



Proximus Reference Offer for Bitstream Access

Covering the technology VDSL2

Annex 7: Roles & Responsibilities throughout the OLO CPE lifecycle

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1 Preamble

This document aims at clarifying and defining all the roles & responsibilities of Proximus and Beneficiaries throughout the lifecycle of an OLO Customer Premises Equipment ("OLO CPE"). This step is important as many of the current Bitstream VDSL2 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 Beneficiary, the latter can have help from its subcontractor(s) (e.g. CPE-vendors, another OLO, specialized labs ...) but under any circumstances the Beneficiary remains the sole responsible towards Proximus.

The present document is an Annex to the Bitstream offer, communicated to the BIPT, and will be considered as binding and applicable upon Proximus and the Beneficiary as from its publication. In the event the General Terms and Conditions of the Bitstream offer contain clauses which are contradictory with the clauses of the present document, the latter shall prevail.

2 Contractual relationship / engagement between Proximus and Beneficiary

A Beneficiary who decides to use its own VDSL2 OLO CPE on the VDSL2 network of Proximus commits to the following:

- The Beneficiary informs Proximus in writing of its intention to use its own VDSL2 OLO CPE, indicating the expected timing of launch;
- The Beneficiary 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 its OLO 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 its OLO CPE against all DSLAM firmware upgrades announced by Proximus within the timeline as defined in this document;
 - assigns the necessary resources (human resources, lab environment, hardware and software) allowing to respect its obligations as defined in this document;
- The Beneficiary agrees with the content of this document and fully endorses the related Roles & Responsibilities;
- The Beneficiary agrees with and assumes all consequences as defined in this document (for instance if not respecting its obligations or when not reaching the deadlines);
- The Beneficiary acknowledges and agrees that Proximus will not engineer nor operate the OLO CPE in any way, and that Proximus has no responsibility whatsoever for the proper functioning of the OLO CPE;
- The Beneficiary accepts that Proximus will not have any additional tasks or obligations than those described in this document.

3 Executive summary

Proximus will consider that an OLO CPE will behave in a similar manner as a Proximus CPE. The Beneficiary will have to ensure that its modem will be interoperable with the Proximus IT systems to enable the provisioning and repair processes (cf. Chapter 5.1.1). Proximus will provide the Beneficiary with a series of tests ("OLO CPE Test Plan" as described in Appendix 1 of this document) that the OLO CPE must successfully pass by means of one of the proposed OLO CPE certification services as described in Chapter 6.3 "OLO CPE Certification Services". The OLO CPE Test Plan verifies that the OLO CPE supports the main line configurations used by the Proximus VDSL2 network, but it does not guarantee the correctness of CPE behavior, nor CPE performance, nor the accuracy of reporting parameters. Hence the Beneficiary will assume the responsibilities of the operational consequences of a situation where the OLO CPE should behave differently from a Proximus CPE.

Hence R&R are defined as follows (more details to be found in the indicated chapters):

- Engineering (Chapter 5.1):
 - The OLO CPE shall respect some minimum technical requirements (Chapter 6.1). The evolution of technical requirements will be communicated according to the planned upgrades process (Network & OLO CPE - Chapter 5.1.2).
 - The OLO CPE must be validated according to the OLO CPE Test Plan (Chapter 6) before being connected to the Proximus VDSL2 network by means of one of the proposed OLO CPE certification services Proximus offers (Chapter 6.3).
 - If the OLO CPE or the OLO CPE Test Plan evolves (Chapter 6.2), the tests mentioned in the OLO CPE Test Plan shall be re-validated by means of one of the proposed OLO CPE certification services Proximus offers (Chapter 6.3).
 - For all network upgrades a common retro-planning will enable a clear communication and planning between Proximus and the Beneficiary (Chapter 5.1.2).
- Operational (Chapter 5.2):
 - Line Ordering (Chapter 5.2.1): the ordering process remains unchanged.
 - Installation (Chapter 5.2.2 & Appendix 4):
 - Every time an OLO CPE is connected to the Proximus network, the Beneficiary will be responsible to launch a "Test de Bonne Fin" (Appendix 3) on the concerned line.
 - Once the "Test de Bonne Fin" is over :
 - Proximus will apply the line profile (provisioning, repair, basic or fall-back) on the concerned line of the Beneficiary based on the outcome of the Proximus Repair Profile Advisor (RPA) analysis.
 - Then, the Beneficiary will eventually (optionally) be able to choose a different line profile following certain conditions.
 - Repair (Chapter 5.2.5):
 - Proximus will provide the Beneficiary with the same repair tools for an OLO CPE as for a Proximus CPE. But Proximus cannot guarantee that the repair logic used in these tools will work in the same way as with a Proximus CPE.
 - In case of repair disputes, the Beneficiary shall install a Proximus CPE to be used instead of (or with) the OLO CPE either in a One-Box or a Two-Box (preferred solution) model.
- Certification (Chapter 6.3):

- The Beneficiary shall order the appropriate certification services out of the list of certification services Proximus offers.
- Proximus will perform the ordered certification services (in collaboration with the Beneficiary if foreseen that way) within a reasonable timeframe but within the foreseen timings for recertifications and synchronisation tests triggered by DSLAM firmware upgrades.

4 Confidentiality

The information disclosed by Proximus (or its subcontractor(s)) in the frame of this R&R document will be covered by an NDA. This NDA needs to be signed between Proximus and the Beneficiary prior to any information disclosure. In no event shall Proximus (or its subcontractor(s)) be compelled to deliver or disclose any more information to the Beneficiary beyond what is reasonably needed for the Beneficiary to develop, deploy, exploit and maintain its own VDSL2 OLO CPE in compatibility with the Proximus VDSL2 network and with the Proximus' VDSL2 bitstream wholesale service.

Moreover, if Proximus is subject to a confidentiality obligation vis-à-vis specific subcontractor(s) or a third-party, Proximus will do its best to include the Beneficiary into this NDA, but cannot guarantee that the subcontractor(s) or the third-party will accept the new multi-lateral agreement.

5 Roles & Responsibilities

5.1 Engineering Activities

5.1.1 New CPE Introduction

General

Proximus will consider that an OLO CPE will behave in a similar manner as a Proximus CPE. The Beneficiary will have to ensure that its modem is interoperable with the Proximus IT systems for the provisioning- and repair processes, which requires the support of the 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).

Proximus will provide a series of tests ("OLO CPE Test Plan" as described in Appendix 1 of this document) that the OLO CPE must successfully pass by means of one of the appropriate certification services from the list of OLO CPE certification services Proximus offers. The OLO CPE Test Plan verifies that the OLO CPE supports the main line configurations used in the Proximus VDSL2 network, but it does not guarantee the correctness of CPE behavior, nor CPE performance, nor the accuracy of reporting parameters¹.

Hence the Beneficiary will assume the responsibility of the operational consequences of a situation where the OLO CPE would behave differently from a Proximus CPE.

The OLO CPE will be treated, when possible, as a Proximus CPE for all operational (Installation & Repair) activities. Nonetheless, all engineering (new OLO CPE introduction & Upgrades) activities need to be defined.

Design & Development

In respect with its confidentiality constraints, Proximus will communicate to a Beneficiary, at the moment it enters the OLO CPE process 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 Proximus provides such information, it does not mean that this information is binding in any way. Proximus will always be able to change its roadmap according to its strategy.

