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PowerLine Telecommunications (PLT);
Specification on coexistence of VDSL2 and PLT modems in customer premises;
Spectral management of PLT and VDSL2 transceivers

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Powerline Telecommunications (PLT).

The present document is a deliverable covering the coexistence of Powerline Telecommunication transceivers with Very high speed Digital Subscriber Line transceivers in customer premises.

The present document on coexistence of VDSL2 and PLT is aligned on Recommendation ITU-T G.9979 Amendement 1 [i.5].

Executive summary

The overlapping of frequency bands between DSL and PLT is causing mutual interferences raising the issue of EMC.

The present document specifies reference models and functionality of a mechanism to mitigate interference caused by in-home powerline devices to xDSL (implementing access Recommendations like Recommendation ITU-T G.993.2 [2] and Recommendation ITU-T G.9701 [i.4]) and vice versa. It is defined as a pointer document to the Recommendation ITU-T G.9977 (2016) [1].

Addressing the coexistence problems of PLT and DSL operating in customer environments, the present document describes a coordination of both the xDSL access and in-home powerline transmission by an arbitration function (AF) which allows optimizing the performance of each part of the system in order to meet the throughput requirements to the end customer across both in-home and xDSL access networks by appropriately configuring parameters of xDSL and/or PLC devices based on a coordination policy whenever this policy is available.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Introduction

Over the past decades, broadband technologies for access networks and home networking have seen an increasing level of improvements to meet consumers expectations in speed and services.

The demand for higher bit rate data services from customer side is promoted by high-speed Internet access and many forthcoming innovative services as UHD video streaming. This demand become possible with the deployment of DSL technology as well as the extension to DSL vectoring and bonding.

Recent advances in power line communications (PLT) have made it popular for in-home networking. This makes PLT a source of interference for digital subscriber line (DSL) networks within the home environment.

The present document proposes interference mitigation solutions that allow the coexistence of in-home PLT and DSL networks.

In addition, the present document proposes two interference mitigation solutions that enhance the coexistence of in-home PLT and DSL networks.

The interactions between a Digital Subscriber Line (DSL) access network and Home Networks based on Powerline Telecommunication (PLT) have been reported during past years as PLT modems are widely used for IPTV distribution in a home.

PLT networks and DSL networks use some of the same frequencies in the unlicensed band from 2 - 88 MHz. PLT devices and DSL devices may often be placed in relative proximity to each other and there are concerns that this could present interference.

1 Scope

The present document defines a method to improve the coexistence by mitigating the interference between the DSL transceiver and PLT transceiver operating in overlapping frequency band but on different cables.

In-home PLT networks operate over the same spectrum as DSL networks. This increases the likelihood of crosstalk between PLT and DSL communications systems. For instance, two home networks that operate at the same frequency range, one over copper twisted-pairs (138 kHz - 30 MHz) and the other over power lines (1,8 MHz - 30 MHz), would interfere with each other.(ETSI TR 102 930 [i.1]).

The DSL and PLT interference environment is discussed in more detail. Communication standards for PLT, have been developed with mechanisms that prevent any interference between various systems within the home environment.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference/.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] Recommendation ITU-T G.9977 (02-2016): "Mitigation of Interference between DSL and PLC".

[2] Recommendation ITU-T G.993.2 (01-2015): "Very high speed digital subscriber line transceivers 2 (VDSL2)".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TR 102 930 (V1.1.1): "PowerLine Telecommunications (PLT); Study on signal processing improving the coexistence of VDSL2 and PLT".

[i.2] ETSI-PLUGTEST (May 25-29, 2009): "DSL and in-door PLT coexistence Tests Report" from LANPARK.

[i.3] BroadBand ForumTR-069: "CPE WAN Management Protocol".

NOTE: Available at http://www.broadband-forum.org/cwmp.php.

[i.4] Recommendation ITU-T G.9701: "Fast access to subscriber terminals (G.fast) - Physical layer specification".

[i.5] Recommendation ITU-T G.9979 (2014) Amendment 1 (02-2016): "Implementation of the generic mechanism in the IEEE 1905.1a - 2014 Standard to include applicable ITU-T Recommendations".