

ETSI TR 101 562-1 V1.3.1 (2012-02)



PowerLine Telecommunications (PLT); MIMO PLT; Part 1: Measurement Methods of MIMO PLT

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Powerline Telecommunications (PLT).

The present document is part 1 of a multi-part deliverable covering the MIMO PLT as identified below:

- Part 1:** "Measurement Methods of MIMO PLT";
- Part 2: "Setup and Statistical Results of MIMO PLT EMI Measurements";
- Part 3: "Setup and Statistical Results of MIMO PLT Channel and Noise Measurements".

Introduction

In order to study and compare MIMO (Multiple Input Multiple Output) characteristics of the LVDN network in different countries, the STF 410 (Special Task Force) was set up. The present document is one of three parts of TR 101 562 which present the findings of STF 410 research.

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1 Scope

Conventional PLT modems (SISO) use only the phase and neutral wire of the mains grid. MIMO PLT utilizes additionally the protective earth wire.

The present document is an overview of the prevalence of the third wire in private homes and a description of the measurement setup and equipment used to perform EMI, channel and noise measurements.

2 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 reference document (including any amendments) applies.

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2.1 Normative references

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

Not applicable.

2.2 Informative references

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] Sartenaer, T. & Delogne, P., "Powerline Cables Modelling for Broadband Communications", ISPLC 2001, pp. 331-337.
- [i.2] R. Hashmat, P. Pagani, A; Zeddarn, T. Chonavel, "MIMO Communications for Inhome PLC Networks: Measurements and Results up to 100 MHz", IEEE International Symposium on Power Line Communications and its Applications (ISPLC), Rio, Brasil, March 2010.
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- [i.4] ETSI TR 102 175 (V1.1.1): "PowerLine Telecommunications (PLT); Channel characterization and measurement methods".
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- [i.12] Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.
- [i.13] IEC 60364-1: "Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions".

3 Symbols and abbreviations

3.1 Symbols

For the purposes of the present document, the following symbols apply:

dB	decibel (logarithmic unit)
dBm	$10 * \log_{10} (P / 1 \text{ mW})$
Hz	Hertz
L	Inductance
m	meter
MHz	Mega Hz
nF	nanoFarads
nH	nanoHenry
R	Resistor
Ω	Ohm
Z	Impedance

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AC	Alternating Current
AMN	Artificial Mains Network
BCA	Building & Construction Authority
BNC	Bayonet Nut Connector
BS	British Standard
BSI	British Standards International
C	"Center point" of the Coupler
CEE	Conformity certification of Electrical Equipment
CIS	Commonwealth of Independent States
CM	Common Mode
DC	Direct Current
DM	Differential Mode
E	Protective Earth Contact