The OLO CPE shall respect a minimum set of technical requirements, namely compliancy with ITU SG15 standards, including compliancy with "G.Vector Friendliness" in Upstream and Downstream, according to G.993.2 annex Y. Alternatively, if the Beneficiary 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 Beneficiary must be aware that the current legacy VDSL2 linecards in the Proximus network have a startfrequency (f_{OL}) which is not the same as for the ADSL/2/2+ bandplans. The startfrequency (f_{OL}) on the

¹ Additionally it shall be noticed that the respect of ITU Standards and the Broadband Forum test plans (TR-114, TR-115 and TR-138) do not ensure that the OLO CPE performance, behavior and accuracy of reporting parameters will be similar to the Proximus CPE.

current VDSL2 legacy linecards is at 138 kHz. The Beneficiary must take this into account in its OLO CPE HW and/or SW. The new vectoring linecards that are being deployed support a different bandplan with the VDSL2 upstream UO startfrequency (f_{OL}) at 25 kHz and the stopfrequency (f_{OH}) at 276 kHz. The OLO CPE must be compatible with both types of linecards and bandplans.

Testing

The Beneficiary is the sole responsible to get its OLO CPE certified according to the OLO CPE Test Plan (provided in Appendix 1 of this document) by means of the appropriate certification test from the proposed OLO CPE certification services Proximus offers. The Beneficiary will order an appropriate certification service from the list of certification services Proximus offers.

A certification does not guarantee in any way that the OLO CPE will operate the same way as a Proximus CPE. The Beneficiary will assume the responsibility of the operational consequences of a situation where the OLO CPE behaves differently than a Proximus CPE.

If necessary, a Beneficiary can request to Proximus to perform ad-hoc tests to solve issues that require a testing environment which is difficult to replicate such as the Proximus vectoring testing environment.

Proximus authorizes Beneficiaries to label the certified OLO CPE with the mention « authorised on the VDSL2 network of Proximus ».

Launch

The Beneficiary will inform Proximus about the launch of a new OLO CPE at least 3 months in advance before the OLO CPE is plugged into the Proximus network.

The Beneficiary will have to provide all the relevant information, which includes but is not limited to:

- Technical details of the physical VDSL2 layer:
 - VDSL2 Chipset manufacturer and version;
 - VDSL2 Chipset firmware version;
 - Start frequency of high pass filter in OLO CPE (if applicable);
 - Status with regard to support of G.Vector, G.Vector Friendliness and G.INP.
- All information related to the CPE vendor, version and firmware version allowing to identify the OLO CPE by the Proximus network.
- Purchase order for the appropriate Proximus certification service from the list of certification services Proximus offers (see Chapter 6.3 “OLO CPE Certification Services”).

5.1.2 Upgrades (Network & OLO CPE)

Network

In case Proximus intends to upgrade its network infrastructure (DSLAMs), the choice to execute or not the upgrade is the sole responsibility of Proximus.

Definitions:

- VDSL2 DSLAM Proxy Firmware: the software package responsible for 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 the VDSL2 physical layer) and/or
 - The gradual introduction of a new hardware ("HW") linecard in the Proximus DSLAMs without outphasing of the already deployed linecards (typically triggered by DSLAM vendor HW evolutions, or by the introduction of new functionalities) and/or
 - The gradual introduction of a new linecard in the Proximus 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 the Proximus DSLAMs. The massive introduction of the VDSL2 Vectoring technology in the Proximus 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 a symmetrical VDSL2 profile (spectrum + service profile), introduction of a VDSL2 profile for long loops (spectrum + service profile), adaptation of the actual UPBO-profile, adaptation of an existing spectrum profile, ...
- Synchronization checks: is a subset of tests defined in the OLO CPE Test Plan that verifies the synchronization of the VDSL line for relevant Proximus access network configurations.

Legend for the figure illustrating the network upgrade:

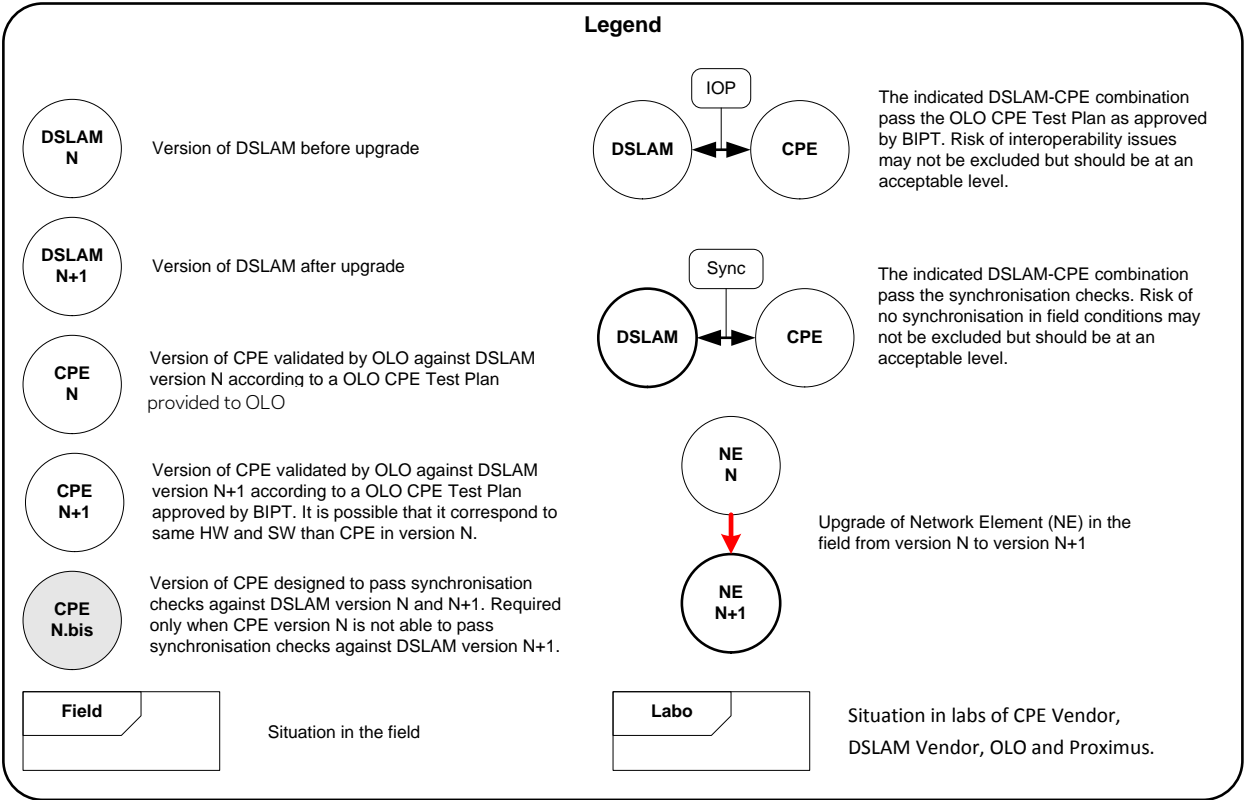


Figure 1: Legend for the figure 2 illustrating the network upgrade

Figure 2 hereafter illustrates the network upgrade and the necessary steps for the alignment of a CPE (see legend above):

