Tariffs applicable for the End User line for WBA VDSL2 lines with dedicated VLANs

~~28~~29 In section 2.3~~2.3~~, the word "WBA VDSL2" refers systematically to the service with dedicated VLAN.

2.3.1 One time fees

2.3.1.1 LLU Inquiry Tool

~~29~~30 The Customer will be invoiced the following amount per inquiry done.

	Euro
Per inquiry done	€0,00

2.3.1.2 Activation Fee of WBA VDSL2 Service on an End User Line

~~30~~31 The following activation fee is inclusive the price of the configuration of the dedicated VLAN.

~~31~~32 This fee includes the Network Termination Point installation, travel to the end-user and hardware costs.

Activation Fee per line	**Price**
Activation fee for WBA VDSL2 with voice	€159,63
Activation fee for WBA VDSL2 without voice, installed by Belgacom	€157,99
Activation fee for WBA VDSL2 without voice, installed by certified technician	€45,13

~~32~~33 If during a repair action performed by Belgacom on a newly installed WBA VDSL2 without voice installed by a certified technician, in case the trouble covered by the Trouble Ticket was due to an incorrect installation performed by the certified technician, an additional fee for repair will be due. This fee will be invoiced on top of the Activation Fee for WBA VDSL2 without voice, installed by a certified technician.

Additional fee for repair due to the incorrect installation by certified technician	**Price**
WBA VDSL2 without voice	€145,76

2.3.1.3 Rush Order

~~33~~34 When Rush order has been requested the standard activation fee will be doubled.

2.3.1.4 Modification of a dedicated VLAN profile

	Price
Modification of a dedicated VLAN profile	€33,47

2.3.1.5 Coordinated Move

Coordinated Move Fee	Price
Move of the WBA VDSL2 with voice service from location A to location B in coordination with Voice move	€168,76

~~34~~35 This fee remunerates the coordination of the move of the Customer's data service together with the Belgacom Voice service, in the framework of a WBA VDSL2 with voice. The coordinated move fee includes both the activation and the de-activation part of the move.

2.3.1.6 Conversion PSTN/ISDN

~~35~~36 Conversion is the change from WBA VDSL2 with voice over PSTN toward WBA VDSL2 with voice over ISDN and vice versa.

Conversion Fee	Price
WBA VDSL2 with voice	€36,82

2.3.1.7 De-activation fee of an End User line

~~36~~37 This is the fee that the customer has to pay in case the customer wants to stop an already activated service.

	Euro
De-activation fee for WBA VDSL2 line with voice	€9,13
De-activation Fee for WBA VDSL2 line without voice	€9,30

~~37~~38 The above-mentioned fees are inclusive the price of the de-activation of the dedicated VLAN.

2.3.1.8 Change Date Fee

~~38~~39 When a Customer requests to change the date of implementation, Belgacom will invoice this Customer the following Change Date fee:

Change Date Fee	Euro
Change before DD-1 (12 pm)	€6,78

2.3.1.9 Cancellation Fee

~~39~~40 The Customer requesting the cancellation of an order shall pay to Belgacom the administrative fee mentioned in the table below:

Cancellation Fee	Euro
Cancellation before DD-1 (12 pm)	€7,20

~~40~~41 In case cancellation is requested after DD-1 (12 pm), the related activation fee and the de-activation fee (instead of the cancellation fee) will have to be paid by the Customer (refer to point 2.3.1.2 and 2.3.1.7~~2.3.1.7~~ of this section).

2.3.1.10 Pending order due to useless end-user visit

Pending order due to useless end-user visit	Euro
Per intervention	€20,59

~~41~~42 This fee is due when an end-user of the Customer is not present at his premises on the appointment date, and if the installation is performed by Belgacom.

2.3.1.11 Small Network Adaptations

~~42~~43 In case Belgacom needs to perform additional work, also called Small Network Adaptations, both the Small Network Adaptations and the installation of the line will always be performed by Belgacom, according to the terms and definitions as defined in this Offer. The following fee will apply in surplus of the Activation fee, relevant to an installation by Belgacom.

	Euro
Small Network Adaptations	€447,63

2.3.1.12 Wrongful repair request

~~43~~44 In case of wrongful repair request by a Customer, as defined in section ~~9~~13. 8 (“Wrongful Repair Requests”) of Annex ~~4~~3 (Planning and Operations), Belgacom will invoice this Customer a fee of 107,62 Euro.

~~44~~45 Belgacom will provide the following information to the Customer: the ticket number, the date and hour of opening and closing of the ticket, the identification number (e.g. directory numbers) and the cause of the wrongfull repair.

2.3.2 Monthly Recurring fee per End User line

WBA VDSL2 With voice	
BRUO Shared Pair (excl. Splitter maintenance cost)	€0,52
Passive part	€4,46
Active part	€3,07
Transport Rental ETH	€0,78
Total Monthly Rental	**€8,83**

WBA VDSL2 Without voice	
BRUO Raw Copper	€5,94
Passive part	€4,46
Active part	€3,07
Transport Rental ETH	€0,78
Total Monthly Rental	**€14,25**

2.4 SLA documented reports

46 Belgacom is entitled to invoice the Customer for the production of the SLA documented reports described in the Annex ~~5~~4, Basic SLA, section 7 "Documented reports". The unit price per report amounts 25,14 €.

2.5 Compensation for Non First Time Right Installation

47 In cases that a WBA VDSL2 line is brought into service by Belgacom and that a repair ticket is created for this line by the Beneficiary within 14 calendar days after provisioning closure date, giving a fault located on Belgacom access network, and caused by Belgacom or a third party working for Belgacom, the Beneficiary will be entitled for this line to a compensation for "Non first time Right Installation".

49 The compensation due by Belgacom per Non First Time Right Installation related to a specific WBA VDSL2 line is equal to the Activation Fee of the WBA VDSL2 Service on this End User line, as defined in § 4 to 6 of this document.

50 Compensations for Non First Time Right Installation will be settled through a Beneficiary's invoice without VAT.

51 Together with this invoice, the Beneficiary must provide Belgacom with the necessary information to claim for Non First Time Right Installation. Belgacom will upon receipt verify this information. When this verification appears that the information of the Beneficiary shows a shortcoming of Belgacom that gives cause for paying compensation for Non First Time Right Installation, refunding will be done by Belgacom.

52 This necessary information will be provided to Belgacom under the form of a structured file (Excel or CSV format), and will include at least the following data's for each Non First Time Right Installation:

- Beneficiary, Circuit Id, Ready For Service Date, Belgacom repair ticket nr, Belgacomrepair ticket opening date, Belgacom repair ticket closure date, number of the Belgacom invoice of the claimed Non First Time Right Installation and total activation fee, as mentioned in the invoice, of the claimed Non First Time Right Installation (HTVA).

Each invoice of The Beneficiary related to Non First Time Right Installation claims will group the cases of one or several complete months, based on the Belgacom repair ticket closure date.

2.6 Tariffs applicable for the Ethernet Transport (with shared VLANs)

53 In section 2.6~~2.6~~, the word "WBA VDSL2" refers systematically to the service with shared VLANs.

2.6.1 Preamble

54 The Customer must be connected to at least one Service PoP in each Service area in which he wants to deliver the WBA VDSL2 service.

55 Per service quality and per LEX where the Customer wants to deliver the WBA VDSL2 service, the Customer must order at Belgacom at least one and maximum two shared VLAN per QoS between the IP-DSLAMs of this LEX and a Service PoP to which the Customer is connected, sited in the same Service Area as the LEX himself.

2.6.2 One-time fees

2.6.2.1 Fee for activation of shared VLAN

	Euro
Activation fee per shared VLAN	€49,40

2.6.2.2 Fee for change of shared VLAN Bandwidth

	Euro
Modification fee per shared VLAN	€30,28

2.6.2.3 Fee for de-activation of shared VLAN

	Euro
De-Activation fee per shared VLAN	€2,68

2.6.3 Monthly recurring fees

56 The prices are applicable per shared VLAN.

57 The price of the Ethernet Transport is differentiated based upon the requested Service Quality.

Service Quality	Price per Mbps (in €)
Best Effort (P=0)	1,96

Low Priority (P=1)	2,61
Medium Priority (P=3)	3,27
Highest Priority (P=5)	3,92

58 If the Bandwidth of a shared VLAN is expressed in Gbps, the following conversion rule applies: 1 Gbps = 1.000 Mbps.

2.7 Tariffs applicable for the Ethernet Transport (with dedicated VLANs)

59 In section ~~2.7~~2.7, the word "WBA VDSL2" refers systematically to the service with dedicated VLAN.
60 Preamble

61 Each dedicated VLAN is configured by Belgacom at the moment of the implementation of the end-user line, following specifications of the dedicated VLAN profile given by the Customer in the VDSL2 line ordering. The Customer is responsible for the choice and definition of each dedicated VLAN profile.

62 Each dedicated VLAN profile has following attributes: Dwn Bwdth p0, Dwn Bwdth p1, Dwn Bwdth p3, Dwn Bwdth p5, Up Bwdth p0, Up Bwdth p1, Up Bwdth p3 and Up Bwdth p5, where each bandwidths are expressed in Mbps

- Dwn Bwdth p0 = Maximum Downstream bandwidth for P=0
- Dwn Bwdth p1 = Maximum Downstream bandwidth for P=1
- Dwn Bwdth p3 = Maximum Downstream bandwidth for P=3
- Dwn Bwdth p5 = Maximum Downstream bandwidth for P=5
- Up Bwdth p0 = Maximum Upstream bandwidth for P=0
- Up Bwdth p1 = Maximum Upstream bandwidth for P=1
- Up Bwdth p3 = Maximum Upstream bandwidth for P=3
- Up Bwdth p5 = Maximum Upstream bandwidth for P=5

2.7.1 Monthly recurring fees

63 The following formula allows to compute the monthly recurring fee per dedicated VLAN:

Max(Dwn Bwdth p0, Up Bwdth p0) * Pp0 + Max(Dwn Bwdth p1, Up Bwdth p1) * Pp1 + Max(Dwn Bwdth p3, Up Bwdth p3) * Pp3 + Max(Dwn Bwdth p5, Up Bwdth p5) * Pp5

Where Pp0, Pp1, Pp3, Pp5 are the prices per Mbps of the Ethernet Transport, according to the requested Service Quality.

Service Quality	Price per Mbps (in €)
Best Effort (P=0)	Pp0 = 2,45€
Low Priority (P=1)	Pp1 = 3,26€
Medium Priority (P=3)	Pp3 = 4,09€
Highest Priority (P=5)	Pp5 = 4,90€

2.8 Tariffs applicable for the OLO Access Line

2.8.1 Tariffs applicable for the Customer-Sited OLO Access Line

64 For the tariffs applicable to the Customer-Sited OLO Access Line 1GE (resp. 100 or 10 Mbit/s), reference is made to the BROTSoLL Ethernet pricing, namely to the Belgacom-Sited Gigabit Ethernet (resp. Fast Ethernet 100 or Ethernet 10 Mbit/s).

2.8.2 Tariffs applicable for the 1GE Belgacom-Sited OLO Access Line

Enquiry Fee : 112 €
Cable&Cable tray:
Installation fee: 6,74 € per meter
(with a minimum invoice equivalent to 20 meters)
Monthly rental: 0,17 € per meter + 38,47 €
(with a minimum invoice equivalent to 5 meters)
Small Building Works: case by case if necessary.

2.8.3 Tariffs applicable for the 1+1 GE / Belgacom + Customer-Sited OLO Access Line

65 The tariffs applicable to the 1+1 GE / Belgacom + Customer-Sited OLO Access Line is the sum of the tariffs applicable to the 1GE Customer-Sited OLO Access Line and of the tariffs applicable to the 1GE Belgacom-Sited OLO Access Line.

2.8.4 Tariffs applicable for the 1 GE Backhaul OLO Access Line

66 For the tariffs applicable to the Backhaul OLO Access Line 1GE, reference is made to the BROTSoLL Ethernet pricing, namely to the BROTSoLL Ethernet Dual Belgacom-sited).

2.9 Migration fees for WBA VDSL2 line with shared VLANs

~~65~~67 This section only refers to migrations towards a WBA VDSL2 Shared VLAN service. The tariffs for migration

- towards a BROBA ADSL service are described in Annex 6 of BROBA II ADSL.
- towards a BROBA SDSL service are described in Annex 6 of BROBA II SDSL.
- towards a BRUO service are described in Annex H "Price List' of BRUO.

2.9.1 Single Line Migration fees

~~66~~68 The migration fee includes both the activation and the deactivation parts of the migration, and will be entirely invoiced to the party requesting for migration.

~~67~~69 The Migration fee is applicable in the following cases:

a. **Change of ownership**: transfer of a line from Customer 1 to Customer 2. The fee is invoiced to the party requesting for transfer (i.e Customer 2).
b. **Convert**: Product modification from any product to WBA VDSL2 Shared VLAN. The line remains at the ownership of the Beneficiary (no transfer of ownership). The fee is invoiced to the party requesting for conversion.
c. **A combination of a. and b.**

2.9.1.1 Conversion resulting in any change on the Belgacom Voice service (from WBA VDSL2 Shared VLAN with voice towards WBA VDSL2 Shared VLAN without voice, or conversely)

~~68~~70 The following tariffs are applicable to the OLO requesting for the conversion from WBA VDSL2 Shared VLAN with voice towards WBA VDSL2 Shared VLAN without voice (or conversely) in accordance with the scenario of conversion presented in the following table.

Conversion fees with change on the Belgacom Voice service for WBA VDSL2 Shared VLAN	**Price**
WBA VDSL2 Shared VLAN with voice to WBA VDSL2 Shared VLAN without voice, asked by Belgacom following request of the end-user to cease/port his Belgacom Voice service	€0,00
WBA VDSL2 Shared VLAN with voice to WBA VDSL2 Shared VLAN without voice, indirectly asked by OLO through a Number Portability request	€5,42
WBA VDSL2 Shared VLAN without voice to WBA VDSL2 Shared VLAN with voice	€0,00

2.9.1.2 Other Migration fees (change owner and/or any other scenario of conversion)

~~69~~71 The following tariffs are applicable to the OLO requesting for migration in accordance with the scenario of migration to WBA VDSL2 Shared VLAN presented in the following table (except cases in 2.9.1.1).

Migration to WBA VDSL2 Shared VLAN without End-User Visit Price	**Price**
Change of owner/Convert to WBA VDSL2 Shared VLAN with voice	€88,81
Change of owner/Convert to WBA VDSL2 Shared VLAN without voice, installed by Belgacom	€90,48
Change of owner/Convert to WBA VDSL2 Shared VLAN without voice, installed by certified technician	€13,14

~~70~~72 In case of request by the Customer of a "with End-User visit" together with the Migration of an End User Line, the additional fee for "with End-User visit" is added to the Migration Fee without End-User Visit.

Additional fee per line for Migration with End-User Visit	**Price**
WBA VDSL2 with voice	€45,27
WBA VDSL2 without voice, installed by Belgacom	€45,21
WBA VDSL2 without voice, installed by certified technician	€00,00

~~71~~73 If during a repair action performed by Belgacom on a line migrated to a WBA VDSL2 without voice line, and ordered without End-User visit, in case the trouble covered by the Trouble Ticket was due to the absence of the Network Termination Point, an additional fee for with End-User Visit detected during a repair action will be due. This fee will be invoiced on top of the Migration Fee without End-User Visit.

Additional fee for End-User visit detected during repair	**Price**
WBA VDSL2 without voice	€78,21

~~72~~74 If during a repair action performed by Belgacom on line migrated to a WBA VDSL2 without voice line installed by a certified technician, in case the trouble covered by the Trouble Ticket was due to an incorrect intervention performed by the certified technician, an additional fee for repair will be due. This fee will be invoiced on top of the Migration Fee for WBA VDSL2 without voice, installed by a certified technician.

Additional fee for repair due to the incorrect intervention by certified technician	**Price**
WBA VDSL2 without voice	€155.45

~~73~~75 For other cases than specified in sections 2.9.1.1 and 2.9.1.2 the provisioning will be realized in two steps, the first will be the deactivation of the previous situation and the second one the activation of the new situation. Therefore a deactivation fee will be invoiced to the Customer of the previous situation and an activation fee will be billed to the Customer of the new service. In case of product modification within the installed base of the same Customer, this Customer will be billed the deactivation fee and the activation fee.

