Addendum to WBA

Vectoring in the frequency band 1,1MHz -2,2Mhz" for the 1,1 MHz vectoring zones 1, 2 & 3

Approved by BIPT on 22/02/2017
Sensitivity: **Confidential**

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1. Purpose

The present addendum is part of the project "Vectoring in ADSL(2+) frequencies" that aims at improving VDSL2 performances in all ROPs than can be homogenized.

For more details on the rationale and the definitions used for this project, reference is made to the addendum to BROBA "*Vectoring in ADSL(2+) frequencies – phase 1*" which has been approved by the BIPT on 21/10/2016.

The present addendum addresses the impacts on the WBA VDSL2 reference offer of the activation of vectoring in the frequency band between 1,1 MHz and 2,2 MHz.

It also entails the inclusion of an adapted VDSL2 fall-back mode for VDSL2 lines that are not equipped with a modem that is at least vector friendly.

2. Dependencies with other addenda

Some addenda related to vectoring technology have already been submitted and approved by the BIPT:

- Addendum to BROBA, "Vectoring in ADSL(2+) frequencies – phase 1" (approved by the BIPT on 21/10/2016),
- See also the list of other relevant addenda on vectoring referenced in section 2 of the above mentioned addendum.

3. Scope and planning

This addendum addresses the impacts on the WBA VDSL2 reference offer of the activation of vectoring in the frequency band between 1,1 MHz and 2,2 MHz for the 1,1 MHz vectoring zones 1, 2 and 3.

The present addendum has been submitted for approval to the BIPT in order to become effective as from **01/07/2017** [1].

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

4. Activation of vectoring in the frequency band between 1,1 MHz and 2,2 MHz

As a next step in the continuous improvements of VDSL2 performance, Proximus gradually plans the activation of vectoring in the ADSL2+ frequency band from 1,1MHz to 2,2MHz as from July 2017 for ROPs on which all Living Units are in reach of VDSL2.

The currently vectored ROPs mandatorily only use vectoring technology in the frequency bands above 2,2 MHz for compatibility reasons of VDL2-lines with ADSL2+ lines present in the same cable binders. This is called "2,2 MHz Vectoring" from now on.

From 1 July 2017 onwards vectoring can be activated in the frequency band between 1,1 MHz and 2,2 MHz on homogeneous ROPs in order to further improve VDSL2 performance. This is called "1,1 MHz Vectoring". Homogeneous ROPs are ROPs without any ADSL2+ lines present.

As explained in the approved addendum "Vectoring in ADSL(2+) frequencies – phase 1", Proximus will notify waves of ROPs from the notified list of homogenizable ROPs on which remaining ADSL2+ lines will have to be migrated to VDSL2 (preferred) or ADSL1 as an enabler for the activation of 1,1 MHz vectoring.

5. Impacts on the "fall-back mode" and the "fall-back profile"

Currently the VDSL2 fall-back line profile (LP725) is activated on VDSL2 lines on which a VDSL2-CPE is connected which is not at least vector friendly or on which a Proximus CPE is installed but with a non-remotely upgradeable outdated firmware.

The current VDSL2 fall-back line profile (LP725) uses a downstream bitrate of up to 7,5 Mbps in the spectrum to 2.2 MHz in order to ensure spectral compatibility with the current 2,2 MHz Vectoring mechanism.

On ROPs with 1,1 MHz vectoring activated, the current VDSL2 fall-back line profile (LP725) will still be configured on VDSL2 lines equipped with a CPE - even not whitelisted - which announces itself as being at least vector friendly.

As Proximus planned as a second phase also the introduction of vectoring in the downstream frequency bands below 1,1 MHz, the new VDSL2 fall-back mode (which is activated by ISAM) already ensures spectral compatibility with the anticipated future activation of vectoring in the frequency band between 552 kHz and 1,1 MHz.

The fall-back mode is only activated by the ISAM on the very limited number of VDSL2 lines which are equipped with a modem which is not at least vector friendly. The fall-back mode only uses spectrum up to 552 kHz on ROPs on which 1,1 MHz Vectoring is activated. This fall-back mode ensures a downstream speed of around 1 Mbps which suffices largely for the main reasons of the existence of a fall-back mode, being VDSL2 line synchronisation for repair reasons including the ability to remotely upgrade the CPE firmware to an at least a vector friendly firmware version.

As described in chapter 13.6 “Special conditions in connection with Repair” of Annex 3 of the WBA-VDSL2 reference offer, this fall-back mode will be consultable in the e-Troubleshooting tool.

6. Operational impact

This section describes the impact on **WBA VDSL2 operations** of the 1st phase of the activation of vectoring in ADSL(2+) frequencies where **vectoring will be activated ROP by ROP in the ADSL2+ spectrum** from 1,1 MHz to 2,2 MHz, **after having migrated any remaining ADSL2+ lines to VDSL2** (preferred solution) or to ADSL1.

6.1 Provisioning

Living units connectable to ROPs which are activated for 1,1 MHz Vectoring benefit from the specific better 1,1 MHz vectoring provisioning rules whose details are documented below in the related modified paragraphs of the WBA VDSL2 reference offer.

The picture below visualises the improved provisioning attenuation rules for “1,1 MHz Vectoring” compared to the current “2,2 MHz Vectoring”.