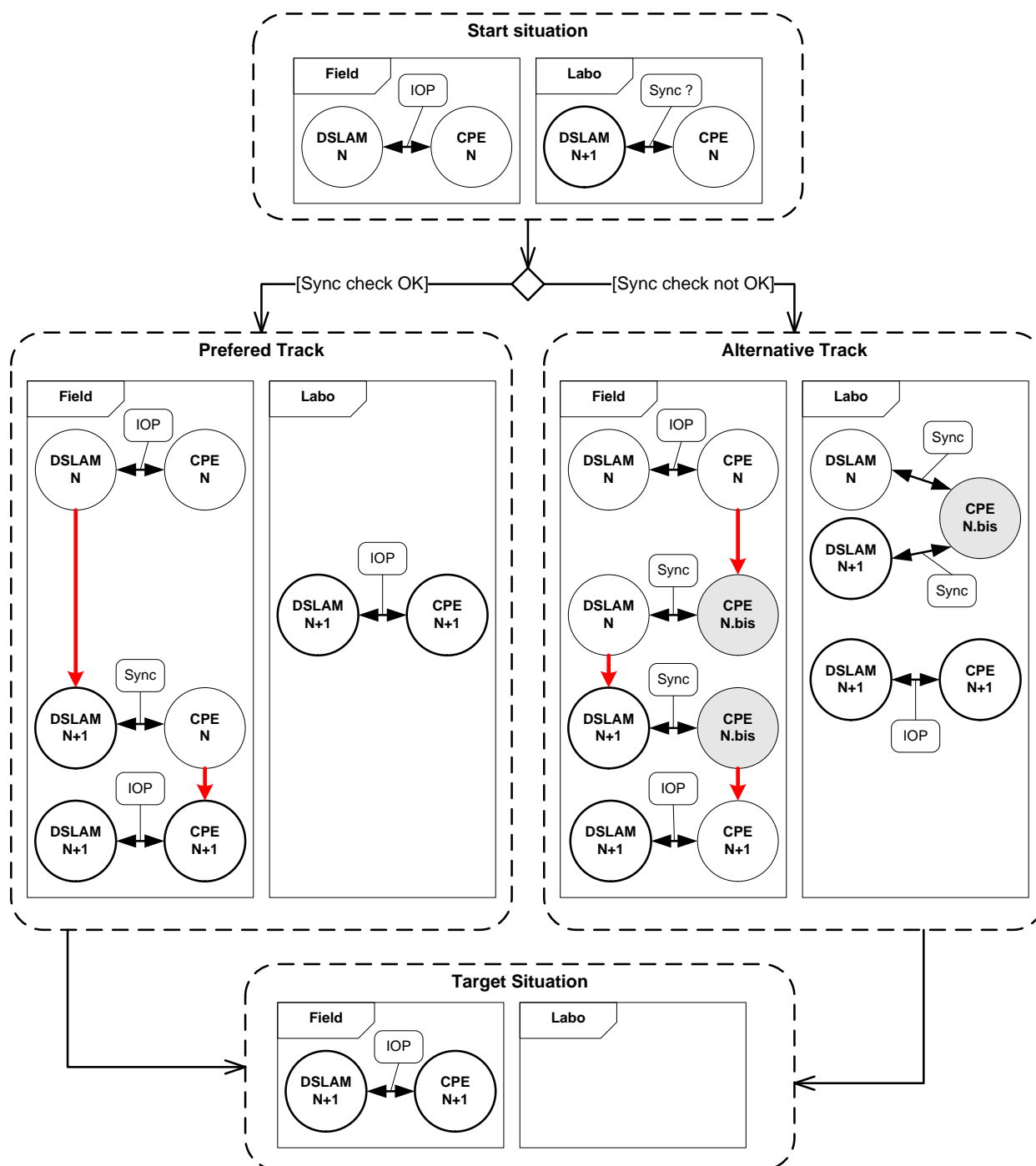


Figure 2: Network upgrade tracks, "Preferred" vs. "Alternative" track

As illustrated in 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 OLO 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”), the Beneficiary can order a “Basic synchronisation check” (see Chapter 6.3 “OLO CPE Certification Services”). Proximus will then execute a basic Synchronization check with the OLO CPE.

In order to allow Proximus to execute the ordered “Basic synchronisation check”, the Beneficiary will provide Proximus with 4 units of each of its elected OLO CPE in the latest SW version. In case of a SW upgrade from already certified OLO CPE from version N to version N+1, Proximus and the Beneficiary will agree on how to upgrade these 4 units of OLO CPE in order to have at all times the most recent OLO CPE SW available in the Proximus labs. Those CPE will be delivered by the Beneficiary to Proximus free of charge.

Proximus engages to perform this test – if timely ordered - in the first phase of the lab testing cycle with comparable timing as with the Proximus CPE testing (knowing that Proximus will first execute this test on the Proximus CPE 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. Proximus will communicate the results of this test to the Beneficiary.

The reference time (Step 6 in Table 1 with time = 0) for “DSLAM network SW upgrade” is independent of the track followed by each CPE (OLO CPE and Proximus CPE).

Some examples of upgrade scenarios 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 Proximus and the Beneficiaries:

Step		Responsible	Minor Upgrade	VDSL2 layer (re-) configuration	Major Upgrade	Strategic Upgrade
1	PROXIMUS informs the Beneficiary about the DSLAM upgrade	Proximus	- 1 Month	Mostly project based according to Bitstream offer	- 6 Months or earlier	-12 Months or earlier
2	PROXIMUS provides the Beneficiary with technical information ⁽¹⁾ (draft)	Proximus	NA	NA	- 6 Months	- 12 Months
3	PROXIMUS communicates any evolving technical information to the Beneficiary for engineering purposes and informs the latter when the Field Trial recertification can start	Proximus	NA	NA	Continuous ⁽²⁾	Continuous ⁽²⁾
4	PROXIMUS provides the Beneficiary with the final technical information ⁽¹⁾ & OLO CPE Test Plan to be used (final)	Proximus	NA	- 3 Months	- 3 Months	- 3 Months
5	PROXIMUS' new DSLAM SW validated and communicated to the Beneficiary for OLO CPE N and/or N+1 testing finalisation	Proximus	NA	NA	- 1 Month	- 1 Month
6	DSLAM network SW upgrade	Proximus	Start: 0 End ⁽³⁾ : + 3 weeks	0 (Re)-configuration applied	Start: 0 End ⁽³⁾ : + 6 weeks	Start: 0 End ⁽³⁾ : + 8 weeks
7	DSLAM upgrade finished	Proximus	+ 3 weeks ⁽³⁾	0 Delta validation for the new configurations	+ 6 weeks ⁽³⁾	+ 8 weeks ⁽³⁾
8	The Beneficiary and PROXIMUS start the CPE SW upgrade if required ⁽⁴⁾	Proximus & Beneficiary	NA	NA	At end of network upgrade (step 7)	At end of network upgrade (step 7)
9	Activation of new DSLAM functionalities or VDSL2 new configurations as from	Proximus	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 for the specific Proximus context for the elements subject to 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: the 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, Proximus will communicate towards the Beneficiary any evolving “Technical information” data that might have impact on the CPE engineering for the specific Proximus context in order to allow the Beneficiary to keep the same pace in its own engineering cycle of its own CPE.