2.10 Migration fee for WBA VDSL2 line with dedicated VLANs

~~74~~76 This section only refers to migrations towards a WBA VDSL2 Dedicated VLAN service. The tariffs for migration

- towards a BROBA ADSL service are described in Annex 6 of BROBA II ADSL.
- towards a BROBA SDSL service are described in Annex 6 of BROBA II SDSL.
- towards a BRUO service are described in Annex H "Price List' of BRUO.

2.10.1 Single Line Migration fees

~~75~~77 The migration fee includes both the activation and the deactivation parts of the migration, and will be entirely invoiced to the party requesting for migration.

~~76~~78 The Migration fee is applicable in the following cases:

d. **Change of ownership**: transfer of a line from Customer 1 to Customer 2. The fee is invoiced to the party requesting for transfer (i.e Customer 2).
e. **Convert**: Product modification from any product to WBA VDSL2 Dedicated VLAN. The line remains at the ownership of the Beneficiary (no transfer of ownership). The fee is invoiced to the party requesting for conversion.
f. **A combination of a. and b.**

2.10.1.1 Conversion resulting in any change on the Belgacom Voice service (from WBA VDSL2 Dedicated VLAN with voice towards WBA VDSL2 Dedicated VLAN without voice, or conversely)

~~77~~79 The following tariffs are applicable to the OLO requesting for the conversion from WBA VDSL2 Dedicated VLAN with voice towards WBA VDSL2 Dedicated VLAN without voice (or conversely) in accordance with the scenario of conversion presented in the following table.

Conversion fees with change on the Belgacom Voice service for WBA VDSL2 Dedicated VLAN	**Price**
WBA VDSL2 Dedicated VLAN with voice to WBA VDSL2 Dedicated VLAN without voice, asked by Belgacom following request of the end-user to cease/port his Belgacom Voice service	€0,00
WBA VDSL2 Dedicated VLAN with voice to WBA VDSL2 Dedicated VLAN without voice, indirectly asked by OLO through a Number Portability request	€5,42
WBA VDSL2 Dedicated VLAN without voice to WBA VDSL2 Dedicated VLAN with voice	€0,00

2.10.1.2 Other Migration fees (change owner and/or any other scenario of conversion)

~~78~~80 The following tariffs are applicable to the OLO requesting for migration in accordance with the scenario of migration to WBA VDSL2 Dedicated VLAN presented in the following table (except cases in 2.10.1.1).

Migration to WBA VDSL2 Dedicated VLAN with~~out~~ End-User Visit Price	**Price**
Change of owner/Convert to WBA VDSL2 Dedicated VLAN with voice	€172,72
Change of owner/Convert to WBA VDSL2 Dedicated VLAN without voice, installed by Belgacom	€174,33
Change of owner/Convert to WBA VDSL2 Dedicated VLAN without voice, installed by certified technician	€44,96

~~79~~81 If during a repair action performed by Belgacom on line migrated to a WBA VDSL2 without voice line installed by a certified technician, in case the trouble covered by the Trouble Ticket was due to an incorrect intervention performed by the certified technician, an additional fee for repair will be due. This fee will be invoiced on top of the Migration Fee for WBA VDSL2 without voice, installed by a certified technician.

Additional fee for repair due to the incorrect intervention by certified technician	**Price**
WBA VDSL2 without voice	€162,27

~~80~~82 For other cases than specified in sections 2.10.1.1 and 2.10.1.2 the provisioning will be realized in two steps, the first will be the deactivation of the previous situation and the second one the activation of the new situation. Therefore a deactivation fee will be invoiced to the Customer of the previous situation and an activation fee will be billed to the Customer of the new service. In case of product modification within the installed base of the same Customer, this Customer will be billed the deactivation fee and the activation fee.

2.11 Use of databases

2.11.1 Repair e-Tools

~~81~~83 The e-tool for repair WBA VDSL2 and the repair line measurement

Repair e-Tools	**Price**
Repair and Line Measurement	Free of Charge

2.11.2 Street Information

~~82~~84 The Customer will be invoiced for the KVD inquiry performed.

Received in one inquiry:	**Price**
First KVD Inquiry (1 KVD + 1 half hour for looking up the info)	€17,75
For every extra KVD	€0,59
For every extra 20' started A maximum of €17.25 * {# of requested KVD's} will be billed	€17,16

~~83~~85 The Network Street Relation Database can be obtained in MS Access format.

Network Street Relation Database	**Price**
Initial License Fee	€16.660
1 update/year annual fee	€2.000
6 updates/year annual fee	€5.000

2.12 Training and certification costs of certified technicians

~~84~~86 The program of the training to follow by each candidate certified technician is determined by Belgacom individually, based on the Belgacom trainings already received by each candidate and on its professional experience. For each candidate to the certification it will result in a personal training program, based on a series of theoretical and practical training modules, followed by an individual test. The duration of each training module is a multiple of half days. The duration of the test is less than a half day.

~~85~~87 After its certification, each certified technician will have to follow mandatory updating sessions organized periodically by Belgacom to refresh its technical skills on the services covered by the project Certified Technician and communicate him the evolution of the processes and of the documentation systems. The duration of each updating session is a multiple of half days.

~~86~~88 The cost of a theoretical training module, or of an updating session, of an half day is: € 79,00 per certified technician.

~~87~~89 The cost of a practical training module of an half day is: € 68,00 per certified technician.

~~88~~90 The cost of the test is: € 53,00 per certified technician.

~~89~~91 If the certified technician is an employee of a Customer, the cost of the training modules and of the test will be invoiced by Belgacom to this Customer.

~~90~~92 If the certified technician is a subcontractor or an employee of a subcontractor of one or several Customers, the cost of the training modules and of the test will be invoiced by Belgacom to the subcontractor.

3 Billing

3.1 Preliminary

9193 Parties are defined in the present document as Belgacom a telecommunication operator in Belgium and Customer, an undertaking authorized to practice the activities covered by this agreement under the Belgian regulatory framework.

9294 The Belgacom billing process is based on a number of steps in which the two Parties have specific responsibilities. In order to implement this process, both Parties need to put in place (a) system(s) that will be used for the purposes of accounting and billing.

9395 For each WBA VDSL2 product, Belgacom will invoice Customer accordingly

9496 Belgacom shall record, store and process the Billing Data in accordance with Section ~~2~~3 of this Document.

9597 The "Billing Data" is the data that is necessary to ascertain the charges payable by Customer under the Agreement. The Billing Data is recorded via the Billing System as described in Section ~~2.2~~3.2 of this Document.

9698 All information related to the Billing procedures between Belgacom and Customer is covered by the obligation of confidentiality set out in the Agreement. Specifically, such information will be kept strictly confidential by the Parties and will only be used for the purposes of accounting, and invoicing between the Parties and will only be disclosed between the Parties, or as legally required or in the framework of formal dispute procedures. Belgacom will be under no obligation to provide to Customer direct access to its Billing system nor to any other system or facility generating the Billing Data.

9799 Belgacom reserves the right to modify the layout and the presentation of the invoice to the Customer.

3.2 Recording and storage of billing data

~~98~~100 For each service chargeable under the Agreement, Belgacom shall record via its Billing System at least the following Billing Data:

Product/service ID;

Type of request;

Subscription date;

End of month of Subscription date;

Customer ID;

Account ID;

~~99~~101 The general list of billing data indicated above is not exhaustive. Pricing is set in the Section ~~1~~2 of this Annex.

~~100~~102 Billing Data shall be stored for 60 days after the due date of the related invoice. In case of a dispute on the Billing Data, Belgacom will use all reasonable effort to keep the storage of the concerned Billing Data. The storage of these detailed Billing Data shall be limited to the disputed amount of Billing Data.

3.3 Confirmation of charging principles

~~101~~103 All charges payable under this Agreement shall be calculated in accordance with the rules set out in the relevant provisions of this Agreement and its Annexes.

~~102~~104 For internal purpose, Belgacom will use 6 decimals in Euro. The use of decimals is set as follows:

- Per line items up to 4 decimals can be used in Euro.
- The revenues, VAT and the totals use decimals in Euro.

~~103~~105 All the non-recurring charges will be mentioned in the Invoice of the Billing Period covering the Bringing Into Service Date.

~~104~~106 The recurring charges for the product fees will be mentioned in the Invoice of the Billing Period which the Bringing In Service Date encompasses. The Charges will be calculated on the proportion of the Billing Period in which the product and service fee were operational

~~105~~107 Customer amount of charges will be divided in the groups of one-time fees and recurring fees for the services described in the pricelist of this offer (Section ~~1~~2 of this Annex)

3.4 Invoices

~~106~~108 Subject to the specific rules applying to specific types of Services as set out in Appendix A, Belgacom shall submit to the Customer, invoice(s) for the charges under the Agreement during the applicable Billing Period.

~~107~~109 For each Billing Period, Belgacom shall provide to Customer the Invoice described hereafter. The Invoice will be established in accordance with the following rules:

- Invoice Details: the Invoice will list all the services by product that are provided by Belgacom to the Customer.

- The above-mentioned Invoice will be transmitted via ordinary mail to the representatives or departments of Customer as listed in Appendix B Contact persons.

~~108~~110 Any invoice or credit note transmitted by Belgacom will contain the following information, in addition to any legally required mentions and information:

- relevant Billing Period;
- total net amount in Euro;
- due VAT amount;
- total amount due in Euro (including VAT);
- Due Date.

~~109~~111 Belgacom shall use its best endeavours to issue invoices as of the start of the applicable Billing Period. Though, in respect of the development of billing systems by both Parties and the sending of invoices, Belgacom cannot ensure that the invoicing for the products and services provided will be performed within specific delays. Delays in the production of invoices can occur under these circumstances following notification by the Billing Party. Neither party may construe any late billing by the other party as a renunciation to its right to payment of the said bills.

~~110~~112 Notwithstanding the foregoing, if an adjustment is required following a change in the referred Price List, a pending Dispute (for which the appropriate Dispute resolution mechanisms have been timely activated in accordance with this Agreement) or the outcome of commercial negotiations having a retroactive effect, the amount of such adjustment shall be established and Belgacom shall issue an invoice or a credit note as the case may be, within 30 days from the date of the relevant adjustment.

~~111~~113 All changes to amounts invoiced in accordance with this Section ~~4~~ will be effected through credit notes or additional invoices.

3.5 Payment

~~112~~114 All charges due by Customer to Belgacom under the Agreement shall be paid within 30 Calendar Days after issuance of the invoice (the "Due Date").

~~113~~115 If Customer has sent to Belgacom a Notice of Dispute related to an amount invoiced by Belgacom and if such Dispute has not been resolved by the Due Date the disputed amount may be withheld until the dispute is resolved provided that the remaining balance is payable on the Due Date.

~~114~~116 Credit notes will be set off against any payments due of the next invoice and are refundable when there are no outstanding invoices.

~~115~~117 If payment is not received by Belgacom on or before the Due Date, Belgacom will be entitled to an interest calculated on the basis of the legal interest rate + 2 percent points on the unpaid balance for late payment interests, administrative and recovery costs, but is only due if the dispute has been resolved in favour of Belgacom. This interest shall accrue from the Due Date until the date of payment in full of the amount to be paid. Such interest shall accrue day by day and shall not be compounded. In the event that a Dispute resolution procedure has been initiated by Belgacom as provided by the Agreement (including Section ~~6~~3.6 of this Document), this interest shall be limited to the legal interest rate.

~~116~~118 Value Added Tax as well as any other applicable taxes, if any, shall be added to all or any part of the charges due under this Agreement and shall be paid by the Customer responsible for making such payment.

~~117~~119 Any payments under this Agreement will be made in Euro and will be made by bank transfer on the bank accounts mentioned in the Invoice. Payment costs are borne by the Customer. Costs of credit notes are borne by Belgacom.

3.6 Disputes

~~118~~120 The Parties shall use their reasonable endeavours to resolve, pursuant to this Section ~~6~~3.6 disputes related to the calculation and settlement of the charges invoiced or to be invoiced pursuant to this Document. Notwithstanding the foregoing, either Party will be allowed to trigger at any time the dispute resolution procedure provided under the main body of the Agreement provided that such Party reasonably believes that the Dispute at stake involves aspects of the Parties' rights and obligations broader than the mere calculation and settlement of charges pursuant to this Document. The fact that a Dispute involves aspects broader than the mere calculation and settlement of charges pursuant to this Document will not release the Disputing Party from its obligation to pay any undisputed amount pursuant to Section 3.5~~2.5.2~~.

~~119~~121 Any Dispute under this Section ~~2.6~~3.6 will be triggered by a Notice of Dispute sent by registered letter by the Customer to Belgacom before the Due Date. Such Notice of Dispute will indicate the disputed amounts, as well as a summary of the grounds for the Dispute and the position of the Disputing Party. Any amount invoiced under the Agreement will be deemed accepted unless a Notice of Dispute has been sent in accordance with above.

~~120~~122 Upon receipt of the Notice of Dispute, the Parties shall exchange by ordinary mail any information necessary or useful for solving the Dispute.

~~121~~123 Within 15 Working Days from the date of the Notice of Dispute, Belgacom will provide, by registered mail, an answer ("Notice of Reply") to the Customer. If Belgacom does not accept some or all the arguments of the Customer, the Notice of Reply will contain a justified reply to the arguments of the Customer. If Belgacom accepts all or some arguments of the Customer, Belgacom will, together with the Notice of Reply, issue a credit note for the relevant amount.

~~122~~124 If, within 15 Working Days from the receipt of the Notice of Reply, the Customer confirms its position in writing by registered letter, the Parties will escalate the Dispute within their respective organization as provided under Paragraph 125~~Section 2.6.6~~. If the Customer fails to confirm its position within 15 Working

Days, from the date of the Notice of Reply, any outstanding amounts will be paid promptly and without delay and the Dispute will be deemed settled.

~~123~~125 If the Parties have been unable to settle the Dispute as provided under the foregoing provisions, they will refer the matter to Implementation Committee, which, if deemed necessary by either Party, will be organized for this specific purpose. If after such meeting, the Dispute remains, the Parties will follow such additional steps in the escalation procedure as provided in the main body of the Agreement, or, if requested by either Party, the Dispute will be submitted to a certified accountant to be either jointly appointed by the Parties, or, failing agreement between the Parties in this respect, to be appointed by "Belgisch Instituut voor Bedrijfsrevisoren"/"Institut Belge des Réviseurs d'Enterprise". This certified accountant will investigate and determine a solution for the Dispute, acting as an expert and not as an arbitrator. Unless there is evidence of a manifest error, decision of the certified accountant will be final in respect of those elements covered by the Dispute referred to him/her and will be binding on the Parties. The Parties will co-operate with this investigation. The costs of the certified accountant will be borne as determined by him/her in proportion to the outcome of the Dispute. Prior to undertaking his/her mission, the certified accountant will provide the Parties with an estimate of the relevant fees and costs. Upon final settlement of the Dispute, any necessary credit note will be issued and any outstanding amount will be paid promptly and without delay.

Appendix A: Billing parameters

~~124~~126 Product covered under this billing and accounting document:

~~125~~127 WBA VDSL2

~~126~~128 The general list of billing services below is not exhaustive, and may be adapted. Pricing is set in Section ~~1~~2 of this Annex.

~~127~~129 **Tariffs applicable for the End User line**

- One time fees
  - LLU Inquiry Tool.
  - Activation fee of WBA VDSL2 Service on an End User line.
  - Only for WBA VDSL2 with shared VLANs: Service Quality Configuration Fee for WBA VDSL2 Service on an End-User Line (activation/deactivation of a Service Quality).
  - Only for WBA VDSL2 with dedicated VLANs: modification of VLAN profile
  - Only for WBA VDSL2 with shared VLANs: Additional fee for End-User Visit.
  - Only for WBA VDSL2 with shared VLANs: Additional fee for End-User Visit detected during repair.
  - De-activation fee of WBA VDSL2 Service on an End User line .
  - Change Date fee.
  - Cancellation fee.
  - Pending order due to useless end-user visit.
  - Small Network Adaptations fee.
  - Migration fees (conversion with to without or conversely, and other migration fees).
  - Conversion PSTN/ISDN.
  - Coordinated move
  - Wrongful repair request.
- Monthly recurring fee per End User line

~~128~~130 **Tariffs applicable for the Ethernet Transport**

- Monthly recurring fee for Ethernet Transport between the IP-DSLAMs located in the Lex's where the Customer wants to connect End Users and the Belgacom Service PoPs to which the Customer is connected. The monthly recurring fee is invoiced per VLAN.
- One-time Fees (only for WBA VDSL2 with shared VLANs):
  - Fees for activation/deactivation of VLANs.
  - Fees for change of VLANs Bandwidth.

