



SLOVENSKI STANDARD
oSIST prEN 50561-1:2011
01-marec-2011

Aparati za komunikacije po elektroenergetskih vodih pri nizkonapetostnih inštalacijah - Karakteristike radijskih motenj - Omejitve in merilne metode - 1. del: Aparati za domačo uporabo

Power line communication apparatus used in low voltage installations - Radio disturbance characteristics - Limits and methods of measurement - Part 1: Apparatus for in-home use

iteh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 50561-1:2014](https://standards.iteh.ai/catalog/standards/sist/2d60a947-5152-48bb-89c7-4dcec523c794/sist-en-50561-1-2014)

<https://standards.iteh.ai/catalog/standards/sist/2d60a947-5152-48bb-89c7-4dcec523c794/sist-en-50561-1-2014>

Ta slovenski standard je istoveten z: prEN 50561-1:2011

ICS:

33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
97.030	Električni aparati za dom na splošno	Domestic electrical appliances in general

oSIST prEN 50561-1:2011

en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 50561-1

January 2011

ICS

English version

**Power line communication apparatus used in low voltage installations -
Radio disturbance characteristics -
Limits and methods of measurement -
Part 1: Apparatus for in-home use**

To be completed

To be completed

This draft European Standard is submitted to CENELEC members for CENELEC enquiry.
Deadline for CENELEC: 2011-04-15.

It has been drawn up by CLC/TC 210.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

1

Foreword

2 This draft European Standard was prepared by the Technical Committee CENELEC TC 210,
3 Electromagnetic compatibility (EMC). It is submitted to the CENELEC enquiry.

4

5

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50561-1:2014

<https://standards.iteh.ai/catalog/standards/sist/2d60a947-5152-48bb-89c7-4dcec523c794/sist-en-50561-1-2014>

Contents

6			
7			
8			
9	1	Scope	4
10	2	Normative references	4
11	3	Definitions	4
12	4	Requirement for conducted disturbances at AC mains power ports	5
13	5	Requirement for conducted disturbances at telecommunication/network ports	5
14	6	Requirements for PLT ports	5
15	7	Requirement for radiated disturbances	6
16	8	Measurement conditions for PLT ports	6
17	9	Measurement methods and procedures for PLT ports	6
18	9.1	Conducted unsymmetrical disturbances	6
19	9.2	Dynamic power control	8
20	9.3	Permanent frequency exclusion	9
21	9.4	Cognitive frequency exclusion	10
22	9.5	Conducted asymmetric disturbances	10
23		Annex A (normative) Excluded frequency ranges	12
24		Annex B (normative) Impedance Stabilisation Network (ISN) for asymmetric disturbance	
25		measurements	13
26		Figures	
27		Figure 1 - Test arrangement for measuring the PLT port with an AMN	7
28		Figure 2 - Example coupling unit	8
29		Figure 3 - Example test equipment arrangement for measuring PLT transmit signal levels	9
30		Figure 4 - Test arrangement for measuring the PLT port with an AMN	11
31		Figure B.1 - Example circuit schematic for ISN	13
32		Figure B.2 - Arrangement for measurement of the ISN differential mode transmission loss	13
33		Figure B.3 - Arrangement for measurement of the ISN common mode decoupling attenuation	
34		(isolation) (excluding the Coupling System)	14
35		Tables	
36		Table 1 - Limits for conducted disturbances	6
37		Table 2 - Maximum PLT transmit signal levels	6
38		Table 3 - Configuration for measuring receivers or spectrum analyzers	10
39		Table A.1 - Permanently excluded frequency ranges	12
40		Table A.2 - Permanent or dynamically excluded frequency ranges	12
41			

42 1 Scope

43 This European standard specifies limits and methods of measurement of radio disturbance characteristics for
44 in-home communication apparatus that uses the low voltage power installation as the transmission medium.
45 The standard applies to equipment that transmits in the frequency range 1,7 MHz to 30 MHz.

46 Procedures are given for the measurement of signals generated by the equipment and limits are specified for
47 the frequency range 9 kHz to 400 GHz. No measurements need be performed at frequencies where no limits
48 are specified.

49 The intention of this publication is to establish uniform requirements for the radio disturbance level of the
50 equipment contained in the scope, to establish limits of disturbance, to describe methods of measurement
51 and to standardize operating conditions and interpretation of results.

52

53 2 Normative references

54 The following referenced documents are indispensable for the application of this document. For dated
55 references, only the edition cited applies. For undated references, the latest edition of the referenced
56 document (including any amendments) applies.