The above timeline also indirectly explains that the Beneficiary can put in place its own (himself or through sub-contracting) engineering track to validate its CPE against the Proximus DSLAMs through a Field Trial approach. This is valid for the engineering of a new OLO CPE as well as for the (maintenance) evolution of the existing OLO CPE to keep pace with the Proximus DSLAM network evolution. Proximus will inform Beneficiaries who ordered a Field Trial recertification when an (intermediate) DSLAM firmware is considered being sufficiently stable to start the field trial.

- (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 the upgrade procedure or in the 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 the needed physical interventions in all ROPs of the access network.

The gradual activation of a new functionality comes typically in the months after the end of the DSLAM SW upgrade.

- (4) If an OLO CPE in version N or N.bis already passes the OLO CPE Test Plan for the DSLAM version N+1, then the Beneficiary does not need to upgrade its CPE. The CPE will be considered as being in version N+1, and will become the new version N for the next cycle.

If not, the Beneficiary 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 Beneficiary will communicate towards Proximus the technical information about the OLO CPE and the status of its OLO CPE upgrade process. After these 3 months, Proximus can decide to no longer support the OLO CPE firmware version N and can remove it from the whitelist after having informed the Beneficiaries.

Proximus is allowed to activate the new VDSL2 functionalities supported by the DSLAM SW N+1 as from 3 months after the 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 has no impact on the CPE SW (so the functionalities only requiring a minor upgrade or a (re-)configuration), Proximus can activate these new functionalities directly as from the start of the DSLAM upgrade. Proximus will notify the Beneficiaries of such functionality activations in its VDSL2 network.

During Steps 1, 2 and 3, the exactness of all information provided by Proximus will not be guaranteed and such information will be for informative and indicative purposes only. Proximus is allowed to make any changes to the technical information it needs in order to deploy its VDSL2 network strategy.

Proximus has the right to delay the timing based on technical, operational, commercial, legal, regulatory and/or strategic reasons. In case of delay Proximus will inform the Beneficiaries with an updated timeline (if available).

Proximus acknowledges that having 2 parallel major and/or strategic upgrades running at the same time between the steps 4 and 6 can be difficult to handle. Hence Proximus will not have 2 major and/or strategic DSLAM upgrades in the whole network running at the same time between the steps 4 and 6 (3 Months period). It means that the second network upgrade can only enter in step 4 when the first network upgrade has completed the step 6. Proximus reserves the right to perform some DSLAM upgrades impacting a limited number of VDSL2 lines for pilot and field trial purposes at any time on top of any already ongoing upgrade. Proximus will notify Beneficiaries of the zone/lines impacted by these pilots or field trials. Two kinds of pilots or field trials 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 a planned network upgrade. For this kind of trial Proximus will take the necessary actions to limit as much as possible the risk for the lines of the Beneficiary.
- Trial to validate a future network upgrade: this kind of trial takes place between the steps 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 lines of the Beneficiary.

In both cases, during a pilot/field trial when the OLO CPE with SW version N is not compatible with the DSLAM under test, the Beneficiary needs to use a different CPE (instead/in front of OLO CPE specific to the pilot/field trial) as Proximus might also be required to do so for its own CPE. In case these field trials would impact too much some lines of the Beneficiary, a bi-lateral discussion will be held.

The OLO CPE Test Plan will be subject to updates caused by planned network upgrades. The final OLO CPE Test Plan to be used for the OLO CPE certification will be given at step 4 as described in Table 1. For "VDSL2 layer (re-) configuration", if appropriate, Proximus will offer the possibility of a partial recertification, which is limited to a delta validation representing the differences between the previous OLO CPE Test Plan and the current one, in order to reduce the Proximus workload and related OLO cost of the recertification.

Naturally, during the transition period (time until the agreement of the present R&R document between Proximus and the Beneficiary), the retro-planning for the already planned VDSL2 network upgrades might not be applicable as such as these timelines might be shorter.

The Roles & Responsibilities for specific cases / scenarios need also to be defined:

- Fall-Back Scenario: in case of a DSLAM SW upgrade failure, as the OLO CPE still is in the SW version N it was already compatible with the DSLAM SW version N, Proximus is allowed to go back from DSLAM SW N+1 to the previous firmware (N) without prior agreement of the Beneficiaries. Proximus will notify the Beneficiaries when such a scenario occurs.
- Beneficiary blocked in its development cycle:
 - If a Beneficiary 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, Proximus will accept from the Beneficiary a maximum delay of 1 month allowing the Beneficiary to validate and finish its development/test. After this one month period, Proximus will implement the new DSLAM SW in its network.
 - If a Beneficiary is late in its development cycle without proven VDSL2 interoperability issues with major impact on the OLO CPE, then Proximus is allowed to deploy its new DSLAM SW, starting at day "O", irrespective of potential negative consequences on the OLO CPE.

- If a Beneficiary can no longer upgrade its OLO CPE then Proximus is entitled to deploy its new DSLAM SW even if the Beneficiary is not yet ready, irrespective of potential negative consequences on the OLO CPE. If necessary, a Beneficiary shall install a Proximus CPE or another whitelisted OLO CPE to be used instead of (or with) the OLO CPE either in a One-Box or a Two-Box (preferred solution) model. If an OLO CPE is not able to work in a Two-Box solution, then a Proximus CPE or another whitelisted OLO CPE shall be installed by the Beneficiary to replace the outdated OLO CPE without any guarantees that a Proximus CPE or another whitelisted OLO CPE will operate correctly with the services of the Beneficiary.
- Urgent DSLAM upgrade:
 - without impact on the VDSL2 layer: the notification period will be reduced to 1 day (step 1 in Table 1). The urgency can be triggered by i.a. security issues, stability issues with equipment ...
 - with impact on the VDSL2 layer:
 - Proximus will notify the Beneficiary as soon as the urgent DSLAM upgrade is needed. The Beneficiaries will receive all new firmware information 3 weeks before the upgrade (step 1 in Table 1).
 - If a Beneficiary can prove interoperability issues with the 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, Proximus will accept from the Beneficiary a delay of 2 weeks (on top of the 3 initial) maximum for the Beneficiary to validate and finish its development/test. After this period, Proximus can implement the new SW in its network.
 - Proximus is committed to manage an urgent DSLAM upgrade in such a way that collateral damage is avoided or minimized for Beneficiaries who have decided to manage the OLO CPE SW upgrade as a priority. Proximus will also do the utmost to have executed in this timeframe any ordered certification tests (e.g. a Field Trial) before starting the new urgent SW implementation in its network.

OLO CPE

In case a Beneficiary changes and/or upgrades its CPE (impacting the physical access layer²): a re-certification is needed by means of the appropriate certification process following the same procedure as defined in Chapter 5.1.1, “New CPE Introduction”. The Beneficiary is responsible for the re-validation and re-engineering of its CPE. The new firmware will be validated by means of one of the appropriate certification services from the list of OLO CPE certification services Proximus offers, which is based on the OLO CPE Test Plan as published 3 months before the launch date of the current latest SW version N of the DSLAM firmware unless it is related to a planned network upgrade to SW version N+1.