~~129~~131 **Tariffs applicable for the Access Line**

- Tariffs applicable for Customer-Sited OLO Access Line
- Tariffs applicable for Belgacom-Sited OLO Access Line

~~130~~132 Belgacom reserves its right to modify the lay out and the presentation of its invoice to the Customer.

Appendix B: Contact Persons

The Invoices will be sent to the under mentioned contact persons:

Contact person in Belgacom

Name	
Division	Carrier and Wholesale
Address	Koning AlbertII-laan 27, 1030 Brussels
Tel	+32 2
Fax	+32 2
Bank Account	

Contact persons Customer

Name	
Division	
Room	
Address	
Tel	
Fax	
Bank Account	

Billing address Customer

Name	
Division	
Room	
Address	
Tel	
Fax	

Wholesale Broadband Access VDSL2

Annex ~~8~~6: Prepayment Terms & Conditions

Created on: ~~13~~16 February 2012~~20 December 2011~~

Prepayment Terms and Conditions

1. Belgacom will send on a monthly basis a pre-invoice at least on the 2nd working day after the starting of the month preceding the considered billing month. For Beneficiaries that are in service, the first pre-invoice shall be based on the average of the invoices for Services issued by Belgacom during the last three months. For Beneficiaries not yet in service and concluding a new Contract, the first pre-invoice shall be based on the valuation of the average of the invoices for Services to be issued by Belgacom within the first three months of services.

2. The amount of the pre-invoice shall be adapted on a quarterly basis, i.e. increased or lowered as the case may be, based on the amounts due by the Beneficiary for the Services provided under the Contract during the previous quarter.

3. The Beneficiary agrees to pay the amount of the pre-invoice at the latest the 10th calendar day from the date of the pre-invoice.

4. The amount of the pre-invoice shall be paid on a specific account number to be communicated. The interests generated by the amount of the pre-invoice paid on this account during the period starting from the date the pre-invoice is paid until the date the final invoice is paid shall be accrued to the Beneficiary.

5. Within 15 calendar days after sending the final invoice, Belgacom will send a credit note regarding the pre-invoice.

6. If for the same month the amount of the pre-invoice is higher than the amount of the final invoices, Belgacom shall reimburse the balance.

7. If for the same month the amount of the pre-invoice is lower than the amount of the final invoices, the Beneficiary will pay the surplus.

8. Within 15 days following the final invoice, the Beneficiary will make the payment by wire transfer. If payment is not received by Belgacom on or before this due date, Belgacom will be entitled to an interest calculated on the basis of the legal interest rate + 2 percent points on the unpaid balance for late payment interest, administrative and recovery costs. For disputed amounts, this interest is only due if the dispute has been resolved in favour of Belgacom.

9. If the Beneficiary disagrees with an invoice received from Belgacom, it must notify in writing Belgacom thereof before the due date of such invoice in accordance with the relevant provisions of the Contract.

10. Without prejudice to other legal or contractual remedies and notwithstanding anything to the contrary in the Agreement, in the event the Beneficiary fails to pay on due time any undisputed amount due under the present Prepayment terms and conditions, Belgacom shall be entitled to:

    - Suspension of any SLA obligations that are not foreseen in the Basic SLA;
    - Refusal in writing of any new Services, including Migration Services.
    - Suspension of the existing Services in accordance with article 8~~4~~6 of the Annex 1 – General Terms and Conditions.

Wholesale Broadband Access VDSL2

Annex ~~97~~: Roles & Responsibilities throughout the OLO CPE lifecycle

Created on: 16 February 2012~~23 January 2012~~

1 Table of contents

2 Preamble

This document aims at clarifying and defining all the roles & responsibilities of Belgacom and OLO throughout the lifecycle of an OLO Customer Premises Equipment ("OLO CPE"). This step is important as many of current WBA processes are affected by the introduction of an OLO CPE.

The present document and its appendixes form one unit and cannot be dissociated the one from the other. No part of this document can be read or understood on its own, or used in any such or other way than integrated in the document in its entirety.

In this document, when responsibilities are assigned to the OLO, the OLO can have help from its subcontractor(s) (e.g. CPE-vendors, another OLO, specialized labs …) but under any circumstances the OLO remains the sole responsible and the sole contact point towards Belgacom.

The present document is an Annex to the WBA VDSL2 offer, approved by the BIPT, and will be considered as binding and applicable upon Belgacom and the OLO as from its publication. In the event the General Terms and Conditions of the WBA VDSL2 Offer contain clauses which are contradictory with the clauses of the present document, the latter shall prevail.

At the time of writing this document (as per 08/11/2011), some of the main process and IT developments have not been realized because only foreseen for mid to end 2012 (see specific annotations throughout the text). Hence some documents referenced in this document might not be available yet. These documents will be published on the personal page of the CWS website, as soon as they become available. In the meantime Belgacom will communicate the manual work-around process which needs to be applied by the OLO. When all processes and tools will be available and documented, this comment will be obsolete and therefore deleted from the present document.

3 Contractual relationship / engagement between Belgacom and OLO

If an OLO decides to use its own VDSL2 CPE OLO to connect with Belgacom's VDSL2 network, the OLO commits to the following:

- OLO informs Belgacom in writing of its intention to use its own VDSL2 OLO CPE, indicating the expected timing of launch;
- OLO accepts and commits that it (possibly with the help of its subcontractor(s)):
  - has sufficient knowledge of the VDSL2 physical Layer;
  - has sufficient knowledge and capability to engineer, develop and operate OLO's own CPE;
  - has the capability to strictly respect the retro-planning as defined in this document, which could foresee very short timelines (e.g.: security updates to be done in a few weeks time);
  - has the capability to test and align OLO's own CPE against all upgrades proposed by Belgacom within the timeline as defined in this document;
  - is assigning the necessary resources (human resources, lab environment, hardware and software) allowing to respect its obligations as defined in this document;
- OLO agrees with the content of this document and fully endorses the related Roles & Responsibilities;
- OLO agrees with and assumes all consequences, as defined in this document (for instance if not respecting its obligations or when not reaching the deadlines);
- OLO acknowledges and agrees that Belgacom will not engineer nor operate the OLO CPE in any way, and that Belgacom has no responsibility whatsoever for the proper functioning of the OLO CPE;
- OLO accepts that Belgacom will not have any additional tasks or obligations than the one described in this document;
- OLO commits to provide a yearly recurring forecast of the number of WBA VDLS2 lines that will be equipped with OLO CPE.

4 Executive summary

Belgacom will consider that OLO CPE will operate in a similar manner as a Belgacom CPE. OLO will have to ensure that its modem will be interoperable with Belgacom IT Systems to enable the provisioning and repair processes (cf. Chapter 6.1.1). Belgacom will provide OLO with a series of tests ("OLO CPE Test Plan" as described in Appendix 1 of this document) that OLO CPE must successfully pass. The OLO CPE test plan verifies that the OLO CPE supports the line configurations used into Belgacom VDSL2 Networks, but it does not give guarantees about the correctness of CPE behavior, nor the CPE performances, nor the accuracy of reporting parameters. Hence the OLO will assume the responsibilities of the operational consequences of a situation where the OLO CPE should behave differently from a Belgacom CPE.

Hence R&R are defined as follows (more details to be found in the indicated chapters):

- Engineering (Chapter 6.1):
  - The OLO CPE shall respect some minimum technical requirements (Chapter 6.1). The evolution of technical requirements will be communicated according to the Network Upgrades (Chapter 6.1.2)
  - OLO CPE must be validated by OLO according to OLO CPE Test Plan before being connected to Belgacom VDSL2 Network (Chapter 6.1.1)
  - If OLO's CPE or the OLO CPE Test Plan evolves, the tests mentioned in the OLO CPE Test Plan should be re-validated by the OLO (Chapter 6.1.2)
  - For all network upgrades a common retro-planning will enable a clear communication and planning between Belgacom and OLO (Chapter 6.1.2)

- Operational (Chapter 6.2):
  - Line Ordering (Chapter 6.2.2): The ordering procedure will remain unchanged compared to the current one
  - Install (Chapter 6.2.3 & Appendix 4):
    - Everytime an OLO CPE is connected to Belgacom network, OLO will be responsible to launch a "Test de Bonne Fin" (Appendix 3) on the relevant line.
    - Once the the "Test de Bonne Fin" is over :
      - Belgacom will apply the line profile (provisioning, repair or basic) on the concerned OLO line based on Belgacom Repair Profile Advisor (RPA)
      - Then, OLO will eventually (optional) be able to choose a different line profile following certain conditions
  - Repair (Chapter 6.2.6):
    - Belgacom will provide OLO with the same repair tools for an OLO CPE as for a Belgacom CPE. But Belgacom will not guarantee that the repair logic used in these tools would apply the same way as with a Belgacom CPE
    - In case of repair disputes, OLO shall install a Belgacom CPE to be used instead of (or with) OLO CPE either in one box or 2 box (preferred solution) model

5 Confidentiality

The information disclosed by Belgacom (or its subcontractor(s)) in the frame of this R&R document will be covered by NDA. This NDA needs to be signed between Belgacom and OLO prior to any information disclosure. In no event shall Belgacom (or its subcontractor(s)) be compelled to deliver or disclose any more information to the OLO beyond what is reasonably needed for the OLO to develop, deploy, exploit and maintain its own VDSL2 CPEs in compatibility with the Belgacom VDSL2 network and with Belgacom's VDSL2 bitstream wholesale service (WBA offer).

Moreover, if Belgacom is subject to a confidentiality obligation vis-à-vis specific subcontractor(s) or third-party, Belgacom will do its best to include the OLO into this NDA, but cannot guarantee that the subcontractor(s) or third-party will accept the new multi-lateral agreement.

6 Roles & Responsibilities

6.1 Engineering Activities

6.1.1 New CPE Introduction

General

Belgacom will consider that OLO CPE will operate in a similar manner as a Belgacom CPE. OLO will have to ensure that its modem will be interoperable with Belgacom IT systems to enable the provisioning and repair processes, which requires the support of physical layer OAM configuration and performance monitoring parameters defined in ITU-T G.997.1 and support of the transceiver functional requirements of ITU-T G.993.2 (Very high speed Digital Subscriber Line transceivers 2).

Belgacom will provide OLO with a series of tests ("OLO CPE Test Plan" as described in Appendix 1 of this document) that OLO CPE must successfully pass. The OLO CPE test plan verifies that the OLO CPE supports the line configurations used into Belgacom VDSL2 Networks, but it does not give guarantees about the correctness of CPE behavior, nor the CPE performances, nor the accuracy of reporting parameters[1].

Hence the OLO will assume the responsibilities of the operational consequences of a situation where the OLO CPE should behave differently from a Belgacom CPE.

The OLO CPE will be treated, when possible, as a Belgacom CPE for all operational (Install & Repair) activities. Nonetheless, all engineering (new CPE introduction & Upgrades) activities need to be defined.

Design & Development

In respect with its confidentiality constraints, Belgacom will communicate to an OLO, at the moment it enters the OLO CPE processus for the first time, under NDA, the ongoing Network Upgrades (minor/major/strategic/VDSL2 layer reconfiguration) and the already foreseen or considered future Network Upgrades (minor/major/strategic/VDSL2 layer reconfiguration) known at that moment. Although, even if Belgacom provides such information, it does not mean that this information will be binding in any way. Belgacom will always be able to change its roadmap according to its strategy.

The OLO CPE shall respect some minimum technical requirements, namely compliancy to ITU SG15 standards, including compliancy to "G.Vector Friendliness" in Upstream and Downstream, according G.993.2 annex Y. Alternatively, if the OLO wants to benefit from the vectoring evolution, the OLO CPE shall be compliant with "G.Vector and the necessary stabilization features for an efficient G.Vector (like for instance G.INP)".

The OLO must be aware that due to the implementation of current linecards in the Belgacom network, the startfrequency (f_{OL}) is not the same for the ADSL/2/2+ bandplans as for the VDSL2 bandplans. For VDSL2, current startfrequency (f_{OL}) is at 138 kHz, the OLO must take this into account in its CPE HW and/or SW. Introduction of VDSL2 linecards

[1] Additionally it shall be noticed that the respect of ITU Standard and the Broadband Forum test plans (TR-114, TR-115 and TR-138) do not ensure that the OLO CPE performances, behavior and accuracy of reporting parameters will be similar to the Belgacom CPE.

supporting also other bandplans, where VDSL2 upstream U0 startfrequency (f_{OL}) is at 25 kHz and stopfrequency (f_{OH}) could be 276 kHz is envisaged. The OLO CPE shall be compatible with both types of linecards and bandplans.

Belgacom highly recommends solving these issues by use of an external or internal high pass filter (not to be confused with the mandatory central splitter at NTP), knowing that the OLO takes all responsibilities related to the correct functioning of this solution, and to the potential impacts on provisioning and repair for xDSL and voice. OLO must make its own choice with regards to the CPE high pass filter design. Belgacom shall not be responsible for issues that could result from the design by OLO of such filter.

Testing

OLO is the sole responsible to get its CPE certified according to the OLO CPE test plan (provided in Appendix 1 of this document); for this purpose the OLO can be helped by its sub-contractor(s). OLO will give the final results of such OLO CPE certification to Belgacom. Belgacom will not participate in any way to the testing of an OLO CPE nor in the relationship between OLO and its sub-contractor(s).

The testing does not guarantee in any way that OLO CPE will operate the same way as a Belgacom CPE. The OLO will assume the responsibility of the operational consequences of a situation where the OLO CPE should behave differently from Belgacom CPE.

If necessary, OLO shall contact the vendor of Belgacom's DSLAM to perform such tests (or via one of the OLO's subcontractor(s)). Belgacom will inform the OLO about the relevant DSLAM firmware that needs to be tested. If necessary, in case of an NDA, Belgacom will give the authorization to the vendor of Belgacom's DSLAM to deliver the referenced DSLAM firmware in order to perform the tests.

Launch

OLO will inform Belgacom of a launch of a new OLO CPE at least 3 months in advance before an OLO CPE is plugged into Belgacom network.

OLO will have to provide all the relevant information, which includes but is not limited to:

- Certification report according to OLO CPE Test Plan (as defined previously)
- Technical details of the physical VDSL2 layer:
    - VDSL2 Chipset manufacturer and version
    - VDSL2 Chipset firmware version
    - Start frequency of high pass filter in CPE (if applicable)
    - Status with regard to support of G.Vector, G.Vector Friendliness and G.INP.
- All information relative to CPE Vendor, Version and firmware version allowing to identify the OLO CPE in Belgacom network

6.1.2 Upgrades (Network & OLO CPE)

Network

In case of Belgacom changes and upgrades its network infrastructure (DSLAM's), the choice to execute or not DSLAM upgrades is the sole responsibility of Belgacom.

Definitions:

- VDSL2 DSLAM Proxy Firmware: The software package responsible of driving the VDSL2 chipset.

- Minor upgrade: a DSLAM software ("SW") upgrade not requiring a new VDSL2 DSLAM proxy firmware ("FW"), typically emergency fixes/bug fixes on higher layers.

- Major upgrade: a DSLAM SW upgrade requiring:
  - A new VDSL2 DSLAM proxy FW on already deployed linecards (typically bug fixes or service evolutions on VDSL2 physical layer) and/or
  - The gradual introduction of a new hardware ("HW") linecard in the Belgacom DSLAMs without outphasing of the already deployed linecards (typically triggered by DSLAM vendor HW evolution, or by the introduction of new functionalities) and/or
  - The gradual introduction of a new linecard in the Belgacom DSLAMs which can lead to a replacement of the already deployed linecards on a limited scale and/or
  - Introduction of a new HW supplier.

- Strategic upgrade:
  - A DSLAM SW upgrade combined with a massive HW-swap of already deployed VDSL2 linecards in Belgacom DSLAMs. Massive introduction of the VDSL2 Vectoring technology in the Belgacom DSLAM network is an example.

