



Addendum to BRUO

VDSL2 35 MHz

Approved by BIPT on 13/12/2016

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1 Purpose of the addendum

This addendum is submitted in the context of the ongoing VDSL2 speed improvement program of Proximus.

In 2010, VDSL2 17 MHz has been introduced allowing a provisioning speed of up to 30 Mbps downstream & up to 10 Mbps upstream on legacy VDSL2 lines.

Since 2012, Proximus also applies the DLM (Dynamic Line Management) process, boosting part of its park of VDSL2-lines to up to 70 Mbps downstream speeds. The DLM mechanism allows part of the legacy VDSL2 lines to benefit from higher bit rates than expected according to the provisioning rules based on loop length and attenuation, without increasing significantly the risk for transmission errors or instabilities.

Since 2014, Proximus also applies the DLM process to increase the upstream speed to up to 10 Mbps on legacy VDSL2-lines.

Since 2015, Proximus applies DLM process on vectored VDSL2-lines to increase downstream speed up to 100 Mbps and upstream vectoring which increases the upstream speed on vectored VDSL2-lines to up to 20 Mbps.

Proximus will use the 35MHz spectrum to further increase the VDSL2 downstream speeds.

2 Scope of this addendum

This addendum is applicable to the **BRUO services** as described in the the Proximus Reference Unbundled Local Loop Offer. The impacts on the WBA-VDSL2 reference offer will be subject of one or more separate addenda.

3 Planning

The present addendum has been submitted for approval to the BIPT in order to become effective as from February 2017¹.

4 Operational Impact

This addendum does not have any operational impact: neither on the BRUO ordering and provisioning processes, nor on the E-tools, nor on the fault reporting and repair processes.

¹ Proximus might postpone this date in order to guarantee the quality of the deliverables

5 Impact on the regulated offers²

5.1 Adaptation on BRUO documents

The sections of the BRUO offer documents which are impacted by this addendum are indicated in the subsequent paragraphs. The changes will also be highlighted in the Reference Offer.

Those adaptations refer to the consolidated version of the BRUO offer (version 12), published on the Proximus website, at http://www.proximuswholesale.be/en/id_bruo/public/access/regulated-services/bruo.html

BRUO Annex C - Technical Specifications

In chapter 5 “Common technical specifications for the equipment to be connected to the loop or sub-loop”, section 5.1 “VDSL2”, several adaptations have to be done.

A. In the 3rd paragraph, one band plan is added:

VDSL2 partitioning of the frequency spectrum into non-overlapping frequency bands, each of which is allocated for either upstream or downstream transmission shall respect the 998 or 998ADE17 or 998ADE35 band plans defined in annex B of ITU-T Recommendation G.993.2 and its amendment 1.

B. In the 4th paragraph, new limit masks are added:

This implies that limit mask B8-1, B8-2, B8-3, B8-4, B8-5, B8-6, B8-7, B8-10, B8-11 ~~and~~, B8-12, B8-17, B8-20, B8-21 and B8+22 of table B-3 of ITU-T Recommendation G.993.2 amendment 1 are allowed for transmission.

² Deleted parts are red and strikedthrough while new parts are green.

C. Paragraph 6 does not longer apply and is replaced by a new paragraph:

VDSL2 Upstream Power Back Off, as defined in §7.2.1.3 of ITU-T Recommendation G.993.2, shall be applied for upstream bands U1 and U2. Depending of the equipment location one of following set of a and b parameters shall be used:

	U1		U2	
UPBO parameter set	A	B	A	B
ETSI-D	47,3	26,21	54	17ln,36
Custom PXS	54,5	19,7	53,2	14,6
Mix	47,3	26,21	53,2	14,6

Note

At the time of writing the addendum to BRUJO that includes above UPBO parameter sets:

- The ETSI-D parameter set corresponds to the UPBO that is applied to all VDSL2 and VDSL1 lines. This parameter set was inherited from the VDSL1 deployment.
- At the launch of VDSL1 the operator had to select an UPBO model amongst a set of pre-defined model. At that time ETSI-D parameter set was probably the best choice to match deployment conditions in terms of noise and loop length in PXS access network.
- VDSL2 introduce the possibility to customize the parameters of the UPBO. The Custom PXS parameter set is expected to better match deployment conditions in terms of noise and loop length in PXS access network.
- Tests and trial could indicate that the lines with Custom PXS UPBO risk impacting negatively lines with ETSI-D UPBO if deployed in the same cables. To avoid such interferences, all lines that have a common injection point in the access network (e.g. same KVD) must use the same UPBO parameter set. Because migration scenarios have not been studied yet, the equipments must support all parameter sets.
- The Mix UPBO parameter sets take benefit that the upstream band U2 is actually not activated for current VDSL2 lines in Proximus access network. By mixing ETSI-D parameters in band U1 and Custom PXS parameter in band U2, future line profiles could thus benefit from a better UPBO optimisation in the band U2 without impact the existing lines that still use ETSI-D in the band U1.

New paragraph:

VDSL2 Upstream Power Back Off, as defined in §7.2.1.3 of ITU-T Recommendation G.993.2, shall be applied for upstream bands U1 and U2. The UPBO configuration parameters may be function of equipment location and it shall be possible to adapt it to match the network evolutions.

The parameters in question will be communicated by Proximus when asked.

In chapter 6 “Technical specifications”, section 6.12 “VDSL2”, one adaptation has been done.

80. VDSL2 systems complying with recommendation ITU-T G.993.2 main body and annex B shall be allowed for use on local loop from LEX in any of the following situations:

Loops are directly connected to the LEX without any KVD.

Loops are connected to a specific KVD wherefore it has been estimated that over 90% of the end-users behind it are located at less than one 1 km from LEX, where **no ROP is installed and Proximus confirmed there are no plans to install a ROP.**

In chapter 10 “Sub-loop unbundling”, section 10.6 “Remote VDSL2 from LDC”, one adaptation has been done.

131. VDSL2 systems complying with recommendation ITU-T G.993.2 main body and annex B shall be allowed for use on local loop from LDC in any of the following situations

a. Loops directly connected to the LDC without any KVD.

b. Loops connected to a specific KVD wherefore it has been estimated that over 90% of the end-users are behind it, where **no ROP is installed and Proximus confirmed there are no plans to install a ROP.**

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