57 EN 55022:2010, *Information technology equipment – radio disturbance characteristics – Limits and methods*
58 *of measurement* (CISPR 22:2005, mod.)

59 EN 55014-1:2006 *Electromagnetic Compatibility – Requirements for household appliances, electric tools and*
60 *similar apparatus - Part 1: Emission* (CISPR 14-1:2005)

61 EN 55016-1-1:2010, *Specification for radio disturbance and immunity measuring apparatus and methods,*
62 *Part-1-1: Radio disturbance and immunity measuring apparatus — Measuring apparatus*
63 (CISPR 16-1-1:2010)

64 EN 55016-1-2:2004, *Specification for radio disturbance and immunity measuring apparatus and methods,*
65 *Part 1-2: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Conducted*
66 *disturbances* (CISPR 55016-1-2:2003)

67 ETSI TS 102 578 v1.2.1:2008, *PowerLine Telecommunications (PLT); Coexistence between PLT Modems*
68 *and Short Wave Radio broadcasting services*

69

70 3 Terms and definitions

71 For the purposes of this document, the following terms and definitions apply.

72 3.1

73 AC mains power port

74 port that connects to the low voltage AC mains power network for the sole purpose of supplying electrical
75 energy to the EUT

76

77 3.2

78 Associated Equipment

79 AE

80 equipment needed to maintain the data traffic on the cable attached to the EUT port under test and (or) to
81 maintain the normal operation of the EUT during the test. The associated equipment may be physically
82 located outside the test area

83

84 NOTE The AE can be another ITE, a traffic simulator or a connection to a network. The AE can be situated close to the measurement
85 set-up, outside the measurement room or be represented by the connection to a network. AE should not have any appreciable influence
86 on the test results.

87

88 3.3

89 Equipment Under Test

90 EUT

91 representative equipment used for evaluation purposes

92

93

3.4

94

in-Home PLT apparatus

95

PLT apparatus that connects to the low voltage AC mains power network and intended to be linked to other

96

PLT apparatus connected at the same premises

97

98

3.5

99

PLT apparatus

100

apparatus with a PLT port

101

102

3.6

103

PLT port

104

port that connects to the low voltage AC mains power network for the purpose of data transfer and

105

telecommunications, and may also supply electrical energy to the EUT.

106

107

3.7

108

telecommunications/network port

109

point of connection for voice, data and signalling transfers intended to interconnect widely-dispersed systems

110

via such means as direct connection to multi-user telecommunications networks (e.g. public switched

111

telecommunications networks (PSTN) integrated services digital networks (ISDN), x-type digital subscriber

112

lines (xDSL), etc.), local area networks (e.g. Ethernet, Token Ring, etc.) and similar networks

113

114

NOTE 1 A port generally intended for interconnection of components of an ITE system under test (e.g. RS-232, IEEE Standard 1284

115

(parallel printer), Universal Serial Bus (USB), IEEE Standard 1394 ("Fire Wire"), etc.) and used in accordance with its functional

116

specifications (e.g. for the maximum length of cable connected to it), is not considered to be a telecommunications/network port under

117

NOTE 2 A PLT port shall NOT be considered as a telecommunications/network port.

118

119

4 Requirement for conducted disturbances at AC mains power ports

120

AC mains power ports of the EUT shall comply with the Class B limits, measurement conditions and

121

methodology defined in EN 55022 for mains terminals.

122

123

5 Requirement for conducted disturbances at telecommunication/network ports

124

Telecommunication/network ports of the EUT shall comply with the Class B limits, measurement conditions

125

and methodology defined in EN 55022 for these ports.

126

127

6 Requirements for PLT ports

128

The PLT port of the EUT shall comply with the following requirements:

129

1 5 minutes after the last user data is sent, the PLT port shall comply with the unsymmetrical

130

disturbance limits given in Table 1 between 150 kHz and 30 MHz using the methods and procedures

131

given in 9.1.

132

When no user data is being transmitted by the PLT port any remaining disturbances that exceed the

133

limits of Table 1 shall comply with the requirements for Discontinuous Disturbances given in 4.2 of

134

EN 55014-1:2006.

135

2 For the operating conditions defined in Clause 8 the disturbances from the PLT port shall not exceed

136

the unsymmetrical disturbance limits given in Table 1 between 150 kHz and 1,705 MHz using the

137

methods and procedures given in 9.1.

138

3 The PLT port shall implement dynamic power control for the purpose of minimising the probability of

139

radio disturbance whilst still maintaining communication. The dynamic power control function shall be

140

capable of reducing the output power by at least 30 dB from the maximum level given in Table 2

141

measured using the methods and procedures given in 9.2.