- VDSL2 layer (re-)configuration:
  - The introduction of new VDSL2 profiles or the activation of new VDSL2 features without a DSLAM SW upgrade, so consequently without change of the VDSL2 DSLAM proxy. Examples: introduction of symmetrical VDSL2 profile (spectrum + service profile), introduction of VDSL2 profile for long loops (spectrum + service profile), adaptation of actual UPBO-profile, adaptation of existing spectrum profile, …

- Synchronization checks: is a subset (defined in chapter 7.4) of the OLO CPE Test Plan that verifies the synchronization of the line for relevant Belgacom access network configurations.

Legend for the figure illustrating the network upgrade:

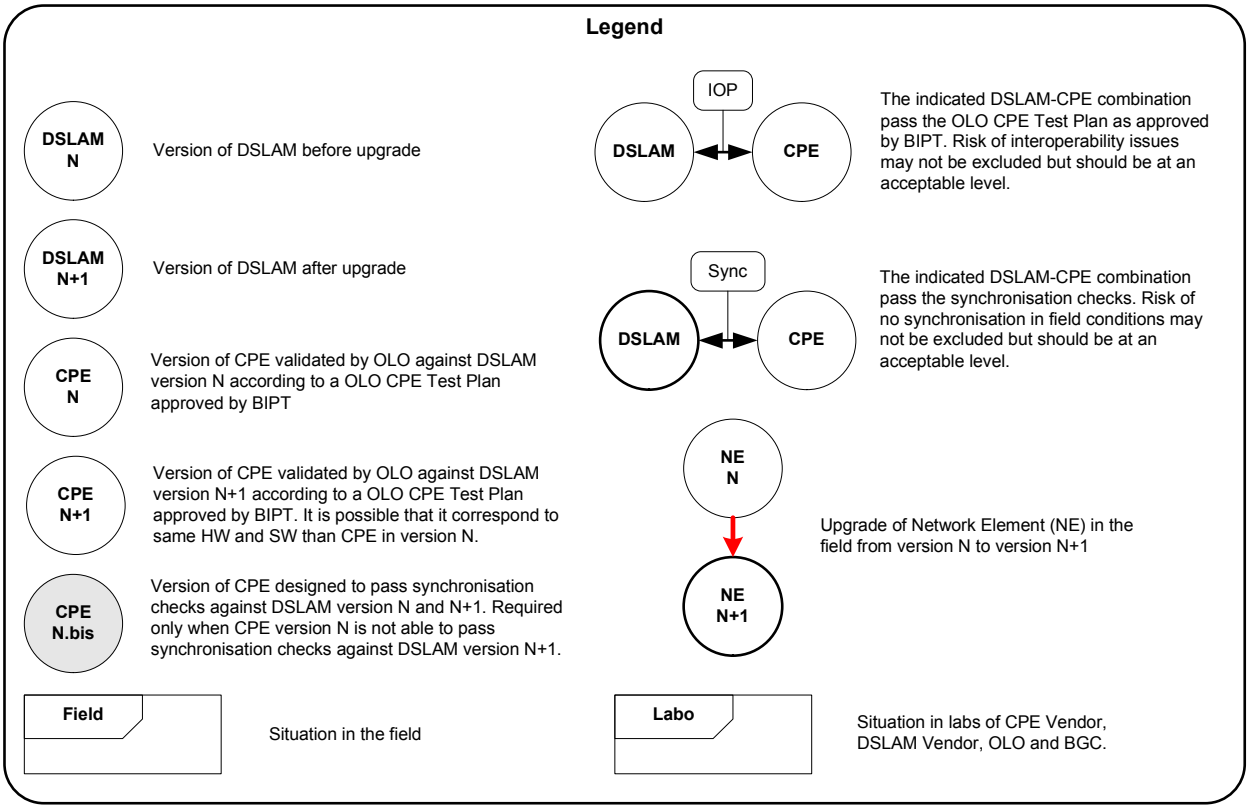


Figure 1: Legend for the figure 2 illustrating the network upgrade

Figure 2 hereafter illustrates the network upgrade and the necessary steps for the alignment of a CPE (see legend above):

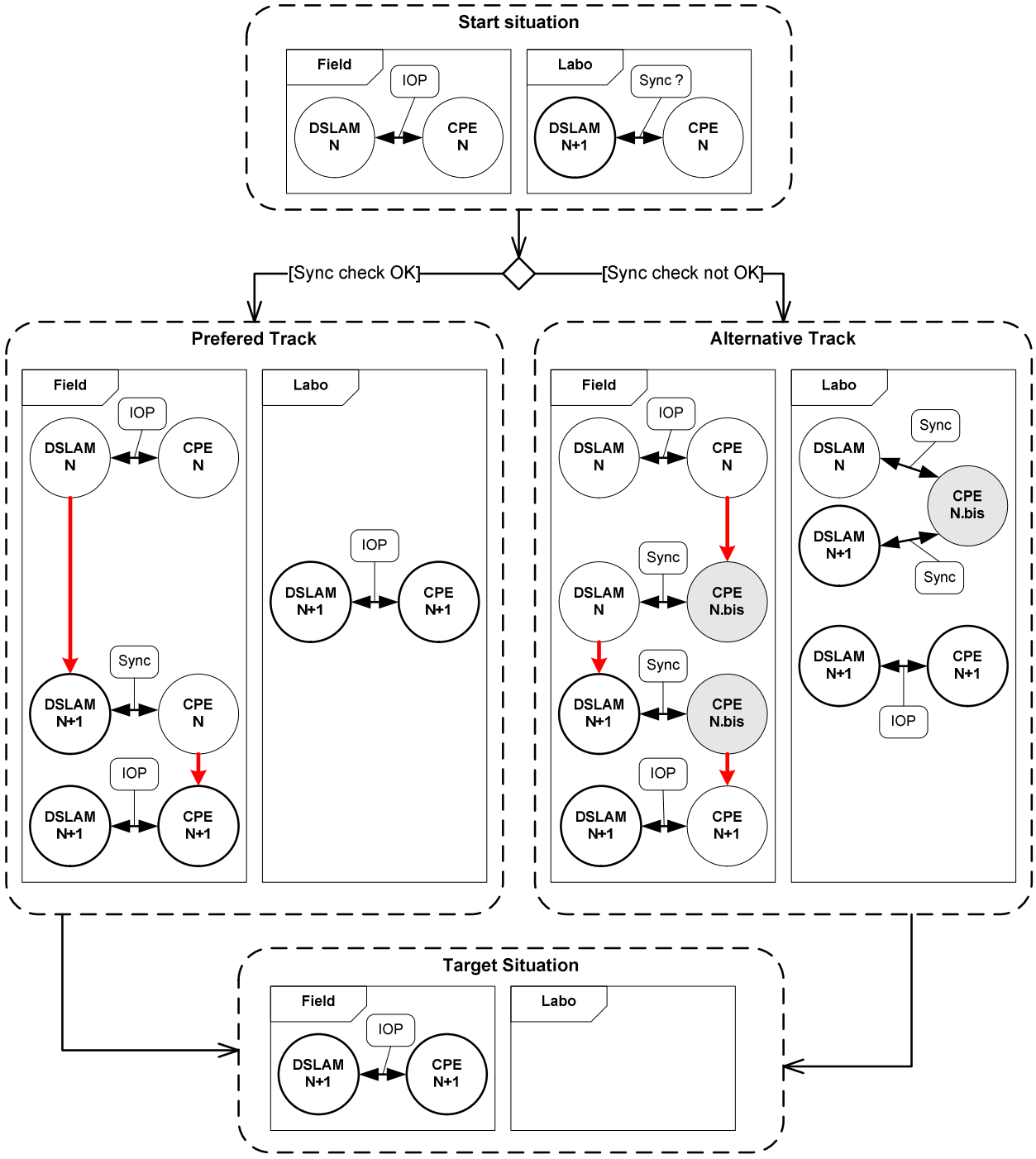


Figure 2: Network upgrades tracks, "Preferred" vs. "Alternative" track

As illustrated on Figure 2, for a Network Upgrade there are 2 possible tracks that an OLO CPE can follow depending on the results of the Synchronization checks performed for this CPE. Based on the outcome of these Synchronization checks (in "Start Situation"), independently for each OLO CPE, the "Preferred track" or the "Alternative track" will be selected naturally.

In order to decide on the track to follow by an OLO CPE ("Preferred" versus "Alternative"), Belgacom will execute a basic Synchronization checks (cf. Chapter 7.4) with the OLO CPE. Belgacom will limit this effort and will elect maximum 5 OLO CPEs chosen as the most representative of the network (the list of CPEs shall be approved by BIPT).

In order to allow Belgacom to execute this test, the OLO will provide Belgacom with 4 pieces of each of its elected CPE(s) in the latest SW version. In case of OLO CPE SW upgrade from N to N+1, Belgacom and the OLO will agree on the upgrade of these 4 CPEs in order to have at all time the most recent CPE SW available in the Belgacom labs. Those CPE's will be pro-actively delivered by the OLO to Belgacom free of charge.

Belgacom engages to perform this test in the first phase of the lab testing cycle with comparable timing as with the Belgacom CPE testing (knowing that Belgacom will first execute this test on the Belgacom CPEs in order to detect potential DSLAM related generic VDSL2 issues first), in order to detect potential issues with OLO CPE related to basic synchronization as from the beginning. Belgacom will communicate the results of this test to the OLO.

Obviously, for other OLO CPEs on which Belgacom do not perform the Synchronization checks, Belgacom highly recommends the OLO to perform the testing himself and to communicate the results to Belgacom as from Step 2 of Table 1 and each time a new DSLAM version is communicated by Belgacom.

The reference time (Step 6 in Table 1 with time = 0) for "DLSAM network SW upgrade" is independent of the track followed by each of the CPE (OLO and Belgacom).

Some example of upgrade scenarii can be found in Appendix 2 of the present document. More generally, the following Engineering Retro-planning and associated Roles & Responsibilities shall be respected by Belgacom and OLO:

Step		Responsible	Minor Upgrade	VDSL2 layer (re-) configuration	Major Upgrade	Strategic Upgrade
1	BGC informs OLO of DSLAM upgrade	Belgacom	- 1 Month	Mostly project based According to WBA offer	- 12 Months	- 18 Months
2	BGC provides OLO with technical information ([1]) (draft)	Belgacom	NA	NA	- 6 Months	- 12 Months
3	BGC communicates the relevant DSLAM SW and FW versions to OLO for engineering purposes	Belgacom	NA	NA	Continuous ([2])	Continuous ([2])
4	BGC provides OLO with technical information ([1]) + OLO CPE Test Plan to be used (final)	Belgacom	NA	- 3 Months	- 3 Months	- 3 Months
5	BGC's new DSLAM SW validated and communicated to OLO for final OLO regression testing	Belgacom	NA	NA	- 1 Month	- 1 Month
6	DSLAM network SW upgrade	Belgacom	Start: 0 End ([3]): + 3 weeks	0 (Re)-configuration applied	Start: 0 End ([3]): + 6 weeks	Start: 0 End ([3]): + 8 weeks
7	OLO provides CPE N+1 to DSLAM N+1 validation report to BGC	Belgacom	NA	0 Delta validation for the new configurations	+ 6 weeks	+ 8 weeks
8	OLO and BGC start the CPE SW upgrade if required ([4])	Belgacom & OLO	NA	NA	At end of network upgrade (step 7)	At end of network upgrade (step 7)
9	Activation of new DSLM functionalities or VDSL2 new configurations as from	Belgacom	0	0	+3 Months	+3 Months

Table 1: DSLAM Upgrade Retro-Planning

(1) "Technical information" is the specific DSLAM HW and SW choices and/or the DSLAM parameters and settings important to enable CPE engineering in the specific Belgacom context for the elements subject of change during the DSLAM upgrade.

International standards, Broadband Forum recommendations, generic DSLAM vendor product information … are not part of this technical information. Examples of technical information: list of DSLAM linecards

supporting the targeted functionalities, specific VDSL2-layer DSLAM settings influencing the CPE interoperability, the chipset proxies integrated in the DSLAM linecard SW …

(2) During the engineering process, Belgacom will communicate its intermediate engineering DSLAM SW versions towards the OLO in order to allow the OLO to keep the same pace in its own engineering cycle of its own CPE.

Belgacom recommends OLOs to have a good relationship with Belgacom VDSL2 DSLAM Provider (currently ALU) to perform all necessary actions (testing, debugging and troubleshooting) described in this document.

The above timeline also indirectly explains that the OLO puts in place its own (himself or through sub-contracting) engineering track to validate its CPE against the Belgacom DSLAMs. This is valid as well for the engineering of a new OLO CPE as well for the (maintenance) evolution of the existing OLO CPE to keep pace with the Belgacom DSLAM network evolution.

(3) The end date of a DSLAM SW upgrade is not pre-defined. The mentioned end dates are dates referring to SW updates (not HW updates) and the dates mentioned in Table 1 are only indicative and can in reality differ. Potential root causes for later end dates of a DSLAM SW are the upgrade procedure, the upgrade time windows, the availability of resources, the quality risks and related checks, unexpected errors in upgrade procedure or in DSLAM SW, the number of first offices (= number of DSLAMs where the new DSLAM SW is loaded and which are evaluated to verify the network quality) … Also the DSLAM SW upgrade can be accompanied by a DSLAM HW upgrade, the latter requiring a significant longer roll-out time (potentially multiple years) due to physical interventions in all ROPs in the access network.

The gradual activation of new functionality comes typically in the months after the end of the DSLAM SW upgrade.

(4) If OLO CPE in version N or N.bis already passes the OLO CPE Test Plan for DSLAM version N+1, then the OLO does not need to upgrade its CPE. The CPE will be considered naturally as being in version N+1, and will become the new version N for the next cycle.

If not, the OLO must make the necessary CPE SW updates starting at the corresponding date and ending within a reasonable timeframe, the latter being maximum 3 months. The OLO will communicate the technical information about the OLO CPE towards Belgacom and the status of its OLO CPE upgrades process. After these 3 months, Belgacom will no longer support CPE firmware version N.

Belgacom is allowed to activate the new VDSL2 functionalities supported by DSLAM SW N+1 as from 3 months after finalization of the DSLAM network SW upgrade irrespective of the support of the OLO CPE of these functionalities and irrespective of the potential negative consequences on the OLO CPE.

In case the activation of these new functionalities have no impact on the CPE SW (so the functionalities only requiring a minor upgrade or a (re-)configuration), Belgacom can activate these new functionalities directly as from the start of the DSLAM upgrade. Belgacom will notify the OLOs of such functionality activations in its VDSL2 network.

During Steps 1, 2 and 3, the exactness of all information provided by Belgacom will not be guaranteed, and such information will be for informative and indicative purposes only. Belgacom shall be able to make any changes desired to the technical information it needs in order to perform its VDSL2 network strategy.

Belgacom has the right to apply another delayed timing based on technical, operational, commercial, legal, regulatory and/or strategic reasons. In case of delay Belgacom will inform the OLO with an updated timeline (if available).

Belgacom acknowledges that having 2 parallels major and/or strategic upgrades running at the same time between the steps 4 to 6 can be difficult to handle. Hence Belgacom will not have 2 major and/or strategic DSLAM upgrades in the whole network running at the same time between steps 4 to 6 (3 Months periods). It means that the second network upgrade can only enter in step 4 when the first network upgrade has completed the step 6. Belgacom reserves the right to perform some DSLAM upgrade impacting a limited number of VDSL2 lines for pilot and field trial purpose at any time on top of any already ongoing upgrade. Belgacom will notify OLOs of the zone/lines impacted by these pilots or field trials. Two kinds of Pilots or field trial shall be distinguished:

- Trial for pure R&D purposes: This kind of trial is typically not frequent, very limited in time, very limited in number of lines and is not necessarily linked to possible network upgrades. For this kind of trial Belgacom will take the necessary actions to limit as much as possible the risk for the OLO lines.
- Trial to validate future network upgrades: This kind of trial takes place between step 2 and 5 of the retro-planning. The result of the Synchronization checks should already be available before the start of the trial, this would enable to estimate and minimize the risks for the OLO lines.

In both cases, during a pilot/field trial, the OLO might need to use a different CPE (instead/in front of OLO CPE specific to the pilot/field trial) as Belgacom would also be required to do for its own CPE. In case these field trials would impact too much some OLO lines, a bi-lateral discussion should be held.

The OLO CPE Test Plan will be subject to updates depending on network upgrades. The final OLO CPE Test Plan to be used by OLO will be given at step 4 as described in Table 1. For "VDSL2 layer (re-) configuration", Belgacom will accept to receive from OLO only the delta validation representing the difference between the previous OLO CPE Test Plan and the current one, in order to reduce the OLO workload.