In case the Beneficiary only changes functional services in its CPE (no impact on the physical access layer²), the Beneficiary shall order an “Administrative certification” to Proximus for the new firmware version (so that Proximus can add it to the whitelist of validated firmwares) 1 month in advance with the formal confirmation from the Beneficiary that indeed the OLO CPE upgrade has no impact on the physical access layer, hence no re-/additional certification is required.

² Corresponding to layer 1 of the OSI model.



Although it remains recommended that all OLO CPE get equipped with the latest certified version of the OLO CPE firmware, Proximus can keep previous OLO CPE firmwares whitelisted as long as they remain compatible with the DSLAM firmware.

5.2 Operational Activities

5.2.1 Line Ordering & Associated Provisioning Profile

There is no impact on the line ordering processes.

All additional information below in this chapter is for information and explanatory purposes only. Only the line ordering processes from the Bitstream offer (“Main Body” and Annex “Planning & Operations”) are the sole reference.

When a Beneficiary orders a Bitstream VDSL2 line, Proximus will send back the Provisioning Profile (as described in the “VDSL2 deployment rules” of the “Main Body”) according to the Proximus VDSL2 engineering rules.

This Provisioning Profile will be set and activated on the line of the Beneficiary. Once the OLO CPE is installed (cf. Chapter 5.2.2 for more details on installation), the Beneficiary will launch a “Test de Bonne Fin” (TBF). This TBF first checks, with the Provisioning Profile, the quality of the line. If the tests are successful, the line will be kept on its Provisioning Profile. If not, the line will be downgraded to a lower “Repair Profile” or to the Basic Connectivity Profile if the line is truly faulty.

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, please refer to Appendix 4 of this document;
- The different line profiles, please refer to Appendix 6 of this document.

Hence several Repair Profiles are assigned to each Provisioning Profile. The Provisioning Profile and its assigned underlying Repair Profiles (the common Basic Connectivity Profile being the minimal Repair Profile) form a Provisioning Profile Group which is independent from the other Provisioning Profile Groups.

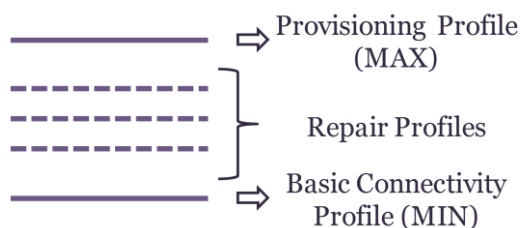


Figure 3: Example of a Provisioning Group: a Provisioning Profile associated with its Repair Profiles

5.2.2 Installation

All current Bitstream VDSL2 provisioning processes will apply but the Beneficiary is responsible for the launch of a TBF as soon as an OLO CPE is connected to the Proximus network. Proximus has designed an external API (SOA / XML service) available for Beneficiaries to remotely launch the TBF (cf. Appendix 4 of the present document for more details).

If Proximus notices that a Beneficiary does not automatically launch a TBF on each new line when an OLO CPE is connected to its network, Proximus reserves the right to put, by default, all newly provisioned lines in the Basic

Connectivity Profile until the Beneficiary launches the TBF (where the line profile will be adapted depending on the TBF result).

After having performed the TBF, the result and technical information of such a TBF will be sent back to the Beneficiary (through the above-mentioned external API). Proximus will send back all technical information as defined in Appendix 5 of this document.

The moment of launching the TBF depends on the installation method:

1. In case of “Remote” or “Without customer visit” installation method: when the installation is done, the Beneficiary shall launch a TBF as soon as the CPE is connected to the Proximus network.
2. In case of “With customer visit” installation method under Proximus responsibility or “With customer visit splicing included” installation method, the process is as follows:
 - Proximus installs and/or connects the NTP as today. The installation procedure is equivalent to the current installation as described in the Annex “Planning & Operations”.
 - All tests performed by a Proximus technician to test the line (same as today) are done with a Proximus CPE.
 - As soon as the OLO CPE is connected to the Proximus VDSL2 network, the Beneficiary must launch a TBF.

At the end of the TBF, Proximus will apply a line profile on the concerned line depending on the result of the Proximus Repair Profile Advisor (RPA). In return, optionally, the Beneficiary will be entitled to choose a different line profile (to be activated by Proximus 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” the Basic Connectivity Profile is to re-launch the TBF with a TBF result which is <u>at least</u> a Repair Profile		
Other Profile	The Beneficiary can choose any of the legacy line profiles from the Provisioning Profile Group but cannot request a profile from a different Provisioning Group, vectoring profiles or the fall back profile		

Table 2: Capability & Constraints for the Beneficiary to update Line Profile following a TBF

The Line Profile change is an extension (optional step) of the TBF launch external service as defined in Appendix 4 of the present document.

If Proximus notices that a Beneficiary launches too many³ TBFs on the same line, Proximus reserves the right to limit a Beneficiary in the number of TBFs launched per line.

³ Per Beneficiary, 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 Bitstream VDSL2 lines of the Beneficiary concerned compared to the total number of Bitstream VDSL2 lines; 500 being the maximum number of TBF per day that Proximus can support.

5.2.3 Remote OLO CPE Management

Proximus highly recommends Beneficiaries to have their own OLO CPE Management platform. If a Beneficiary decides not to, it will have to upgrade manually all its CPE in case of Network or CPE Upgrade in the timeframe defined in Chapter 5.1.2.

In case a Beneficiary decides to have its own Management platform, the Beneficiary will have complete access to its CPE. The Beneficiaries can use any of their VLANs (as defined in the Bitstream offer) and can use any protocol necessary to remotely manage their CPE. Proximus will in no way block any of this traffic.

5.2.4 Spectrum Management (No harm to the network)

Proximus implements 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 does not respect the UPBO mechanism and sends too 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 (Longitudinal Conversion Loss) resulting in a very strong egress to other lines.

Proximus can use any of the following criteria to determine that an individual line is a potential disturber:

- Lines wherefore the computation of the received upstream PSD at the DSLAM based on carrier data TxPSD + carrier data HLOG is above the UPBO reference PSD⁴.
- 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 PSD⁴ into band U1.
- Lines which trigger an UPBO violation alarm (with UPBO Policing activated). The UPBO violation alarm can be triggered by the DSLAM when it detects that the received Power is above the UPBO reference PSD⁴.
- "Unstable lines" that are defined as having more than 50 Resynchronizations or failed initialization per day.
- Disturbance may also be observed from correlation with performance statistics from other lines.
- Once the G.Vector will be implemented, lines which don't 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 an individual line is identified as being a potential disturber in accordance with the criteria set above, Proximus has the right to put this line in a Basic Connectivity Profile or another specific profile to limit the risk of disturbance. Proximus will inform the Beneficiary about such an action. For situations where a line is considered as potential disturber because it is very unstable, the line can be monitored in Basic Connectivity Profile, and the TBF must be re-launched by the Beneficiary to retest the line. Following the TBF result, the necessary repair actions shall be undertaken by the Beneficiary (line profile downgrade, physical repair ...). If the line continues to be "very

⁴ Defined by UPBOPSD(f) in ITU-T G.993.2 §7.2.1.3.2 and using the a and b parameters that are defined per band in BRUO Annex C.

unstable" for 5 working days, even with the Basic Connectivity Profile, the line can be disabled or the Beneficiary shall install a Proximus CPE or another whitelisted OLO CPE to be used instead of (or with) the OLO CPE either in a One-Box or a Two-Box (preferred solution) model. Proximus highly recommends that any OLO CPE is able to operate in a One-Box or a Two-Box Model.