142

4 When user data is being transmitted by the PLT port the disturbances from the PLT port may exceed

143

the unsymmetrical disturbance limits of Table 1 at frequencies above 1,705 MHz provided that

144

a. at all excluded frequency ranges given in Table A.1 -A.1 the transmitted signals are

145

permanently reduced over the entire range by a minimum of 30 dB measured using the

146

methods and procedures given in 9.3,

- 147 b. at all frequency ranges given in Table A.2 the transmitted signals are either
 148 i. permanently reduced over the entire range by a minimum of 30 dB measured using the
 149 methods and procedures given in 9.3,
 150 or,
 151 ii. dynamically reduced in accordance with 9.4 for cognitive frequency exclusion.
- 152 5 in order to ensure the symmetry of the PLT port it shall, in all operating conditions, comply with the
 153 disturbance limits given in Table 1 using the methods and procedures given in 9.5.
 154

155 **Table 1 - Limits for conducted disturbances**

Frequency range MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE 1 The lower limit shall apply at the transition frequencies.
 NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

156

157

Table 2 - Maximum PLT transmit signal levels

Symmetrical mode insertion loss EUT to AE (dB)	10	≥ 40
Maximum transmitted signal in dB μ V (AV)	65 (see Note 2)	95
Maximum transmitted signal in dB μ V (PK)	75 (see Note 2)	105

NOTE 1 The transmit power management function of an AE should function in the same way as the EUT otherwise the signal of the AE may dominate and cause erroneous results during measurement.
 NOTE 2 Due to the low insertion loss signal leakage from the AE may result in only a 28 dB reduction being measurable giving adjusted maximum limits of 77 dB μ V Peak and 67 dB μ V Average.

158

159 **7 Requirement for radiated disturbances**

160 The EUT shall comply with the Class B limits, measurement conditions and methodology defined in
 161 EN 55022 for radiated disturbances.

162

163 **8 Measurement conditions for PLT ports**

164 Tests requiring the PLT modem function to be active shall be performed with a PLT utilization in excess of
 165 10 % and with the maximum transmit level maintained for a minimum of 250 ms. As an example the
 166 transmission of a large data file could be used to exercise the port. Where this is not possible an appropriate
 167 configuration should be used that ensures the PLT transmission is active for long enough to allow for
 168 repeatable measurements in this state.
 169

170 **9 Measurement methods and procedures for PLT ports**

171 **9.1 Conducted unsymmetrical disturbances**

172 The PLT port of the EUT shall be measured using an AMN in accordance with EN 55016-1-2:2004, 4.3, the
 173 measurement method given in EN 55022:2010, Clause 9 for main ports and the arrangements shown in
 174 Figure 1 and EN 55022:2010, Clause 8 for frequencies between 150 kHz and 30 MHz.

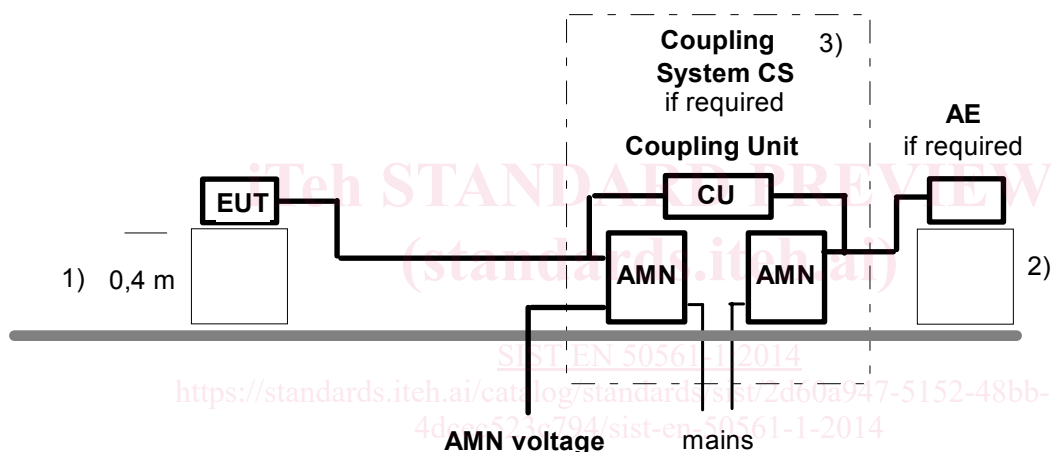
175 The insertion loss (symmetric) of the Coupling System between its two ports shall be such, that the link to the
 176 AE works properly and that the EUT transmits at its maximum power level. Figure 2 shows an example
 177 coupling unit with a nominal insertion loss of 40 dB.