Naturally, during the transition period (time between the agreement of the present R&R document between Belgacom and OLO and next planned VDSL2 network upgrades), the retro-planning might not be applicable as such and timeline might shift.

Roles & Responsibilities for specific cases / scenarios need also to be defined:

- Fall-Back Scenario: In case of DSLAM SW upgrade failure, as the OLO CPE still in SW version N was supposed to be already compatible before with the DSLAM SW version N, Belgacom should be able to go back from DSLAM SW N+1 to its previous firmware (N) without OLO's prior agreement. Belgacom will notify OLO when such scenario shall occur.

- OLO blocked in its development cycle:
  - If OLO can prove interoperability issues with the new DSLAM SW N+1 at the latest at "- 1 month" (so 1 month before the start of the DSLAM SW upgrade): In case the interoperability issues have a proven major impact on the OLO CPE, Belgacom will accept from OLO a delay of 1 month maximum for the OLO to validate and finish its development/test. After this one month period, Belgacom will implement the new DSLAM SW in its network.
  - If OLO is late in its development cycle without proven VDSL2 interoperability issues with major impact on OLO CPE, then Belgacom is allowed to deploy its new DSLAM SW, starting at day "0", irrespective of potential negative consequences on the OLO CPE.
  - If OLO can no longer upgrade its CPE, Belgacom is entitled to deploy its new DSLAM SW even if OLO is not yet ready, irrespective of potential negative consequences on the OLO CPE. If necessary, OLO shall install a Belgacom CPE to be used instead of (or with) OLO CPE either in one box or 2 box (preferred solution) model. If OLO CPE is not capable to work in a 2 box solution, then a Belgacom

CPE shall be installed by OLO to replace OLO CPE without any guarantees that a Belgacom CPE will operate correctly with OLO services.

- Urgent DSLAM upgrade:
  - **without** impact on the VDSL2 layer: The notification period will be reduced to 1 day (step 1 in Table 1). Urgency can be triggered by *i.a.* security issues, stability issues with equipment …
  - **with** impact on the VDSL2 layer:
    - Belgacom will notify the OLO as soon as the Urgent DSLAM Upgrade is needed. OLO shall receive all new Firmware information 3 weeks before the upgrade (step 1 in Table 1).
    - If OLO can prove interoperability issues with new DSLAM SW at the latest at "- 3 working days" (so 3 working days before the start of the DSLAM SW upgrade): In case the interoperability issues have a proven major impact on the OLO CPE, Belgacom will accept from OLO a delay of 2 weeks (on top of the 3 initial) maximum for the OLO to validate and finish its development/test. Passed this period, Belgacom will implement the new SW in its network.

OLO CPE

In case OLO changes and/or upgrades its CPE (impacting Physical access layer[2]): a re-certification needs to take place following the same procedure as defined in "New CPE Introduction". OLO should be responsible to re-validate and re-engineer its CPE. The new firmware will be validated with OLO CPE Test Plan which was available 3 months before the launch date of the firmware as far as it does not impact the planned network upgrades.

In case OLO would only change higher services in its CPE (no impact on physical access layer2), the OLO should communicate to Belgacom the new firmware version used (so that Belgacom can add it to the list of validated firmware) 1 month in advance and formally confirm that indeed the CPE upgrade had no impact on physical access layer, hence no re-/additional certification is required.

[2] Corresponding to layer 1 of OSI model.

6.2 Operational Activities

6.2.1 Line Ordering & Associated Provisioning Profile

No change on current line ordering processes is required.

All additional information below in this chapter is for information and explanatory purpose only. Only the line ordering processes from the WBA offer ("Main Body" and "Annex ~~4~~3 – Planning & Operations") are to be considered as being the sole reference.

When OLO orders a WBA line, Belgacom will send back the Provisioning Profile (30Mbps, 20 Mbps, 16.5 Mbps, 12 Mbps) according to Belgacom's VDSL2 engineering rules:

Att_{Loop} [dB]	$Length_{Loop}$ [m]	Provisioning Profile Selected
< 0,4	< 400	30 Mbps (17 MHz)
< 0,7	< 700	20 Mbps (8 MHz)
<1	< 1.000	16,5 Mbps (8 MHz)
<1.4	< 1.400	12 Mbps (3,75-5,2 MHz)

Table 2: Engineering Rules to set VDSL2 Provisioning Profile

Where:

- Att_{Loop} = The loop attenuation (in dB) at 800 Hz between the ROP and the user premises,
- $Length_{Loop}$ = The loop length (in meter) between the ROP and the user premises,
- The conditions on loop attenuation and loop length must be fulfilled simultaneously to assign a specific Provisioning Profile on an end user line.

This Provisioning Profile will be set and activated on the OLO line. When the OLO CPE will be installed (cf. chapter 6.2.2 for more details on installation), OLO will launch3 a "Test de Bonne Fin" (TBF). The TBF first checks, at Provisioning profile, the quality of the line. If the tests are successful, the line will be kept in its Provisioning Profile. If not, the line will be downgraded to a lower "Repair Profile" or to the Basic Connectivity Profile if line is truly faulty.

Provisioning Profile	30 Mbps	20 Mbps	16,5 Mbps	12 Mbps
Repair Profile 1	25 Mbps	16,5 Mbps	14,5 Mbps	12 Mbps
Repair Profile 2	20 Mbps	14,5 Mbps	N/A	10 Mbps
Repair Profile 3	14,5 Mbps	N/A	N/A	7 Mbps
Basic Connectivity Profile	9 Mbps	9 Mbps	9 Mbps	9 Mbps

Table 3: Repair Profiles associated to Provisioning Profiles

NB: For more details on:

- The TBF itself, please refer to Appendix 3 of this document;
- How to launch a TBF thanks to the external service[3], please refer to Appendix 4 of this document;

[3] currently under development; available before end of 2012

- The different line profiles, please refer to Appendix 6 of this document.

Hence for each Provisioning Profile is associated several repair profiles. The Provisioning Profile and its underlying Repair Profile (the common Basic Connectivity Profile being the minimal Repair Profile) form a Provisioning Profile Group which is independent from the two others.

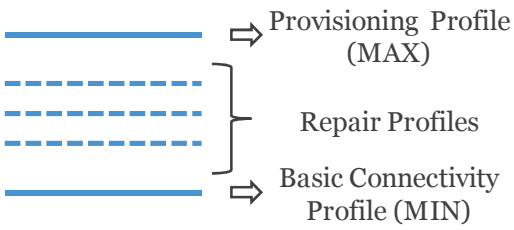


Figure 3: Example of a Provisioning Group: a Provisioning Profile associated with its Repair Profiles

As an example, the 30Mbps provisioning group is composed of the 30Mbps Provisioning profile, the 25 – 20 - 14,5 Mbps Repair Profiles and the 9 Mbps Basic Connectivity Profile.

6.2.2 Installation

All current WBA provisioning processes will apply but OLO will be responsible to launch a TBF as soon as an OLO CPE is connected to Belgacom's network. Belgacom has designed[4] an external API (SOAP / XML service) available for OLOs to remotely launch the TBF (cf. Appendix 4 of the present document for more details).

If Belgacom notices that an OLO does not automatically launch a TBF on each new line when an OLO CPE is connected to its network, Belgacom reserves the right to put, by default, all newly provisioned lines in Basic Connectivity Profile until the OLO launches the TBF (where the line profile will be adapted depending on TBF result).

After having performed the TBF, the result and technical information of such TBF will be sent back to OLO (through the external API described above). Belgacom will send back all technical information as defined in Appendix 5 of this document.

Currently there are two installation methods:

1. DIY**:** When the DIY install is done, the OLO should launch a TBF as soon as the CPE is connected to Belgacom network.
2. Telecom**:** For a Telecom install, the process shall be as follow:
   - Belgacom would install the NTP as today. The installation procedure is equivalent to the current installation.
   - All tests performed by Belgacom's technician to test the line (same as today) will be done with a Belgacom CPE,
   - As soon as the OLO CPE is connected to the Belgacom VDSL2 network, OLO will have to launch a TBF.

[4] currently under development; available before end of 2012

At the end of the TBF, Belgacom will apply a line profile on the line concerned depending on Belgacom's Repair Profile Advisor (RPA). In return, optionally, the OLO will be entitled to choose a different line profile (to be applied by Belgacom on the line concerned) which shall be based on the minimal requirements below:

	Basic Profile	Repair Profile	Provisioning Profile
Basic Connectivity Profile	The only way to "leave" Basic Connectivity Profile is to re-launch the TBF so that TBF result is at least a Repair Profile		
Other Profile	OLO could choose any of the profiles but cannot request a profile from a different Provisioning Group		

Table 4: Capability & Constraints for OLO to update Line Profile following a TBF

The Line Profile change is an extension (optional step) of the TBF launch external service[5] as defined in Appendix 4 of the present document.

If Belgacom notices that an OLO launches too many[6] TBFs on a line, Belgacom reserves the right to limit an OLO in the number of TBFs launched per line.

6.2.3 Remote OLO CPE Management

Belgacom highly recommends OLOs to have their own OLO CPE Management platform. If an OLO decides not to, it will have to upgrade manually all its CPEs in case of Network or CPE Upgrade in the time-frame defined in chapter 6.1.2.

In case OLO decides to have its own Management platform, OLO will have complete access to its CPE. OLO will use any of its VLAN (as defined in WBA offer) to use any protocol necessary to remotely manage its CPE. Belgacom will in no way block any of this traffic.

6.2.4 Spectrum Management (No harm to the network)

Belgacom will implement protection mechanisms to minimize the risk that a line could disturb other lines due to an abnormal behavior of the CPE.

A non exclusive list of situations where a VDSL2 line could disturb other lines because of its CPE behavior is given hereunder:

- The CPE do not respect the UPBO mechanism and send to much upstream power.
- The CPE is unable to achieve a stable synchronization and creates fluctuating noise conditions in the cable.
- The CPE has a very bad LCL resulting in a very strong egress to other lines.

Belgacom proposes to use any of the following criteria for determining that a line is a potential disturber:

[5] currently under development; available before end of 2012

[6] Per OLO, a maximum of 3 TBFs per line per month and a maximum total number of "n" TBFs per day, where n = 500 x the percentage of WBA lines of the OLO concerned compared to the total number of WBA lines; 500 being the maximum number of TBF per day that Belgacom could launch.

- Lines wherefore the computation of the received upstream PSD at the DSLAM based on carrier date TxPSD + carrier data HLOG is above the UPBO reference PSD[7].
- Lines wherefore the computation of the received power at the DSLAM in band U1 based on the upstream power in band U1 – line attenuation of band U1 is above a specific threshold that should not be below the value obtained when computing the power under the UPBO reference PSD[7] into band U1.
- Lines that will trigger an UPBO violation alarm (with UPBO Policing activated). UPBO violation alarm can be triggered by the DSLAM when it detects that the received Power is above the UPBO reference PSD[7].
- "Unstable lines" that are defined as having more than 50 Resynchronizations or failed initialization per days.
- Disturbance may also be observed from correlation with performances statistics from other lines.
- Once the G.Vector will be implemented, line that would not support "G.Vector Friendliness", or "G.Vector and the necessary stabilization features for an efficient G.Vector like (e.g. G.INP)".

This list might be updated at a later stage, under validation by BIPT.

When a line will be identified as being a potential disturber in accordance with the criteria set above, Belgacom will have the right to put the line in Basic Connectivity Profile, or another specific profile to limit the risk of disturbance. Belgacom shall inform OLO of such an action. For situations where a line is considered as potential disturber because it is very unstable, the line should be monitored in Basic Connectivity Profile, and the TBF should be re-launched by OLO to retest the line. Following the TBF result, necessary repair actions should be undertaken by OLO (line profile downgrade, physical repair …). If the line continues to be "very unstable" for 5 working days, even in Basic Connectivity Profile, line shall be disabled or OLO shall install a Belgacom CPE to be used instead of (or with) OLO CPE either in one box or 2 box (preferred solution) model. Belgacom highly recommends that OLO CPE should be able to operate in a One Box or a Two Box Model.

If above actions are not sufficient to avoid disturbance to other lines, Belgacom reserves the right to disconnect the line while notifying the OLO.

The OLO will not be able to change the line profile (as described in chapter 6.2.2) of a potential disturber line until the line has been repaired and is back to a normal state.

Moreover if an OLO has too many lines that are being qualified as being potential disturbers or if Belgacom detects an interoperability issue with an OLO CPE or if the OLO CPE Test Plan (cf. chapter 5.1.1) was not respected, Belgacom reserves the right to stop the OLO to introduce any additional OLO CPE in its network until a solution is found by OLO and validated by Belgacom.

If Belgacom finds in its network an OLO CPE which description and validation (for a specific DSLAM version) has not been given by OLO previously in accordance with Chapter 6.1.1, Belgacom will have the right to put the line in Basic Connectivity Profile, or another specific profile to limit the risk of disturbance, or completely disconnect the line immediately. Belgacom shall inform OLO of such an action.

[7] defined by UPBOPSD(f) into ITU-T G.993.2 §7.2.1.3.2 and using the a and b parameters that are defined per band into BRUO annex C

6.2.5 Repair

OLO will be responsible for 1st line helpdesk. Such 1st line helpdesk services will be equivalent to the 1st line helpdesk services currently provided.

All Belgacom repair processes and tools have been developed to be able to interact and collect information from the CPE through the DSLAM. Having an OLO CPE pass the "OLO CPE Test Plan" allows collecting some information from the OLO CPE. Hence OLO should be able to use all Belgacom repair tools on its CPE, but Belgacom cannot guarantee any of the repair actions proposed by the repair tools as they are made for a Belgacom CPE. Hence OLO recognizes that the level of the repair services performed on a line with an OLO CPE might not be equivalent to the repair services performed on a line with a Belgacom CPE.

If Belgacom is sent onsite for repair, all Belgacom tests shall be done with a Belgacom CPE (Current Belgacom CPE with current FW (N) validated with DSLAM (N)). If the test with a Belgacom CPE shows no abnormality, a wrongful repair shall apply and be paid by OLO. If OLO contests the result of the Belgacom CPE, OLO shall add a Belgacom CPE before its own CPE in a two box model for a minimum period of one month to be able to analyze the underlying network issue(s). This raises again the necessity for an **OLO CPE to be able to operate in a one or two box solution**. If OLO CPE is not capable to work in a 2 box solution, then a Belgacom CPE shall be installed by OLO to replace OLO CPE without any guarantees that a Belgacom CPE will operate correctly with OLO services. At the beginning of the monitoring period, the ticket concerning the troubled line will be automatically closed and a new one will be reopened by OLO at the end of the one month period.

6.2.6 End-User Topology changes

If for some reason, the network topology should change at the end-user which includes but is not restricted to the end-user's CPE or a change of internal cabling, the OLO will perform a new TBF on the line.

7 Appendix 1: OLO CPE Test Plan – High level definition

7.1 OLO CPE validation

This section defined the OLO CPE Test plan.

Chapter 7.2 lists all items that shall be tested and briefly justify why it shall be tested. At least all mandatory tests must be passed successfully by OLO CPE.

When possible reference to the Broadband forum test plans TR-114, TR-115 or TR-138 are used into the Chapter 7.2 to define the test to be done.

Chapter 7.4 (Synchronization checks), 7.5 (UPBO checks) … define more in depth the tests already listed in chapter 7.2.

Chapter 7.3 provides line configuration needed into tests definitions.

7.2 Items to be tested

This section identifies which items should be part of the OLO CPE validation. For each item, the reason to include the item in validation is provided and it is analyzed if the item is sufficiently covered by Broadband forum test plan.

When an item is not sufficiently covered by Broadband Forum test plan:

- If the item is mandatory (e.g. UPBO) an additional test or an adaptation to Broadband Forum test plan is proposed, including tests from TR-114.
- If the item may be considered as optional, possible consequences of not testing the item are identified and the OLO must assume the responsibility of the consequences of not validating the item.

7.2.1 Launch of Test de Bonne Fin (TBF) [Mandatory]

Justification

The TBF must be launched automatically at installation time for following reasons.

- Spectral Management: verify that there is no stub in internal installation to avoid that loop length overestimation could lead to UPBO violations.
- Check if line is OK and if needed apply a repair profile to improve line stability and quality.

CPE should not be allowed for deployment if it does not guarantee to launch automatically the TBF when installed at customer side.

