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Technical Specification

**Access, Terminals, Transmission and Multiplexing (ATTM);
Access network xDSL splitters
for European deployment;
Part 2: Generic specification of xDSL over
ISDN splitters and xDSL universal splitters**

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM).

The present document is **part 2** of a multi-part deliverable covering Access network xDSL Transmission Filters, as identified below:

Part 1: "Generic specification of xDSL over POTS splitters";

Part 2: "Generic specification of xDSL over ISDN splitters and xDSL universal splitters";

Part 3: "Generic specification of distributed filters for xDSL over POTS";

Part 4: "Additional specification for dynamic distributed filters for xDSL over POTS" (under study).

NOTE 1: The present document is derived by merging and complementing 3 older, existing specifications, which were numbered according to the older structure of the splitter documents. Before the publication of the 3 or 4 parts as described above, the TS 101 952 was composed of 2 parts, which discriminated between ADSL and VDSL, with several subparts. For reasons of simplicity the TS is now restructured as a set of only 3 (potentially 4) documents, intended for both ADSL and VDSL when applicable. The older structure of the documents is explained in informative Annex B.

NOTE 2: Useful information on splitter tests may be found in TR 101 953-1-1 [i.3], TR 101 953-1-2 [i.4], TR 101 953-1-3 [i.5], TR 101 953-2-1 [i.6], TR 101 953-2-2 [i.7] and TR 101 953-2-3 [i.8]. These documents are linked to the previous versions of the splitter specifications. The TR 101 953 multi-part [i.3], [i.4], [i.5], [i.6], [i.7] and [i.8] e.g. describe the combination of the AC testing conditions of the test set-ups with the DC conditions controlled via feeding and loading bridges. The TR 101 953 multi-part [i.3], [i.4], [i.6] and [i.7] are intended for splitter over POTS, but also applicable to universal splitters. TR 101 953-1-3 [i.5] and TR 101 953-2-3[i.8] are intended for splitters over ISDN. If there is a discrepancy between the present document and the older TR 101 953 series of documents, the present document prevails.

The present document is fully in line with initiative "eEurope 2002 - An Information Society For All", under "The contribution of European standardization to the eEurope Initiative, A rolling Action Plan" especially under the key objective of a cheaper, faster and secure Internet.

Introduction

Remarks on and limitations of the present document

The present document covers all xDSL system variants, such as ADSL1, ADSL2, ADSL2plus, VDSL1 and VDSL2. It is applicable at the Local Exchange (LE) (i.e. network) side of the line at the LE or at the cabinet and at the Terminal Equipment (TE) (i.e. user) side of the line. A number of limitations and remarks should be listed:

1) The use of the present document is extended to splitters at the cabinet for both the POTS case (universal splitters) and the ISDN-only case, as explained in Annex C. However, this extension has to be applied with care in the case of ISDN. But, as explained in Annex C also, there is evidence that the splitters tested according to the present document will perform satisfactorily when used at the cabinet.

2) The present document covering the xDSL over ISDN or the Universal splitters was gained from the experience with passive and static xDSL splitters, the original state of the art for this application. Furthermore, the experience was gained with identical requirements at either side of the line. Therefore, the requirements in the present document are primarily intended for passive and static filters, with identical requirements for the LE side and the TE side of the line. However, in the note under table A.3 an optional diversification between splitters requirements at the two sides of the line is described. For the TE side splitters an *optional* variant could be allowed with better downstream protection, with less IL in the upstream band and more IL in the downstream band. Similar differentiation between LE and TE is possible for the balance requirements; see the note under table A.10.

3) The present document covering xDSL over POTS splitters is limited to passive and static splitters. There are other classes of filters possible, besides passive and static splitters. Such active and/or dynamic filters are composed of other elements than passive components. Active/dynamic splitters require different and additional requirements and test methods to be specified. The full specification of requirements for active/dynamic splitters is F.F.S. (for further study).

4) For certain static properties in the present document it is possible to relax the requirements and prove in dynamic tests that the splitter performs sufficiently well. These dynamic tests are compiled in TR-127, by the Broadband Forum. The use of the TR-127 methodology for this purpose is outside the scope of this version of the present document. The TR-127 could prove useful to introduce splitters with reduced complexity, or active and/or dynamic splitters. The TR-127 methodology for POTS splitters is now published [i.16]. A tutorial text on TR-127 is given in informative Annex H. Finalizing splitter tests in the present document based on TR-127 for ISDN signals and for ISDN and DSL interaction is F.F.S., as the version for ISDN splitters is still under definition in the Broadband Forum.

5) To test distortion, noise and other requirements in the present document the TR-127 methodology is sometime a superior methodology, or even the only feasible method at an acceptable complexity. Indeed, TR-127 will prove that a splitter works correctly in a worst case xDSL test environment, including POTS and ISDN signals. The use of the TR-127 [i.16] methodology for this purpose is introduced for certain clauses in the present document. With such tests, based on actual xDSL transceiver results, one can avoid requirements are either inadequate or potentially unnecessarily strong.

6) The majority of requirements in the present document are generic and applicable to all splitters for xDSL over ISDN or universal splitters over both ISDN and POTS. In the case where any requirements are applicable to only one particular flavour of xDSL, this is clearly indicated in the clause describing the requirement. The relevant information about requirements for specific xDSL system variants is given in Annex A.