If all above actions are not sufficient to avoid disturbance to other lines, Proximus reserves the right to disconnect the line while notifying the Beneficiary.

The Beneficiary will not be able to change the line profile (as described in Chapter 5.2.2) of a potential disturber line until the line has been repaired and is back to a normal state.

Moreover, if a Beneficiary has too many lines that are being qualified as being potential disturbers or if Proximus detects an interoperability issue with an OLO CPE or if a mandatory recertification (cf. Chapter 5.1.2) was not respected, Proximus has the right to stop the Beneficiary to deploy any additional OLO CPE in its network until a solution is found by the Beneficiary and validated, e.g. through a (partial) recertification. Proximus will collaborate in good faith by informing the Beneficiary of all (relevant) facts that cause the disturbances but it is the Beneficiary or its subcontractor who must perform the analysis necessary to remedy these interoperability issues.

If Proximus can provide evidence that of a specific certified OLO CPE most or all instances disturb other VDSL2 lines, then the concerned OLO CPE can be withdrawn from the whitelist which invokes the activation of the fall back line profile on all these lines. Proximus shall discuss such a decision with the impacted Beneficiaries before withdrawing the concerned OLO CPE from the whitelist. Once the issues of the OLO CPE are solved and appropriate recertification testing is finished, the OLO CPE will be whitelisted again.

If Proximus finds in its network an OLO CPE whose description and validation (for a specific DSLAM version) was not given by the Beneficiary previously in accordance with Chapter 5.1.1, Proximus has the right to put the line in a Basic Connectivity Profile or another specific profile to limit the risk of disturbance, or completely disconnect the line immediately. Proximus shall inform the Beneficiary beforehand about such an action.

5.2.5 Repair

The Beneficiary is responsible for its 1st line helpdesk. Such 1st line helpdesk services must be equivalent to the 1st line helpdesk services currently provided by Proximus.

All Proximus 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 passing the "OLO CPE Test Plan" allows collecting some information from the OLO CPE. Hence the Beneficiary should be able to use all Proximus repair tools on its CPE, but Proximus cannot guarantee any of the repair actions proposed by the repair tools as they are made for a Proximus CPE. Hence the Beneficiary 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 equipped with a Proximus CPE.

If Proximus is sent on site for repair, all Proximus tests will be done with a Proximus CPE (the current Proximus CPE with the current FW (N) validated with DSLAM (N)). If the test with a Proximus CPE shows no abnormality, a wrongful repair shall apply and be paid by the Beneficiary. If the Beneficiary contests the result of the Proximus CPE, the Beneficiary shall install a Proximus 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-Box and a Two-Box solution. If an OLO CPE is not capable to work in a Two-Box solution, then a Proximus CPE shall be installed by the Beneficiary to replace the OLO CPE without any guarantees that a Proximus CPE will operate correctly with the services of the Beneficiary. At the beginning of the monitoring period, the repair case concerning the troubled line will be automatically closed and a new one will be reopened by the Beneficiary at the end of the one month monitoring period.

5.2.6 End-User Topology changes

If for some reason, the network topology changes at the End-User's side, which includes but is not restricted to the End-User's CPE or a change of internal cabling, the Beneficiary will perform a new TBF on the line.

6 Appendix 1: OLO CPE Test Plan and OLO CPE Certification Services – High level definition

6.1 OLO CPE validation

This section describes high level the “OLO CPE Test Plan”. As mentioned in the Chapter “Roles & Responsibilities” of the present Annex, the OLO CPE Test Plan can evolve over time triggered by planned upgrades of the DSLAM software. When the Test Plan changes, Proximus will provide under NDA the Beneficiary with technical information and later, at “Step 4” of the DSLAM Upgrade Retro-Planning, with the final version of the OLO CPE Test Plan that Proximus will use to perform the certification services ordered by the Beneficiary.

The scope of the Test Plan is to enable the evaluation of the transmission layer of a VDSL2 system under pre-defined lab conditions, with as main focus the “no harm to the network” principle. The performance and the correct functioning of the OLO CPE under test are not in the scope of this Test Plan. The sole target is to avoid adverse impact on other lines in the network or on the Proximus provisioning- and repair processes.

The successful execution of the OLO CPE Test Plan for an OLO CPE with SW version N is not a sufficient condition to validate the equipment for field deployment. The validation by the Beneficiary for field deployment should also be done in a broader context that also looks at the functional- and performance aspects not covered by this Test Plan.

In the framework of a CPE validation for Bitstream VDSL2 the following aspects, which go beyond the Test Plan, should be considered as well:

- Acceptance by the operator that intends to deploy an OLO CPE of the roles and responsibilities related to an OLO CPE deployment.
- OLO CPE evolution possibilities to stay aligned with the network evolution.
- Guarantee that the operator that will deploy the concerned OLO CPE will continue to make it evolve in order to stay aligned with the network evolution.
- Compatibility with higher layers.
- Field trials.
- ...

Because it is impossible to reproduce all field conditions in the laboratory, the successful execution of the Test Plan for a specific OLO CPE is not a guarantee that it will work correctly on the Proximus VDSL2 network in all circumstances.

Different types of Upgrades have been defined (see Chapter “Upgrades (Network & OLO CPE)”). A “Minor” upgrade does not impact the current version of the Test Plan but a “VDSL2 layer re-configuration”, a “Major” upgrade or a “Strategic” upgrade might incur modifications of the Test Plan.

The Test Plan includes a set of tests that mainly verify a “no harm to the network” and verify correct interactions with the provisioning- and repair tools in use on the Proximus VDSL2 network.

6.2 Planned modifications to the Test Plan

Beneficiaries who signed a Non-Disclosure Agreement will receive 3 Months before the start of the DSLAM network SW upgrade, if applicable, an updated confidential version of the adapted OLO CPE Test Plan which will include a “partial recertification” option if appropriate.

6.3 OLO CPE Certification Services

The simplified OLO CPE Test Plan still verifies that the OLO CPE supports the main line configurations used in the Proximus VDSL2 network but it does not give guarantees about the correctness of the CPE behaviour, nor CPE performances. The certification cycle has been further simplified by having removed a number of less relevant tests.

Proximus offers these OLO CPE certification services at predefined rates which will be communicated to Beneficiaries who signed the NDA.

Different OLO CPE certification services are developed in order to suit all most common use cases:

1. A **Full certification** with the simplified Test Plan is the mandatory approach for the introduction of a new OLO CPE.
2. An **Administrative** certification allows the whitelisting of an upgraded CPE firmware which only contains functional changes or an upgraded CPE hardware which reuses a certified data pump (hardware & firmware).
3. A **Field trial** certification is suited for the recertification of an upgraded data pump which is already largely present in the Proximus VDSL2 network. A Field trial is performed as a bilaterally agreed multi-stage approach with a gradual roll-out of the new OLO CPE firmware while Proximus monitors the VDSL2 network on “no harm to the network”.
4. A **Fast track** field trial certification is available for the quick recertification of an urgent firmware upgrade, e.g. to solve security issues.
5. A **Basic synchronisation check** towards a new major or strategic DSLAM firmware version is available to check if an upcoming DSLAM firmware upgrade requires a CPE firmware upgrade or not. The check includes the different synchronisation checks required for the upgrade (e.g. a first check against the engineering version of the new DSLAM firmware and a second check against the final version of the new DSLAM firmware).
6. Limited capacity for **ad-hoc** tests in the Proximus lab can only be ordered to solve issues related to the parts of the Test Plan which require the Proximus vectoring testing environment.
7. A **Partial recertification** check will be included in the updated Test Plan – e.g. linked to a planned Major- or Strategic DSLAM firmware upgrade – if a partial recertification for OLO CPE which are already certified suffices. Similarly, a Beneficiary can discuss bilaterally a partial recertification process in case the OLO CPE firmware is upgraded with changes to the VDSL2 datapump.