Test description

The OLO shall verify the launch of TBF via field user test (FUT) on its own WBA lines already in production before introduction or general update/upgrade of the CPE. Belgacom will not provide OLO with an end-to-end environment to test such service.

7.2.2 Inventory information reporting [Mandatory]

Justification

Vendor ID, system vendor ID, system version number, serial number are needed to track CPE that would not be correctly upgraded to stay interoperable with the network or identify CPE versions that would create problems. Upgrades of CPE will result in new system version number. The OLO will communicate to Belgacom the correspondence of system vendor ID and system version number to CPE version.

Test description

OLO must verify that this information is reported to the DSLAM and that the system vendor ID and system version number are clearly linked to the CPE version.

7.2.3 Synchronisation checks with the configurations used in the field [Mandatory]

Justification

Belgacom already observed situations where a CPE was unable to synchronize for some configuration due to interoperability issues. Example of interoperability pitfalls are the multi VDSL2 modes, the use of spectrum with only U0 (no U1&U2) combined with a start frequency at 138kHz, the use of max frequency in showtime, the use of minimum target bit rate greater than 32kbps.

The Broadband forum test plan TR-114, TR-115 and TR-138 do not offer guaranty of synchronization with the configuration used by Belgacom because of following reasons:

- The UPBO configuration used by Belgacom is not tested by TRs.
- The DPBO configurations used by Belgacom are not tested by TRs.
    - Belgacom use DPBO configuration via breakpoints, the TR-114 uses the E-Side model. Belgacom has 19 DPBO masks, the TR-114 defines only one.
- Belgacom spectrum profile vdsl2_U0D1_Max2800kHz used for Basic Connectivity is not tested because its differs from the TR's BB8b spectrum profile by the limitation to 2,8MHz (and thus without no U1 , U2).
- Belgacom spectrum profile vdsl2_D1U1D2U2D3 used for 30Mbps provisioning profile is not tested by TRs because it differs from TR's BB17a by the absence of U0 band and UPBO settings.
- Belgacom spectrum profile vdsl2_D1U1D2 used for 20Mbps provisioning profile is not tested by TRs because it differs from TR's BB8b by the absence of U0 band and UPBO settings.
- The spectrum profile vdsl2_U0D1U1D2 used for the 16,5Mbps provisioning profile is the only spectrum profile that matches a TR's spectrum profile (BB8b), except for the UPBO settings
- The spectrum profiles vdsl2_U0D1U1 planned for the long reach VDSL2 (above 1km/1dB, currently under validation) is not tested by TRs because it differs from to TR's BB8b by be limitation of the spectrum to 5,2MHz, the absence of band D2 and the UPBO settings

- The spectrum profiles vdsl2_D1U1D2U2 planned for the 10Mbps in Upstream is not tested by TRs.
  - it differs from TR's BB17a by spectrum limitation to 12MHz, the absence of U0 band and UPBO settings
  - it differs from TR's BB12a by the fact that the mode 17a is used in-stead-of 12a to enable higher interleaving memory.
- Downstream INP Settings of most provisioning profile (delay 8 and INP 2) are tested but the Upstream INP Settings (delay 4, 5 or 6 with INP 2) are not tested by TRs.
- Downstream INP Settings of repair profile (Delay 15 or 16 with INP 4, 5 or 8) are not tested by TRs.
- Belgacom bit rates are not tested by TRs. TR-114 test either Fixed-Rate either Full rate adaptive profile but do not test profiles like target max 30Mbps and min 14Mbps.

In order to limit the risk of non-synchronization that could result in excessive load of complex and wrongful repairs, the OLO-CPE must be validated for the configurations used with Belgacom VDSL2 access network according to the tests defined in Chapter 7.4 entitled Synchronization checks of this document.

The tests defined in "Chapter 7.4 Synchronization checks" verify that the CPE is capable to synchronize for:

- All DPBO profile combined once with a VDSL2 17a (17MHz) spectrum profile and once with an VDSL2 8b (8MHz) spectrum profile
  - To minimize the number of tests not all spectrum profiles must be tested in combination with all DPBO profiles.
  - Since VDSL2 17a and 8b do not have same power options it is necessary to test them both
- All spectrum profiles for at least one loop length
  - To minimize the number of tests only one loop length is required.
- Most important combinations of INP settings and target bit rates.
  - To minimize the number of tests not all services profiles must be tested.

The successful execution of the tests defined in "Chapter 7.4 Synchronization checks":

- Should increase the confidence that the OLO CPE will synchronize in when connected to Belgacom VDSL2 access network.
- Gives no guarantee that it will synchronize correctly in all situations since some bugs may be function of loop characteristics, length or noise conditions.

Test description

The tests defined in "Chapter 7.4 Synchronization checks".

7.2.4 Upstream Power Back Off (UPBO) PSD verification [Mandatory]

Justification

UPBO verification is needed for spectral management reason. Lines sending too much upstream power will disturb the other lines.

Since the Broadband forum test plan TR-114, TR-115 and TR-138 do not test the UPBO configuration used into Belgacom VDSL2 access network, the OLO CPE must be validated according to Chapter 7.5 Upstream Power Back Off (UPBO) checks (test for Belgacom UPBO with +-10 different lengths once for a 8MHz and once for a 17MHs spectrum profile) .

The UPBO tests are to be performed

- Once with a VDSL2 17a (17MHz) spectrum profile and once with an VDSL2 8b (8MHz) spectrum profile
  - To minimize the number of tests not all spectrum profiles must be tested
- For different loop lengths
  - UPBO violations may be length dependant

Test description

UPBO test is defined in Chapter 7.5

7.2.5 Stability [Mandatory]

Justification

Unstable CPE in lab conditions clearly indicates an interoperability issue. Very unstable lines must be avoided in the field for spectral management reasons.

Test description

The OLO CPE validation shall include the stability test defined in the American Annex of Broadband forum TR-114, test A.4.1, but using Belgacom VDSL2 17a (17MHz) spectrum profile vdsl2_D1U1D2U2D3 with a maximum rate service profile (target >= 100Mbps).

7.2.6 Carrier Data HLOG [Mandatory]

Justification

HLOG is used by the Test de Bonne Fin to detect stubs for spectral management reasons. Stubs may lead to loop length overestimations resulting into UPBO violation. HLOG is also used in repair to verify the loop and the installation.

The HLOG test of Broadband forum TR 138 is only a partial solution to certify the HLOG reporting of the OLO CPE because of following limitations:

- Only straight loops are tested ==> stub detection is not verified.
- Vendor is free to choose the test profile ==> vendor may test with only 8MHz if it knows there is a problem with 17MHz.

Test description

The OLO CPE validation shall include the HLOG test based on TR-138 with VDSL2 17a (17MHz) spectrum profile vdsl2_D1U1D2U2D3 where it shall be verified that the OLO-CPE reasonably match the loop insertion loss or at least the measurements provided in same condition by Belgacom CPE on:

  - a 200m TP100 cable
  - a 200m TP100 cable + a stub of 20m

7.2.7 Carrier Data QLN [Mandatory]

Justification

The QLN is used by repair to detect disturbers or strong Xtalk situations.

2nd line repair could make wrong diagnostic if the carrier data QLN for OLO CPE is not working correctly.

The QLN test of Broadband forum TR 138 is only partial solution to certify the QLN reporting of the OLO CPE because the vendor is free to choose the test profile (vendor may test with only 8MHz if it knows there is a problem with 17MHz).

Test description

The OLO CPE validation shall include a simple test to verify that the QLN measure of the OLO CPE with VDSL2 17a (17MHz) spectrum profile vdsl2_D1U1D2U2D3 reasonably match the measure provided in same condition by Belgacom CPE on a 200m TP100 with -110dBm/Hz injected noise at CPE side.

7.2.8 Carrier data transmit PSD [Mandatory]

Justification

In order to improve the protection against UPBO violation, the Carrier data transmit PSD will be used in combination with the carrier data HLOG to compute the received PSD at DSLAM side and compare it to the UPBO mask.

If Carrier data transmit PSD is not reported correctly it could lead to wrong diagnostic of UPBO violation with as consequence migration to basic connectivity profile (BC) for protection of other lines (to protect other lines the BC profile disables upstream the bands U1 and U2).

In such situation, the migration to BC will be the consequence of bad interoperability and be the responsibility of the OLO.

Test description

In order to minimize the risk for interoperability issue the OLO CPE validation must include a simple test where the reported transmit PSD of OLO CPE with VDSL2 17a (17MHz) spectrum profile vdsl2_D1U1D2U2D3 on a 200m TP100 should not exceed the UPBO mask.

7.2.9 Carrier data SNR (signal to noise ratio) [Mandatory]

Justification

The carrier data SNR is used by Belgacom engineering in the frame of studies about G.Vector.

If the OLO wants to benefit from G.vector, a correct functioning of the SNR measuring that is one of the building blocks of G.Vector is important.

It is also important to verify that the carrier data SNR is not influenced by the use of virtual noise. Otherwise there is a risk to have some issues with virtual noise for lines that are included into DLM tool. Those issues may result in line instabilities and the decision of DLM tool to set back the line to provisioning profile.

The carrier data SNR test of Broadband forum TR 138 is only a partial solution to certify the carrier data SNR reporting of the OLO CPE because

- The vendor is free to choose the test profile (vendor may test with only 8MHz if it knows there is a problem with 17MHz).
- The test does not verify that the Carrier Data SNR is not impacted by virtual Noise.

Test description

The OLO CPE validation shall include a test based on TR-138 for carrier data SNR, but performed with VDSL2 17a (17MHz) spectrum profile vdsl2_D1U1D2U2D3 and including an additional test with virtual noise the check that is does not impact the carrier data SNR.

7.2.10 Virtual Noise [Recommended]

Justification

Used by Belgacom DLM tool. A bad support of the Virtual Noise may lead to instabilities for lines that are included into DLM tool. The customer may be impacted during the period of instabilities and the DLM tool may decide to set back the line to provisioning profile.

OLO must accept the risk to not benefit from the higher speed possible with DLM tool.

The virtual Noise test of Broadband forum TR 115 is only partial solution to certify the HLOG reporting of the OLO CPE because of following limitations:

- Noise profile corresponds only to noise below 8MHz ➔ the band up to 17MHz is not tested.
- The test does not compare the bit rate with virtual Noise and no real noise to the bit rate without virtual Noise but with real Noise ➔ Virtual Noise may be under-performing.
- The test does not verify that the Carrier Data SNR is not impacted by virtual Noise."

Test description

It is recommended, but not mandatory, to perform a test based on TR-115, with following adaptation:

- Test should be performed with VDSL2 17a (17MHz) spectrum profile vdsl2_D1U1D2U2D3 on a 200m TP100
- Test shall use the virtual noise VN-1 defined by Belgacom
- An additional check should confirm that in case of real noise conditions, the achieved bitrate is the same as with virtual noise (the real noise would be VN-1 – loop attenuation).

7.2.11 Throughput test [Mandatory]

Justification

Reported current bit rate must correspond to actual bit rate.

The PTM Throughput test of Broadband forum TR 114 does not use the configuration used into Belgacom VDSL2 access network. However the risk that the throughput should be correct for some configurations but not for others is considered to be low.

Test description

The OLO CPE validation shall include the PTM Throughput test of Broadband forum TR-114

7.2.12 Performances Test [Recommended]

Justification

CPE with low performances risk to:

- Lead to wrongful repair,
    - To enable the repair of a VDSL2 line a minimum performance level of the CPE is needed. This is to exclude the CPE as cause of the trouble in case of cable or installation defect.
- Have more risk to become very unstable (more than 50 resynchronizations per day) and disturb the others.
- Give a negative perception of VDSL2 technology to the end-customer.

The Broadband forum test plan TR-114 does not offer sufficient performances guaranties because of following reasons:

- The UPBO configuration used by Belgacom is not tested.
- The DPBO configurations used by Belgacom are not tested.
- The Belgacom line configurations are not tested (see more detailed comments at Chapter 7.2.3)
- Within the TR, downstream test for BB8b and BB17a are the most representative for Belgacom conditions. This concerns only 8 measurement points.

Therefore even if the OLO CPE is tested according to Broadband forum test plan:

- The OLO will have no guarantee that the CPE performances are compatible with Belgacom deployment rules.
    - E.g. more risk to be unstable and have more transmissions errors if the CPE has low performances
- The OLO will have no guarantee that the CPE performances will be compatible with Belgacom repair rules
    - E.g. standard repair procedure will not be sufficient to stabilize the line.

The OLO shall assume the responsibilities of the consequences due to the fact that the performances of the OLO-CPE may differ from the performances of Belgacom CPE.

Repair procedure for a line with an OLO-CPE must include the possibility to do a comparative test with Belgacom CPE to identify wrongful repair.

Test description

No mandatory test defined by Belgacom. It is recommended that the OLO perform comparative tests against Belgacom CPE.

7.2.13 Noise Margin Accuracy [Recommended]

Justification

An accurate reporting of the noise margin is important for following points

- In order to identify performances issues in case of repair.
- If the OLO-CPE is overestimating the noise margin, it will have more risk for errors and instabilities because sync speed will be too high.
- Noise Margin is used by TBF to identify performances issues and select a repair profile when needed.
- Noise Margin is used by DLM to allow transition to higher speed.

The margin verification test of Broadband forum test plan TR-114 is only a partial solution to certify the noise margin accuracy of the OLO CPE because of following limitations:

- Belgacom line configurations are not tested.
- The TR checks only the validity of the NMR between 0 and Target Noise Margin (6dB) but do not test the noise margin accuracy above target (when rate is limited by max target bit rate).
- The BER is derived from empirical formulas that allow code violation ratios that are much higher than observed in reality. Traffic measurement with the traffic analyzer would be preferable.

Therefore even if the OLO CPE has been tested according to Broadband forum test plan the OLO will have no guaranty about the noise margin accuracy. Belgacom recommends that the OLO performs the noise margin test of the test plan defined by Belgacom (used in Option 1).

The OLO shall assume the responsibilities of the consequences due to the fact the noise margin reporting of the OLO-CPE may be inaccurate and differ from the noise margin reporting of Belgacom CPE.

Some possible consequences are listed below:

- Repair process and TBF could take wrong repair decision. A line with noise margin very close to 6dB when it should be much higher may be considered at risk and lead to the decision to reduce the speed.
- The DLM tool could take wrong decisions. Increase speed when it should not or not increase the speed when it should.
- Repair procedure must include the possibility of a test with Belgacom CPE to enable the repair or identify a wrongful repair.

Test description

No mandatory test defined by Belgacom.

7.2.14 Attainable bit rate accuracy [Recommended]

Justification

An accurate reporting of the attainable bit rate is important for following points

- In order to identify performances issues in case of repair.
- Attainable bit rate is used by TBF to identify performances issues and select a repair profile when needed.
- Attainable bit rate is used by DLM to select a transition to another speed when needed.

The Broadband forum test plan TR-114, TR-115 and TR-138 do not verify the attainable bit rate accuracy. It is indicated as being for further study in TR-138 and not present in the other test plans.

Therefore even if the OLO CPE has been tested according to Broadband forum test plans the OLO will have no guaranty about the attainable bit rate accuracy.

The OLO shall assume the responsibilities of the consequences due to the fact that the attainable bit rate reporting of the OLO-CPE may be inaccurate and differ from the attainable bit rate reporting of Belgacom CPE.

Some possible consequences are listed below:

- Repair process and TBF could take wrong repair decision. A line with noise margin very close to 6dB when it should be much higher may be considered at risk and lead to the decision to reduce the speed.

- The DLM tool could take wrong decisions. Increase speed when it should not or not increase the speed when it should.
- Repair procedure must include the possibility of a test with Belgacom CPE to enable the repair or identify a wrongful repair.

Test description

No mandatory test defined by Belgacom.

7.2.15 Error Counters [Mandatory]

Justification

Accurate error counters are needed to evaluate quality and stability of a VDSL2 line.

E.g.:

- Error Counters are used by TBF to identify lines that need a repair profile.
- Error Counters are used by DLM to evaluate the line quality.

The most important counters are ES, SES, CV, FECC, Reinit, UAS, LOS.

A CPE wherefore the error counters reporting would not work has clearly an interoperability problem and should not be allowed for deployment.

The tests of Broadband forum test plan TR-115 are considered to be sufficient to validate the error counters.

Test description

The OLO CPE validation shall the error counters of Broadband forum TR-115.