178 The following operating conditions and configurations shall be measured:

- 179 1 with the PLT port of the EUT active, but no associated PLT apparatus (AE) connected; the
 180 disturbance levels shall be measured and compared with the limits given in Table 1;
- 181 2 with the PLT port of the EUT active and communicating to an associated PLT apparatus (AE)
 182 exercised in accordance with Clause 8, using its maximum transmit power the disturbance levels
 183 shall be measured between 150 kHz – 1,705 MHz and compared with the limits in Table 1 at these
 184 frequencies;
- 185 3 after completion of configuration 2 the exchange of user data exercising the EUT shall be caused to
 186 stop. The disturbance levels shall be measured and compared with the limits given in Table 1 at all
 187 frequencies after 5 minutes of the user data being stopped.

188

189 When no user data is being transmitted by the PLT port of the EUT any remaining disturbances that exceed
 190 the limits of Table 1 shall be assessed using the methods given in EN 55014-1 for Discontinuous
 191 Disturbances and compared with the requirements given in 4.2 of EN 55014-1:2006.
 192



193

194 NOTE 1 Distance to the reference ground plane (vertical or horizontal).

195 NOTE 2 Distance to the reference ground plane is not critical.

196 NOTE 3 Coupling System (see Figure 2 for details of coupling unit) is required for:

- 197 • stabilization of the differential mode impedance;
- 198 • attenuation of the differential mode signal of the AE;
- 199 • isolation of the common mode signal of the AE;
- 200 • filtering of the differential- and common mode signal from the mains.

201

Figure 1 - Test arrangement for measuring the PLT port with an AMN

202

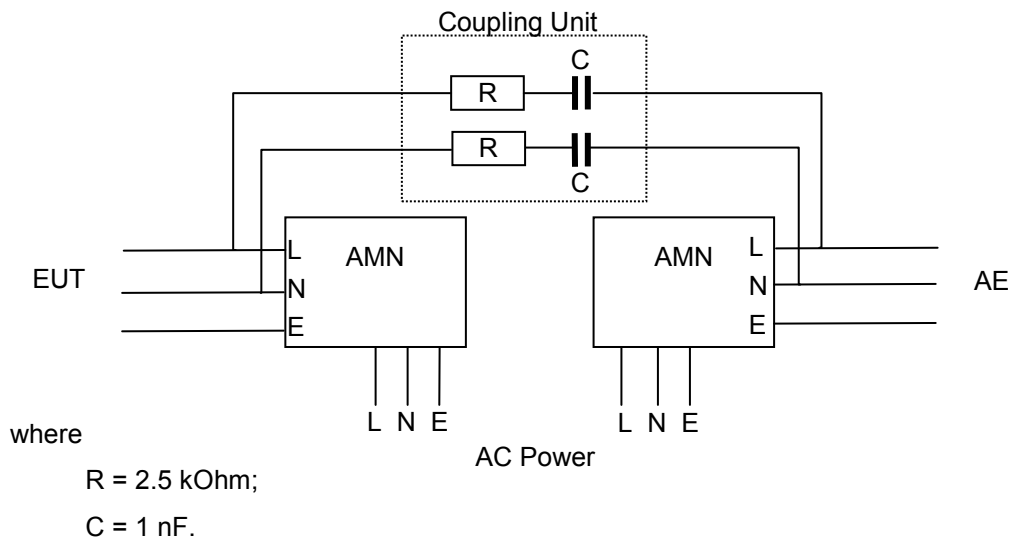


Figure 2 - Example coupling unit

203
204

205

206 9.2 Dynamic power control

207 The symmetrically transmitted signals from the PLT port of the EUT shall be measured for frequencies
 208 between 150 kHz and 30 MHz in order to ensure the maximum transmit signal levels are not exceeded and
 209 to ensure the presence of a dynamic power control function. The PLT port shall be exercised in accordance
 210 with the operating conditions given in Clause 8. Measurements shall be made using a Peak and Average
 211 detector; the detectors shall be in accordance with the requirements of EN 55016-1-1 including the 9 kHz
 212 requirement for the 6 dB bandwidth. An example test arrangement is given in Figure 3.

213 The following configurations shall be assessed

- 214 1 with a symmetrical insertion loss between EUT and AE of 10 dB,
- 215 2 with a symmetrical insertion loss between EUT and AE of 40 dB,
- 216 3 with a symmetrical insertion loss between EUT and AE of 50 dB.

217

218 The transmit signal level shall be measured at all PLT transmission frequencies and compared with the
 219 maximum levels given in Table 2.

220