Proximus will confirm a committed throughput time within 5 working days after having received a firm order for an OLO CPE certification service. The throughput time depends amongst others on the availability of testing slots in the Proximus VDSL2 lab.

- For recertifications triggered by a Major or a Strategic update of the DSLAMs Proximus will perform timely ordered recertifications within the foreseen timings of the DSLAM Upgrade Retro-Planning which is 3 months ⁽⁵⁾ except for a motivated “Fast Track” field trial where Proximus will target at having performed an initial “no harm to the network”-check within 15 working days after completion by the Beneficiary of the CPE firmware upgrades.
- Proximus will target at having performed “Full certifications” of OLO CPE that are triggered by the Beneficiary - e.g. to validate a new OLO CPE - within 4 months after having received the firm order.
- Proximus will target at having executed “Administrative certifications” within 5 working days after having received the firm order.
- Similarly, Proximus will target at having performed “Field trials” that are triggered by the Beneficiary – e.g. to validate a new OLO CPE firmware – within 4 months which starts once the Beneficiary upgraded a sufficient number of OLO CPE with the new firmware.

A recertification of an existing OLO CPE is triggered by Proximus through the notification of a Major- or Strategic DSLAM upgrade or is triggered by the Beneficiary in case the OLO CPE firmware is upgraded with changes on the VDSL2-datapump. See Chapter 5.1.2 for details.

For any OLO CPE certification service with a negative result Proximus will explain the reasons for it and will negotiate in good faith the possible next steps which can be an included additional monitoring effort during the ongoing “Field Trial” recertification, a specific “Partial certification” for the failed tests or a new “Full certification” for a failed new OLO CPE if all the tests must be redone once the updated OLO CPE becomes available.

⁵ 3 months is the time between step 4 and step 6 of the DSLAM Upgrade Retro-Planning in Table 1.

7 Appendix 2: Example of DSLAM & CPE upgrades

7.1 Upgrade scenario example for a major upgrade

Scenario for a major upgrade			
Step	Date	Proximus	Beneficiary
1	D - 6 months or earlier	PROXIMUS informs the Beneficiaries about its intention to upgrade DSLAM (=Step 1 in table 1).	ack.
2	D - 6 months	ack.	The Beneficiary orders a Synchronisation check and provides a CPE version N unless PROXIMUS already has the CPE version N.
3	D - 6 months	PROXIMUS informs the Beneficiary about the first DSLAM engineering version that is supposed to be representative for the future target version (=Step 2 in table 1).	ack.
4	D - 6 months		The Beneficiary starts to work on CPE to develop version N+1.
5	D - 6 months	PROXIMUS performs ordered basic sync tests with OLO CPE version N against engineering version of DSLAM.	
6	D - 6 months	Basic sync tests of OLO CPE version N against engineering version of DSLAM are OK. PROXIMUS informs the Beneficiary.	ack.
7	D - 3 months	PROXIMUS informs the Beneficiary about the final DSLAM version N+1 (=Step 4 in table 1).	ack.
8	D - 3 months or sooner	PROXIMUS performs ordered basic sync tests with OLO CPE version N against DSLAM version N+1.	
9	D - 3 months or sooner	Basic sync tests of OLO CPE version N against DSLAM version N+1 are OK. PROXIMUS informs the Beneficiary.	ack.
10	D - 3 months		The Beneficiary continues to work on CPE to develop version N+1.
11	D - 2 months		The Beneficiary has a candidate for CPE version N+1.
12	D - 1 month	End PROXIMUS DSLAM validation. PROXIMUS confirms the upgrade to version N+1 (=Step 5 in table 1).	ack.
13	D - 1 month		PROXIMUS (as well as Beneficiary) continues the ordered certifications of CPE version N+1 against DSLAM version N+1.

14	D + 0 day	Start of DSLAM upgrade (=Step 6 in table 1).	
15	D + 6 weeks	End of DSLAM upgrade.	
16	D + 2 months		The Beneficiary validated the performance of CPE version N+1 against DSLAM version N+1.
17	D + 2 months	ack.	The Beneficiary can communicate the CPE N+1 performance validation report to PROXIMUS.
18	D + 2 months		The Beneficiary starts the migration of OLO CPE in the field from version N to version N+1.
19	D + 5 months	PROXIMUS assumes all deployed OLO CPE have SW version N+1.	
20	D + 5 months	DSLAM N+1 becomes the new version N for the next upgrade.	CPE N+1 becomes the new version N for the next upgrade.

7.2 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	Proximus	Beneficiary
1	D - 12 months or earlier	PROXIMUS informs the Beneficiaries about its intention to upgrade DSLAM (=Step 1 in table 1).	ack.
2	D - 12 months	ack.	The Beneficiary orders a Synchronisation check and provides a CPE version N unless PROXIMUS already has the CPE version N.
3	D - 12 months	PROXIMUS informs the Beneficiary about the first DSLAM engineering version that is supposed to be representative for the future target version (=Step 2 in table 1).	ack.
4	D - 12 months	PROXIMUS performs ordered basic sync tests with OLO CPE version N against engineering version of DSLAM.	
5	D - 12 months	Basic sync tests of OLO CPE version N against engineering version of DSLAM are not OK . PROXIMUS informs the Beneficiary.	ack.
6	D - 12 months		The Beneficiary starts to develop a bug fix to enable sync against engineering DSLAM version.

7	D - 5 months		The Beneficiary releases a CPE version N.bis that solves the sync against engineering DSLAM version issue and still sync with DSLAM version N.
8	D - 5 months	ack.	The Beneficiary provides a CPE version N.bis to PROXIMUS.
9	D - 5 months	PROXIMUS performs ordered basic sync tests with OLO CPE version N.bis against engineering version of DSLAM.	
10	D - 5 months	Basic sync tests of OLO CPE version N.bis against engineering version of DSLAM are OK. PROXIMUS informs the Beneficiary.	ack.
11	D - 5 months		The Beneficiary starts to prepare the migration of OLO CPE in the field to version N.bis.
12	D - 5 months		The Beneficiary continues to work on CPE to develop version N+1.
13	D - 3 months	PROXIMUS informs the Beneficiary about the final DSLAM version N+1 (=Step 4 in table 1).	ack.
14	D - 3 months	PROXIMUS performs ordered basic sync tests with OLO CPE version N.bis against DSLAM version N+1.	
15	D - 3 months	Basic sync tests of OLO CPE version N.bis against DSLAM version N+1 are OK. PROXIMUS informs the Beneficiary.	ack.
16	D - 3 months		The Beneficiary starts the migration of OLO CPE in the field from version N to version N.bis.
17	D - 3 months		The Beneficiary continues to work on CPE to develop version N+1.
18	D - 2 months		The Beneficiary has a candidate for CPE version N+1.
19	D - 1 month	End PROXIMUS DSLAM validation. PROXIMUS confirms the upgrade to version N+1 (=Step 5 in table 1).	ack.
20	D - 1 month		PROXIMUS (as well as Beneficiary) continues the ordered certifications of CPE version N+1 against DSLAM version N+1.
21	D - 1 day	PROXIMUS assumes all OLO CPE in the field are in version N.bis.	
22	D + 0 day	Start of DSLAM upgrade (=Step 6 in table 1).	
23	D + 8 weeks	End of DSLAM upgrade.	