7.2.16 PBO electrical length used and estimated accuracy [Limited test mandatory]

Justification

About the importance of an accurate PBO Electrical Length reporting

- Incorrect PBO electrical length may be the indication of UPBO violation
- An accurate PBO Electrical Length reporting is needed to identify defects on a VDSL2 line or in customer installation.
- The PBO Electrical Length is used by TBF to identify defect on the line and within the selection of a repair profile when needed.
- The PBO Electrical Length can be used by DLM to select a transition to another speed when needed."
- The repair process, TBF and DLM could take wrong repair decisions if the PBO electrical length is not accurate.
    - E.g. if PBO electrical length is wrongfully too high a defect could be diagnosed on a good line leading to a wrongful field intervention.
    - The DLM tool could take wrong decisions. Increase speed when it should not or not increase the speed when it should.

The Broadband forum test plan TR-114, TR-115 and TR-138 do not verify the PBO Electrical Length accuracy.

Therefore even if the OLO CPE has been tested according to Broadband forum test plans the OLO will have no guaranty about the PBO Electrical Length accuracy.

The OLO shall assume the responsibilities of the consequences due to the fact that the PBO Electrical Length reporting of the OLO-CPE may be inaccurate and differ from the PBO Electrical Length reporting of Belgacom CPE.

Some consequences are listed below:

- False diagnostic of UPBO violation and activation of spectral protection measures (like migration to Basic Connectivity profile) when not needed.
- The repair process, TBF and DLM could take wrong repair decisions if the PBO electrical length is not accurate.
    - E.g. if PBO electrical length is wrongfully too high a defect could be diagnosed on a good line leading to a wrongful field intervention.
    - The DLM tool could take wrong decisions. Increase speed when it should not or not increase the speed when it should.
- Repair procedure must include the possibility of a test with Belgacom CPE to enable the repair or identify a wrongful repair.

Test description

In order to minimize the risk (without increasing the testing effort) for the OLO-CPE, the UPBO test that must be passed for OLO-CPE validation (see Chapter 7.2.4) shall include some checks on the reported value of the PBO electrical length used and estimated.

7.2.17 Per band attenuation accuracy [Limited test mandatory]

Justification

The situation for the reported per band attenuation is identical to the situation of PBO electrical length used and estimated accuracy (except that it currently is not yet used by DLM).

Therefore even if the OLO CPE has been tested according to Broadband forum test plans the OLO will have no guaranty about the per band attenuation accuracy.

The OLO shall assume the responsibilities of the consequences due to the fact the per band attenuation reporting of the OLO-CPE may be inaccurate and differ from the per band attenuation reporting of Belgacom CPE.

Some consequences are listed below:

- False diagnostic of UPBO violation and activation of spectral protection measures (like migration to Basic Connectivity profile) when not needed.
- The repair process and TBF could take wrong repair decisions if the per band attenuation is not accurate.
- Repair procedure must include the possibility of a test with Belgacom CPE to enable the repair or identify a wrongful repair.

Test description

In order to minimize the risk (without increasing the testing effort) for the OLO-CPE, the UPBO test that must be passed for OLO-CPE validation (see Chapter 7.2.4) shall include some checks on the reported value of per band attenuation.

7.2.18 Per band noise margin accuracy [Limited test mandatory]

Justification

The per band noise margin may be used in advanced repair procedures to help diagnostic. The accuracy of this parameter is not critical since it is not used in most of current process.

Test description

In order to minimize the risk (without increasing the testing effort) for the OLO-CPE, the UPBO test that must be passed for OLO-CPE validation (see Chapter 7.2.4) shall include some checks on the reported value of per band noise margin.

7.2.19 PSD level accuracy [Limited test mandatory]

Justification

The reported upstream PSD may play the same role as the reported upstream aggregated transmit power. For lines where only U1 is used in upstream, the reported value can be used in combination with the per band attenuation of band U1 to evaluate the receive PSD at ROP and check if there is no UPBO violations.

The Broadband forum test plan TR-114, TR-115 and TR-138 do not verify the reported PSD level accuracy.

Therefore even if the OLO CPE has been tested according to Broadband forum test plans the OLO will have no guaranty about the reported PSD level accuracy.

The OLO shall assume the responsibilities of the consequences due to the fact that the reported PSD level of the OLO-CPE may be inaccurate and differ from the reported PSD level of Belgacom CPE.

Some consequences are listed below:

- False diagnostic of UPBO violation and activation of spectral protection measures (like migration to Basic Connectivity profile) when not needed.
- Repair procedure must include the possibility of a test with Belgacom CPE to enable the repair or identify a wrongful repair.

Test description

In order to minimize the risk (without increasing the testing effort) for the OLO-CPE, the UPBO test that must be passed for OLO-CPE validation (see Chapter 7.2.4) shall include some checks on the reported PSD level.

7.2.20 Impulsive Noise Protection efficiency [Mandatory]

Justification

Efficient INP is needed for transmission quality. This is especially critical for video services.

The test 5.2 of the Broadband forum test plan TR-115 verifies the INP efficiency but only for INP = 2.

Therefore OLO CPE has been tested according to Broadband forum test plans the OLO will have no guarantee that the profiles with INP > 2 will be efficient with OLO CPE.

Test description

The OLO CPE validation shall include test 5.2 of Broadband forum TR-115 + same test but with a min INP of 5, a max delay of 15ms and pulse duration of 900µs.

7.2.21 Avoidance of INP optimization at the cost of lower noise margin [Recommended]

Justification

VDSL2 standard allows selecting between a mode where the INP is just greater or equal than requested value and noise margin as great as possible and another mode where the noise margin may be reduced in order to achieve higher INP. Belgacom experience has showed that the latest mode may lead to more line instabilities and is therefore not desirable.

The OLO shall assume the responsibilities of the consequences due to the fact that the OLO-CPE could decide to do INP optimization (at the cost of a lowed noise margin) and behaves differently from Belgacom CPE for that aspect.

Some consequences are listed below:

- The VDSL2 line with OLO-CPE will have higher risk to become unstable.
- The low noise margin (because of high INP overhead) will lead to wrong diagnose : a good line will be considered as being at risk.
- TBF and DLM will take wrong decisions.
- Repair procedure must include the possibility of a test with Belgacom CPE to enable the repair or identify a wrongful repair.

Test description

No mandatory test defined by Belgacom.

7.2.22 Bit Swapping [Mandatory]

Justification

When it works correctly, Bit swapping improves line quality and stability.

Interoperability issues with bit swapping may lead to line instabilities.

Bit swapping requires extensive interaction between DSLAM-CPE and is therefore a difficult point regarding interoperability."

The tests of Broadband forum test plan TR-115 are considered to be sufficient to validate the Bit swapping.

Test description

The OLO CPE validation shall include the bit swapping tests of Broadband forum TR-115.

7.2.23 Reported Aggregated Transmit Power accuracy [Limited test mandatory]

Justification

For lines where only U1 is used in upstream, the reported aggregated transmit power can be used in combination with the per band attenuation of band U1 to evaluate the receive power at ROP and check if there is no UPBO violations.

The Broadband forum test plan TR-114, TR-115 and TR-138 do not verify the reported aggregated transmit power accuracy.

Therefore even if the OLO CPE has been tested according to Broadband forum test plans the OLO will have no guaranty about the reported aggregated transmit power accuracy.

The OLO shall assume the responsibilities of the consequences due to the fact that the reported aggregated transmit power of the OLO-CPE may be inaccurate and differ from the level of Belgacom CPE.

Some consequences are listed below:

- False diagnostic of UPBO violation and activation of spectral protection measures (like migration to Basic Connectivity profile) when not needed.
- Repair procedure must include the possibility of a test with Belgacom CPE to enable the repair or identify a wrongful repair.

Test description

In order to minimize the risk (without increasing the testing effort) for the OLO-CPE, the UPBO test that must be passed for OLO-CPE validation (see Chapter 7.2.4) shall include some checks on the reported aggregated transmit power.

7.2.24 Bit Error Rate [Recommended]

Justification

Some services like video broadcasting require excellent line quality with Bit Error Rates (BER) much lower than 1E-7 (1 bit in error for 10000000 bits transmitted). The problem with that is that the standards give no guarantee about low BER; they only mention that the BER must be less than 1E-7 at 0dB of noise margin.

Therefore validation of an OLO CPE based on the broadband forum test plan will give no guarantee to the OLO that the CPE is able to run with a BER below 1E-7.

The OLO shall assume the responsibilities of the consequences due to the fact that the performances of the OLO-CPE may have a BER as high as 1E-7 in normal operating mode.

Some consequences are listed below:

- OLO may be unable to provide video quality.
- Repair procedure must include the possibility of a test with Belgacom CPE to enable the repair or identify a wrongful repair.

Test description

No mandatory test defined by Belgacom.

7.2.25 LCL - EMC [Recommended]

Justification

EMC compatibility is mandatory in Europe and a correct LCL is necessary to avoid excessive egress to other line and ingress from external disturbers.

The LCL is tested by The Broadband forum test plan TR-115 but standard criteria are not severe and should not guarantee an effective protection. No other EMC tests are defined with the Broadband forum test plans.

OLO must accept the risk that the CPE is not immune against EFT

Repair procedure must be adapted to include comparative test with Belgacom CPE to identify wrongful repair.

Test description

No mandatory test defined by Belgacom.

7.3 Line configurations used in Belgacom VDSL2 access network

7.3.1 List of configurations

Following attached xls file list the 35 VDSL2 line configurations that are used in the field in combination with the 19 DPBO profiles defined in 7.3.2.

List VDSL2 line configurations_v2.xls

[Attached file under NDA]

Remark that the DLM tool use the OVERRULE functionality to adapt the target bit rate, the INP settings or the virtual noise setting of the lines. Therefore the spectrum and service profile are not sufficient in all cases to define the line configuration.

7.3.2 DPBO, Service and Spectrum Profiles in CLI

Following file details the DPBO profiles in CLI syntax:

VDSL2 validation DPBO Profiles Nov 20

[Attached file under NDA]

Following file details the Services Profiles in CLI syntax:

VDSL2 validation
Service Profiles Nov 2

[Attached file under NDA]

Following file details the Spectrum Profiles in CLI syntax:

VDSL2 validation
Spectrum Profiles Nov

[Attached file under NDA]

7.3.3 Overrule data

Some configurations require the application of overrule data. However as mentioned in the attached field of Chapter 7.3.1 equivalent lab configurations without overrule are proposed to facilitate the testing automation. If the OLO would like anyhow to use the configuration via the overrule, it is allowed to do so and this paragraph provides the necessary information.

Following file provides some information on the CLI syntax for the overrule functionality.

Short info on
Overrule syntax in Cl

[Attached file under NDA]

7.3.4 Virtual noise overrule commands in CLI

VN-Light

The CLI commands for VN-Light are provided in file below (in the overrule examples the R/S/L/P stands for a specific port e.g. 6/3/2/2):

Virtual Noise
VN-Light.zip

[Attached file under NDA]

VN-1

The CLI commands for VN-1 are function of the DPBO EL and provided in file below (in the overrule examples the R/S/L/P stands for a specific port e.g. 6/3/2/2):

CLI Overrule VN-1

[Attached file under NDA]

7.4 Synchronization checks

7.4.1 Scope of the Synchronization checks

The goal of the Synchronization checks is to verify that the couple CPE-DSLAM is able to synchronize for the configurations used by Belgacom.

7.4.2 Pass/Fail criterion

No performances criteria are mandatory. The only pass/fail criterion to be applied is the synchronization of the line (pass if the line reaches synchronization, fail otherwise).

Belgacom recommends however that the following shall be checked:

- For TP100 loop length specified in the excel file "Synchronization checks – test list" provided below,
- With application of the noise wherefore the breakpoints are provided below,
- The current and attainable bit rate shall be greater than the planned bit rate of the service profile minus 64kbps.

Belgacom expect that those conditions should easily be satisfied since:

- It is the case for Belgacom CPE.
- The loop lengths specified in excel file "Synchronization checks – test list" are close to but below the maximum provisioning length for the tested configuration.
- The mentioned noise conditions are less severe than the worst case noise conditions that can be observed in the field.

However Belgacom cannot give more guarantees about OLO CPE performances than what the OLO is ready to accept from its side. Therefore the Synchronization checks that Belgacom will perform on a limited number of OLO CPE, when needed as specified in the present document, will be limited to the verification of the mandatory criteria.

7.4.3 Testing of DPBO profiles

Ideally all possible line configuration shall be tested for all possible DPBO Profile, but this will result in too numerous tests. Therefore the testing of all DPBO profiles is limited to only one service profile per major spectrum settings.

Following Service and Spectrum profile combinations must be tested for the 19 different possible DPBO profiles with DPBO EL from 0 till 66dB:

Info	Service Profile	Spectrum Profile
9M Profile	…	…
30M Profile	…	…
16,5M Profile	…	…

[Table above under NDA]

Some other combinations may introduce some changes into the spectrum profile and therefore shall better be tested for at least a limited set of DPBO profiles. Therefore following combinations shall be tested for at the 3 DPBO profiles that correspond to EL = 0, 18 and 34.

Info	Service Profile	Spectrum Profile
20M Profile	…	…
10M Upstream Profile	…	…
Long Reach Profile	…	…
Long Reach Repair Profile	…	…
DLM Profile	…	…

[Table above under NDA]

For the other line configurations the testing can be limited to the DPBO profile corresponding to EL = 18.

7.4.4 Synchronization checks – test list

Following XLS file defines the 82 measurements points to be done for the Synchronization checks

Synchronization checks test list_v5.xls

[Attached file under NDA]

Meaning of the columns:

- To Check: define if the test must be done or not
- Length (TP100): Length of TP100 for which the test shall be done (see Chapter 7.4.2)
- Info: information field
- DPBO EL: single or set of DPBOESEL values for which the test shall be done
- Service Profile: The Service Profiles as defined into 7.3.2.
- Spectrum Profile: The Spectrum Profiles as defined into 7.3.2
- Dn Rate Criteria (see Chapter 7.4.2)
- Up Rate Criteria (see Chapter 7.4.2)

7.5 Upstream Power Back Off (UPBO) checks

The goal of the test is to verify that the CPE respects the UPBO settings used in Belgacom VDSL2 access network.

The UPBO tests are also used to verify up to a limited level of confidence the following items:

- PBO electrical length used and estimated accuracy
- Per band attenuation accuracy

- PSD Level accuracy
- Reported Aggregated Transmit Power accuracy

UPBO test shall be executed with following configuration:

- Service profile : LAB_MaxRate_IL8242
- DPBO Profile : EL18_2208kHz
- Noise : No noise or -130dBm/Hz white noise injected at both sides

The tests are executed for different lengths once for a 8MHz and once for a 17MHs spectrum profile.

Ideally the Upstream PSD shall be measured at the DSLAM side and CPE side. However the PSD measured at one side corrected with the measured insertion loss of the line simulator for the specific length being tested may be considered as equivalent to the PSD at the other side.

By application of the UPBO mechanism described in ITU-T Rec. G.993.2, the Upstream PSD at DSLAM side for upstream bands U1 and U2 must respect:

- For TP100 length >= 100m: UP_PSD_DSLAM <= – a – b √f + 3,5 [dBm/Hz]
- For TP100 length at 50m (as klo may be <1,8dB): UP_PSD_DSLAM <= – a – b √f + 3,5 + √f [dBm/Hz]

Where f is expressed in MHz and a and b are function of the upstream band and provided below:

- Upstream band U1 : A=47,3 and B = 26,21
- Upstream band U2 : A= 53,2 and B = 14,6

By application of the ITU-T Rec. G.993.2, the Upstream PSD at CPE side must respect:

UP_PSD_DSLAM <= VDSL2-998ADE17-M2x-B.NT

Where VDSL2-998ADE17-M2x-B.NT is the limit mask B8-12 defined into Table B.6 of ITU-T Rec. G.993.2 (2006)/Amd.1 (04/2007).