6.2 Borderline cases

The new 1,1 MHz vectoring deployment rules also use the attenuation documented on the copper pair of VDSL2 lines connected to a 1,1 MHz vectored ROP to increase the number of lines eligible for 1,1 MHz vectoring provisioning profiles. As the new vectoring deployment rule for "1,1 MHz Vectoring zone 3" is only used for newly provisioned lines after 01/07/2017 on 1,1 MHz vectored ROPs, an opportunity exists to reassign with the "1,1 MHz vectoring deployment rules table" VDSL2 lines :

1. with a Line Profile from the 2,2 MHz vectoring zone 2 to a Line Profile in the 1,1 MHz vectoring zone 1
2. and with a Line Profile from the legacy zone 4 to a Line Profile in the 1,1 MHz vectoring zone 3.

Therefore, as from 01/07/2017, a reassessment will be performed of the WBA VDSL2 lines connected on 1,1MHz vectored ROPs and equipped with a whitelisted vector-compliant modem. Basically, the re-assement will be done on an ongoing basis after having activated 1,1MHz vectoring.

Information will be provided through the standard "planned works" process, in e-TS (Netevent), listing all ROP-related border lines per OLO, min 48hours in advance.
Targeted service interruption per customer is estimated to 3 minutes.

- Intervention window:
  - Monday 00h00 – 06h00 AM.
  - Tuesday – Friday: 6h – 7h15 AM.

More specifically the communication of the new Vectoring Provisioning Line Profiles will be performed through the BGCOUT12 and remains unchanged.

6.3 Repair

The current fall-back profile (LP725) remains used on ROPs with 1,1 MHz Vectoring activated for VDSL2 lines which are equipped with a non-whitelisted modem but which announces itself as being at least vector friendly.

See above chapter on the definition of the new VDSL2 fall-back mode that will be used for VDSL2 lines on ROPs on which 1,1 MHz is activated and which are equipped with a modem that is not at least vector friendly.

Note that this addendum has no impact on the fault reporting and repair processes. The communication flows during reporting and during the repair process of the existing ADSL2+services remain unchanged.

6.4 E-Tools

The 1,1 MHz Vectoring does not have any impact on the XDSL availability tool (web interface and XML interface).

The XDSL availability tool will be adapted with the IT-release of June 2017 [2] to check the available speed based on the 1,1 MHz vectoring provisioning rules for addresses located in the copper distribution area of a ROP activated for the 1,1 MHz Vectoring.

6.5 TBF

The TBF process continues to behave as today including communicating via XML of the activated Line Profile.

The TBF remains a mandatory test when connecting a new CPE for the first time on a WBA VDSL2 circuit.

6.6 Pricing

Same pricing conditions will be applied as the regular WBA VDSL2 products.

[2] Proximus might postpone this date in order to guarantee the quality of the deliverables

7. Adaptation on WBA documents

The sections of the WBA offer documents which are impacted by this Addendum are indicated in the subsequent paragraphs (changes are highlighted in grey). Those adaptations refer to the consolidated version of the WBA VDSL2 reference offer (version 14), published on the Proximus website, at http://www.proximuswholesale.be/en/id_wba_vdsl2/public/access/regulated-services/wba-vdsl-2.html

WBA Main Body

The section 4.12 "VDSL2 deployment rules" must be updated with additional scenario:

For VDSL2 End-User lines connected to a vectored ROP with 2,2 Mbps Vectoring activated

⇨ No change in the current table

For VDSL2 End-User lines connected to a vectored ROP with 1,1 Mbps Vectoring activated (*)

Att_{Loop} [dB]	$Length_{Loop}$ [m]	Line Profile name
<0,5	<900	LP860 [8]
<0,7	<1000	LP863 [9]
<1,1	<1.400	LP866 [10]
<1,4	<1.400	LP711
<1,6	<1.600	LP730
<0,6	<600	LP715 [11]
<0,6	<600	LP717 [12]
<1	<1.000	LP740

(*) "These deployment rules are only applicable for new lines provisioned as from 01/07/2017 onwards on ROPs that became activated for 1,1 MHz Vectoring."

In section 4.14 "Vectoring", the current §82 and 84 must be adapted as follows:

82. Vectoring is a technology implemented to guarantee higher speeds on VDSL2 lines. The principle of vectoring is to cancel the cross-talk (FEXT) between different VDSL2 lines present in the same copper bundle by injecting an anti-signal on each crosstalk-impaired VDSL2 line of the bundle. With no interference, each vectored VDSL2 line can then operate at higher-speed, as if it were the only line in the bundle. Where VDSL2 lines must co-exist with ADSL2+ lines, vectoring can only be activated from 2,2 MHz onwards (2,2 MHz Vectoring). Where VDSL2-lines must co-exist with ADSL1 lines but no ADSL2+ lines are anymore present, vectoring can be activated from 1,1 MHz onwards (1,1 MHz Vectoring).

84. Vectoring line profiles will be activated on vectored ROPs for VDSL2 End-User lines equipped with a (whitelisted) vector-compliant CPE and fulfilling the deployment rules as defined in the section "VDSL2 deployment rules" of the present document. The lines equipped with a (whitelisted) vector-friendly CPE will keep their active line profile while lines equipped with a ~~non-whitelisted~~ CPE which is not at least vector friendly will keep a ~~the~~ fall-back profile/mode (see section 'Special conditions in connection with Repair' of the Annex 3 – Planning & Operations of the present WBA VDSL2 offer).

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