24	D + 2 months		The Beneficiary validated the performance of CPE version N+1 against DSLAM version N+1.
25	D + 2 months	ack.	The Beneficiary can communicate the CPE N+1 performance validation report to PROXIMUS.
26	D + 2 months		The Beneficiary starts the migration of OLO CPE in the field from version N to version N+1.
27	D + 5 months	PROXIMUS assumes all deployed OLO CPE have SW version N+1.	
28	D + 5 months	DSLAM N+1 becomes the new version N for the next upgrade.	CPE N+1 becomes the new version N for the next upgrade.

8 Appendix 3: Additional Information on Proximus “Test de Bonne Fin”

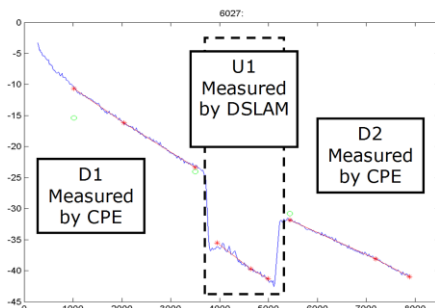
Proximus developed the “Test de Bonne Fin” (TBF) in order to:

- 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 End-User

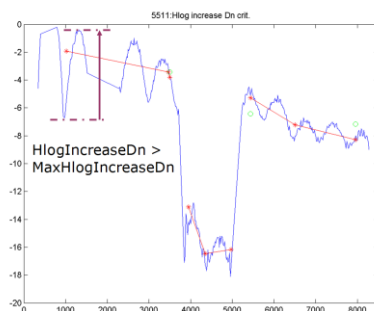
The TBF test is mainly based on 3 inputs of data:

- The Hlog analysis
- Operational data collected by the DSLAM
- Error counters

All values obtained during the TBF are collected at DSLAM level. No interaction with the CPE at higher layers (SNMP/MIB, TR-69, Remote Access ...) is used but the TBF requires from the OLO CPE the support of the physical layer OAM configuration with performance monitoring parameters as 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 a TBF (HLOG) result for a good Line



Example of a TBF (HLOG) result for a bad Line

Each TBF is based on several test iterations:

1. 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 the Hlog analysis), the line will be considered as faulty and the Basic Connectivity Profile will be activated.
 - If the line seems to be correct, the test will continue with step 2.
2. The next wave of iterations (every ~2 days) will collect data from the DSLAM. The TBF requires 4 days of data (CPE up with traffic) to finish. That's why the TBF can take up to 10 days (fixed limit) to complete.
3. Once the TBF is over, based on all information collected, the Line Profile is then chosen by the Proximus "Repair Profile Algorithm" and activated automatically on the line.

9 Appendix 4: External TBF service high-level description

Proximus has implemented an SOA/XML interface for the Beneficiary to be able to remotely launch a TBF on a line with an OLO CPE. The documentation of this SOA service is stored on the secured part of the Proximus wholesale website.

Generally, a Beneficiary can launch a TBF – only after the provisioning – by sending a request to Proximus with the following info:

- CID (the Beneficiary must then know which CPE is linked with which line/CID!)
- ...

Proximus will acknowledge the Launch Request in a synchronous way and pass a reference ID to identify uniquely the TBF test. When the TBF is finished (it can take up to 10 days), Proximus will also send a notification that the TBF test is finished. The Beneficiary can then send another request to fetch the results (cf. Appendix 5 of the present document). The Beneficiary will also be able to send a request to get intermediate results. Anyway, the notification of the completed test will always be sent to the Beneficiary even if the TBF was triggered by Proximus.

In case a TBF is already ongoing, the ongoing TBF will be automatically cancelled. This will help speeding up a repair process, by avoiding to have to wait for the first TBF to finish after having accomplished repair actions. A notification that the ongoing test is cancelled will be sent to the Beneficiary for information (with the reference ID of the cancelled TBF). It is possible that an ongoing/cancelled TBF was launched by Proximus.

At the end of a TBF, Proximus will provision the line profile (Provisioning, Repair or Basic Connectivity) as decided by the Proximus “Repair Profile Algorithm”, as if a Proximus CPE was used.

The Beneficiary has one additional (optional) step in the process to specify the line profile desired:

1. At least a TBF should have been recently launched on the line;
2. The line shall not be flagged as being a potential disturber;
3. If the TBF result is the Basic Connectivity Profile, the Beneficiary will NOT be able to choose any other profile. A repair action must be performed first by the Beneficiary;
4. If a vectoring profile or the fall back profile is active on the line, the Beneficiary will NOT be able to choose any other profile;
5. If not, the Beneficiary will be able to choose any other line profile from the same Provisioning Group (30Mbps, 20Mbps, 16,5Mbps or 12Mbps).

All these processes only apply to the external (SOA/XML) service that Proximus has provided to the Beneficiaries in the OLO CPE framework. All other existing methods & processes (repair interface, IVR ...) to launch a TBF stay as today.

All potential testing related to the launch of a TBF shall be organized by the Beneficiary on one of its own Bitstream VDSL2 test lines in production. Proximus will not provide the Beneficiary with an end-to-end environment to test such service.

10 Appendix 5: Technical information sent back to the Beneficiary after TBF

The information below is the list of measurements (resulting from a TBF request) that will be sent back – optionally – to the Beneficiary. Accordingly and optionally, each Beneficiary 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 5.2.2).

H-log:

- At least an OK /NOK with additional information (what led to this conclusion).

Operational data:

- Upstream aggregateTx power
- Upstream band U1 loop attenuation
- Upstream band U1 signal attenuation
- PBO electrical length used (Upstream attenuation at 1MHz)
- PBO electrical length estimated (Downstream attenuation at 1MHz)
- Downstream actual noise margin
- Upstream actual noise margin
- Downstream attainable bitRate
- 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 Reinit per interval
- Upstream Unavailable Seconds per interval

11 Appendix 6: Line Profiles association during ordering and after TBF

All additional information below in this Appendix is for information and explanatory purposes only. Only the line ordering processes from the Bitstream offer (“Main Body” and Annex “Planning & Operations”) are to be considered as being the sole reference.

All Line Profiles offered for the Bitstream VDSL2 product are described in section “DSL profiles at UNI (Layer1)” of the Annex 2C: “Technical specifications”.

The Provisioning Profiles are set – during ordering – as described in the “VDSL2 deployment rules” of the “Main Body” according to Proximus’ VDSL2 engineering rules.

Following TBF results, in case of line instability, Proximus might downgrade the Line Profile to a “Repair” Profile.

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