Table below provides the spectrum profiles and lengths to be tested:

Spectrum Profile	Length	PBO electrical length used min	PBO electrical length used max	U1 Line Attenuation min	U1 Line Attenuation max	Reported PSD min	Reported PSD max	Reported Aggregated Transmit Power min	Reported Aggregated Transmit Power max
vdsl2_D1U1D2U2D3	50								
vdsl2_D1U1D2U2D3	100								
vdsl2_D1U1D2U2D3	200								
vdsl2_D1U1D2U2D3	400								
vdsl2_D1U1D2U2D3	600								
vdsl2_D1U1D2U2D3	800								
vdsl2_D1U1D2U2D3	1000								
vdsl2_D1U1D2	100								
vdsl2_D1U1D2	200								
vdsl2_D1U1D2	400								
vdsl2_D1U1D2	600								
vdsl2_D1U1D2	800								
vdsl2_D1U1D2	1000								
vdsl2_D1U1D2	1200								
vdsl2_U0D1U1D2	100								
vdsl2_U0D1U1D2	400								
vdsl2_U0D1U1D2	800								
vdsl2_U0D1U1D2	1200								

Note: min and max threshold for PBO electrical length used and estimated, Per band attenuation, PSD Level and Reported Aggregated Transmit Power must be defined in future revision.

8 Appendix 2: Example of DSLAM & CPE upgrades

8.1 Upgrade scenario example for a major upgrade

Scenario for a major upgrade			
Step	Date	Belgacom	OLO
1	D - 12 months	BGC informs the OLOs of intention to upgrade DSLAM	ack.
2	D - 12 months	ack.	OLO provides a CPE version N to BGC.
3	D - 11 months	BGC selects a candidate version to start the testing	
4	D - 11 months	BGC informs the OLO about candidate version	ack.
5	D - 10 months	BGC performs basic sync test with CPE version N against candidate version of DSLAM.	
6	D - 10 months	Basic sync tests of OLO CPE version N against candidate version of DSLAM are OK. BGC informs the OLO.	ack.
7	D - 6 months	BGC informs the OLO of first DSLAM engineering version that is supposed to be representative for the future target version	ack.
8	D - 6 months		OLO starts to work on CPE to develop version N+1
9	D - 6 months	BGC perform basic sync test with OLO CPE version N against engineering version of DSLAM.	
10	D - 6 months	Basic sync tests of OLO CPE version N against engineering version of DSLAM are OK. BGC informs the OLO.	ack.
11	D - 3 months	BGC informs the OLO of final DSLAM version N+1	ack.
12	D - 3 months	BGC perform basic sync test with OLO CPE version N against DSLAM version N+1.	
13	D - 3 months	Basic sync tests of OLO CPE version N against DSLAM version N+1. BGC informs the OLO.	ack.
14	D - 3 months		OLO continues to work on CPE to develop version N+1
15	D - 2 months		OLO has a candidate for CPE version N+1
16	D - 1 month	End BGC DSLAM validation. BGC confirms the upgrade to version N+1.	ack.

Scenario for a major upgrade			
Step	Date	Belgacom	OLO
17	D - 1 months		OLO starts validation of CPE version N+1 against DSLAM version N+1
18	D + 0 day	Start of DSLAM upgrade	
19	D + 6 weeks	End of DSLAM upgrade	
20	D + 2 months		OLO validated CPE version N+1 against DSLAM version N+1
21	D + 2 months	ack.	OLO communicates CPE N+1 validation report to BGC
22	D + 2 months		OLO start migration of OLO CPE in the field from version N to version N+1
23	D + 5 months	BGC assumes and OLO CPE in the field are in version N+1	
24	D + 5 months	DSLAM N+1 becomes new N for next upgrade	CPE N+1 becomes new N for next upgrade

8.2 Upgrade scenario example for a strategic upgrade

Scenario for a strategic upgrade in case of a synchronization issue with CPE N & DSLAM N+1			
Step	Date	Belgacom	OLO
1	D - 18 months	BGC informs the OLOs of intention to upgrade DSLAM	ack.
2	D - 18 months	ack.	OLO provides a CPE version N to BGC.
3	D - 16 months	BGC selects a candidate version to start the testing	
4	D - 16 months	BGC informs the OLO about candidate version	ack.
5	D - 15 months	BGC performs basic sync test with CPE version N against candidate version of DSLAM.	
6	D - 15 months	Basic sync tests of OLO CPE version N against candidate version of DSLAM are OK. BGC informs the OLO.	ack.
7	D - 12 months	BGC informs the OLO of first DSLAM engineering version that is supposed to be representative for the future target version	ack.
8	D - 12 months	BGC perform basic sync test with OLO CPE version N against engineering version of DSLAM.	
9	D - 12 months	Basic sync tests of OLO CPE version N against engineering version of DSLAM are **not OK**. BGC informs the OLO.	ack.

Scenario for a strategic upgrade in case of a synchronization issue with CPE N & DSLAM N+1			
Step	Date	Belgacom	OLO
10	D - 12 months		OLO starts to develop a bug fix to enable sync against engineering DSLAM version
11	D - 6 months	BGC informs the OLO of a new intermediate DSLAM engineering version that is supposed to be representative for the future target version	ack.
12	D - 6 months	BGC performs basic sync test with OLO CPE version N against engineering version of DSLAM.	
13	D - 6 months	Basic sync tests of OLO CPE version N against engineering version of DSLAM are **not OK**. BGC informs the OLO.	ack.
14	D - 6 months		OLO continues to develop a big fix to enable sync against engineering DSLAM version
15	D - 5 months		OLO releases a CPE versions N.bis that solves the sync against engineering DSLAM version issue and still sync with DSLAM version N.
16	D - 5 months	ack.	OLO provides a CPE version N.bis to BGC.
17	D - 5 months	BGC perform basic sync test with OLO CPE version N.bis against engineering version of DSLAM.	
18	D - 5 months	Basic sync tests of OLO CPE version N.bis against engineering version of DSLAM are OK. BGC informs the OLO.	ack.
19	D - 5 months		OLO starts to prepare migration of OLO CPE in the field to version N.bis
20	D - 5 months		OLO continues to work on CPE to develop version N+1
21	D - 3 months	BGC informs the OLO of final DSLAM version N+1	ack.
22	D - 3 months	BGC perform basic sync test with OLO CPE version N.bis against DSLAM version N+1.	
23	D - 3 months	Basic sync tests of OLO CPE version N.bis against DSLAM version N+1. BGC informs the OLO.	ack.

Scenario for a strategic upgrade in case of a synchronization issue with CPE N & DSLAM N+1			
Step	Date	Belgacom	OLO
24	D - 3 months		OLO start migration of OLO CPE in the field from version N to version N.bis
25	D - 3 months		OLO continues to work on CPE to develop version N+1
26	D - 2 months		OLO has a candidate for CPE version N+1
27	D - 1 month	End BGC DSLAM validation. BGC confirms the upgrade to version N+1.	ack.
28	D - 1 months		OLO starts validation of CPE version N+1 against DSLAM version N+1
29	D - 1 day	BGC assumes and OLO CPE in the field are in version N.bis	
30	D + 0 day	Start of DSLAM upgrade	
31	D + 8 weeks	End of DSLAM upgrade	
32	D + 2 months		OLO validated CPE version N+1 against DSLAM version N+1
33	D + 2 months	ack.	OLO communicates CPE N+1 validation report to BGC
34	D + 2 months		OLO start migration of OLO CPE in the field from version N to version N+1
35	D + 5 months	BGC assumes and OLO CPE in the field are in version N+1	
36	D + 5 months	DSLAM N+1 becomes new N for next upgrade	CPE N+1 becomes new N for next upgrade

9 Appendix 3: Additional Information on Belgacom's "Test de Bonne Fin"

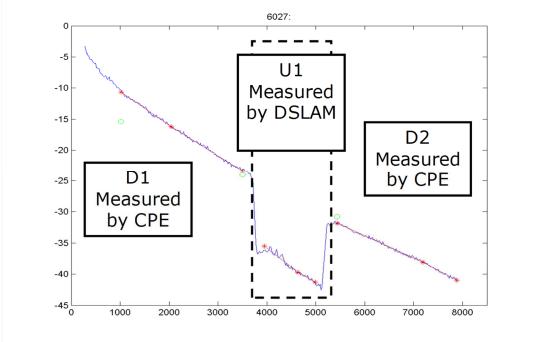
Belgacom developed the "Test de Bonne Fin" (TBF) in order to:

- Better detect wrong VDSL2 installations
- Have a better quality of service :
    - Better stability
    - Less disturbance due to bad neighboring installations
    - Optimal vdsl2 speed for each customer

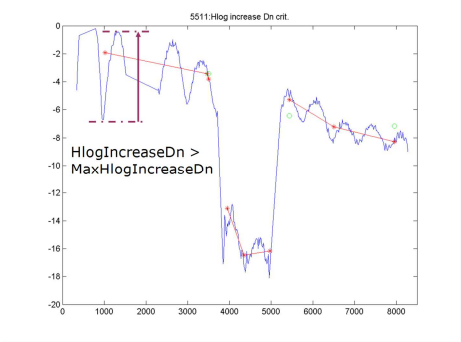
The TBF test is mostly based on 3 kinds of data:

- Hlog analysis
- Operational data collected by the DSLAM
- Errors counters

All values collected by TBF are done at DSLAM level. No interaction with CPE at higher layer (SNMP/MIB, TR-69, Remote Access …) is necessary but it requires from the OLO CPE the support of physical layer OAM configuration with performance monitoring parameters defined in ITU-T G.997.1, and support of the transceiver functional requirements of ITU-T G.993.2 (Very high speed Digital Subscriber Line transceivers 2).



Example of TBF (HLOG) result for a good Line



Example of TBF (HLOG) result for a bad Line

One TBF is based on several test iterations:

- The first iteration (~15 minutes) will give a PASS/FAIL status:
    - If the line has some stubs or other important defaults (mostly reported thanks to Hlog analysis), the line will be considered as faulty and put in Basic Connectivity Profile.
    - If the line seems to be correct, the test will go on to the following iterations.
- The next iterations (every ~2 days) will collect data from the DSLAM. The TBF requires 4 days of data (CPE up with traffic) to be able to finish. That's why the TBF can last up to 10 days (fixed limit) to complete.
- Once the TBF is over and based on all information collected, the Line Profile is then defined by Belgacom "Repair Profile Algorithm" and set automatically on the line.

10 Appendix 4: External TBF service high-level description

Belgacom has implemented[8] a SOAP/XML interface (based on current Open Calendar/Certified Technician technology) for OLO to be able to remotely launch a TBF on a line with an OLO CPE. The requirements for the interface are documented[9] in the "External TBF Service XML Content Description".

Generally, the OLO can launch a TBF – only after a provisioning DONE – by sending a request to Belgacom with the following info:

- CID (OLO must then know which CPE is linked with which line/CID!)
- …

Belgacom will acknowledge the Launch Request in a synchronous way and pass a reference ID to indentify uniquely the TBF test. When TBF is over (it can take up to 10 days), Belgacom will also send a notification that the TBF test is finished. The OLO can then send another request to fetch the results (cf. Appendix 5 of the present document). The OLO will also be able to send a request to get intermediate results. Anyway, the notification of completed test will always be sent to the OLO even though the TBF would have been triggered by Belgacom.

In case a TBF is already ongoing, the previous TBF will be automatically cancelled. This will help speed up repair process, to avoid waiting for the first TBF to finish after repair actions were accomplished. A notification that the test is cancelled will be sent to the OLO for information (with reference ID of cancelled TBF). It might happen that previous/cancelled TBF had been launched by Belgacom.

At the end of TBF, Belgacom will provision the line profile (Provisioning, Repair or Basic Connectivity) resulting from Belgacom "Repair Profile Algorithm", as if it was a Belgacom CPE.

OLO will have one additional (optional) step in the process to specify the line profile desired:

- At least a TBF should have been recently launched on the line;
- The line should not be flagged as being a potential disturber;
- If TBF result is the Basic Connectivity Profile, OLO will NOT be able to choose any other profile. A repair action must be performed first by OLO!
- If not, OLO will be able to choose any other line profile from the same provisioning group (30Mbps, 20Mbps, 16,5Mbps or 12 Mbps).

All this process only applies to the external (SOAP/XML) service that Belgacom has provided to OLOs in the OLO CPE framework. All other existing methods & processes (eTS, IVR …) to launch a TBF stay as today.

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[8] currently under development; available before end of 2012

[9] currently under creation; available beginning of 2012

All potential testing related to the launch of TBF shall be organized by OLO on one of its own WBA line in production. Belgacom will not provide OLO with an end-to-end environment to test such service.

11 Appendix 5: Technical information sent back to OLO after TBF

The information below is the list of measurements (resulting from TBF request) that will be sent back – optionally – to OLO. Accordingly and optionally, OLO will be able to create its own "Repair Profile Algorithm" to decide which Line Profile to apply based on the measurements (and constraints as explained in chapter 6.2.2).

H-log:

- At least OK /NOK with additional information (what led to this conclusion).

Operational data:

- Upstream aggregateTx power
- Upstream band U1 loop attenuation
- Upstream b and U1 signal Attenuation
- PBO electrical length used (Upstream attenuation at 1MHz)
- PBO electrical length estimated (Downstream attenuation1MHz)
- Downstream actual noise margin
- Upstream actual noise margin
- Downstream attainable bit rate
- Upstream attainable bitRate
- Downstream current bitRate
- Upstream current bitRate
- Downstream highestFrequencyUsed

Error counters:

- Downstream Severely Error Seconds per interval (SES-FE)
- Upstream Severely Error Seconds per interval (SES-NE)
- Downstream Error Seconds per interval (ES-FE)
- Upstream Error Seconds per interval (ES-NE)
- Downstream Code Violations per interval (CV-FE)
- Upstream Code Violations per interval (CV-NE)
- Downstream Forward Error Correction Corrected code words per interval (FECC-FE)
- Upstream (near-end) Forward Error Correction Corrected code words per interval (FECC-NE)
- Upstream Reinits per interval
- Upstream Unavailable Seconds per interval

12 Appendix 6: Line Profiles association during ordering and after TBF

All additional information below in this Appendix is for information and explanatory purpose only. Only the line ordering processes from the WBA offer ("Main Body" and "Annex ~~43~~ – Planning & Operations") are to be considered as being the sole reference.

Currently, the following Line Profiles are offered in a WBA product:

LP Name	Max Upstream	Max Downstream	Min Upstream	Min Downstream
LP701	2.000 Kbps	20.000 Kbps	640 Kbps	14.500 Kbps
LP702	2.000 Kbps	16.500 Kbps	640 Kbps	10.000 Kbps
LP703	1.000 Kbps	14.500 Kbps	640 Kbps	10.000 Kbps
LP704	512 Kbps	9.000 Kbps	256 Kbps	4.600 Kbps
LP705	6.000 Kbps	30.000 Kbps	640 Kbps	14.500 Kbps
LP706	6.000 Kbps	25.000 Kbps	640 Kbps	14.500 Kbps
LP707	6.000 Kbps	20.000 Kbps	640 Kbps	14.500 Kbps
LP708	4.000 Kbps	14.500 Kbps	640 Kbps	10.000 Kbps
LP711	1.064 Kbps	12.064 Kbps	256 Kbps	4.664 Kbps
LP712	576 Kbps	12.064 Kbps	256 Kbps	4.664 Kbps
LP713	576 Kbps	7.064 Kbps	256 Kbps	4.664 Kbps
LP714	576 Kbps	10.100 Kbps	256 Kbps	4.664 Kbps

The Provisioning Profiles are set – during ordering – according to the following engineering rules:

Att_{Loop} [dB]	$Length_{Loop}$ [m]	Provisioning Profile Selected
< 0,4	< 400	LP705 (30)
< 0,7	< 700	LP701 (20)
<1	< 1.000	LP702 (16,5)
<1,4	< 1.400	LP711 (12)

Where:

- Att_{Loop} = The loop attenuation at 800 Hz between the ROP and the user premises,
- $Length_{Loop}$ = The loop length between the ROP and the user premises,
- The conditions on loop attenuation and loop length must be fulfilled simultaneously to assign a specific Provisioning Profile on an end user line.

Following TBF results, in case of line instability, Belgacom might downgrade the Line Profile to a "Repair" Profile with the following profiles:

Provisioning Profile	LP705 (30)	LP701 (20)	LP702 (16,5)	LP711 (12)
Repair Profile 1	LP706 (25)	LP702 (16,5)	LP703 (14,5)	LP712 (12)
Repair Profile 2	LP707 (20)	LP703 (14,5)	N/A	LP714 (10)
Repair Profile 3	LP708 (14,5)	N/A	N/A	LP713 (7)
Basic Connectivity Profile	LP704 (9)	LP704 (9)	LP704 (9)	LP704 (9)

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