SLOVENSKI STANDARD

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Communication cables - Specifications for test methods - Part 1-13. del: Electrical test methods - Coupling attenuation or screening attenuation of patch cords/coaxial cable assemblies/pre- connectorised cables

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EUROPEAN STANDARD **EN 50289-1-13**

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English version

Communication cables – Specifications for test methods Part 1-13: Electrical test methods – Coupling attenuation or screening attenuation of patch cords / coaxial cable assemblies / pre-connectorised cables

Câbles de communication – Spécifications des méthodes d'essai Partie 1-13: Méthodes d'essais électriques – Affaiblissement de couplage ou affaiblissement de blindage des cordons de raccordement / des ensembles de câbles coaxiaux / des câbles à pré-connecteurs

Kommunikationskabel – Spezifikationen für Prüfverfahren Teil 1-13: Elektrische Prüfverfahren – Kopplungsdämpfung oder Schirmdämpfung für Rangierschnüre, koaxiale konfektionierte Kabel, konfektionierte Kabel

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists 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.

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

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Ref. No. EN 50289-1-13:2004 E

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 46X, Communication cables.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50289-1-13 on 2004-02-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2005-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2007-02-01

Contents

1 Scope

This Part 1-13 of EN 50289 details the method of test to determine the coupling attenuation or screening attenuation for patch cords, coaxial cable assemblies and pre-connectorised cables used in analogue and digital communication systems. It is to be read in conjunction with EN 50289-1-6.

2 Normative references

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

EN 50289-1-6 Communication cables – Specifications for test methods — Part 1-6: Electrical test methods – Electromagnetic performance

EN 50290-1-2 [1)] Communication cables — Part 1-2: Definitions

3 Definitions

For the purposes of this European Standard, the definitions of EN 50290-1-2 and EN 50289-1-6 apply.

In this document the cords under test (patch cords, coaxial cable assemblies, pre-connectorised cables) are denoted ‘patch cords’.

4 Test method

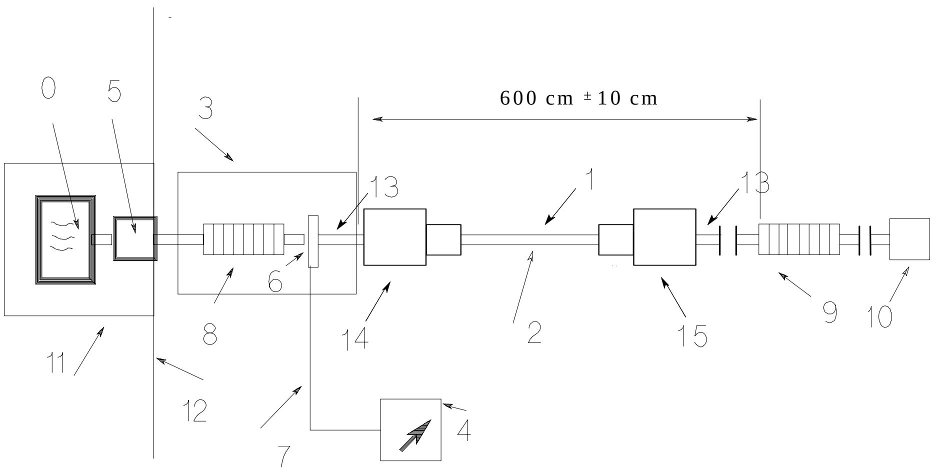
4.1 Equipment

4.1.1 General

See EN 50289-1-6, subclause 9.2.1.1 and Figure 1 below.

For patch cord testing two test head connecting hardware modules and extension cables are needed for measurement of a patch cord (see 4.1.3). The two test heads are denoted near end test head and far end test head.

[1)] Under consideration.



Key

0 signal generator, output impedance Z_0

1 patch cord under test, nominal characteristic impedance Z_1

2 outer circuit of patch cords under test, impedance Z_2

3 absorbing clamp, impedance Z_3

4 measuring receiver

5 balun (if applicable)

6 current transformer of the clamp

7 measuring receiver cable (use the same in measurement and calibration)

8 absorber (ferrite tube) of the clamp, operational attenuation > 10 dB

9 absorber (or second clamp), operational attenuation > 10 dB

10 termination of the far end extension cable connected to patch cord under test

11 shield of signal generator and balun if needed for high dynamic range

12 reflector plate

13 extension cable connected through test head to patch cord under test

14 Test head for termination of patch cord at near end

15 Test head for termination of patch cord at far end

Figure 1 – Measurement of surface wave at near end of patch cord

4.1.2 Balun requirements

For measurement of balanced patch cords, a means for generating balanced signals shall be provided. If the generator is unbalanced, this may be performed by the use of a balun or 180° power splitter.

The minimum requirements for this device are specified in Table 1.

The attenuation of the balun shall be kept as low as possible because it will limit the dynamic range of the coupling attenuation or screening attenuation measurements.

Table 1 – Balun performance characteristics (30 MHz to 1 GHz)

Parameter	Value
Impedance, primary [a]	50 Ω (unbalanced)
Impedance, secondary [b]	100 Ω or 150 Ω (balanced)
Operational attenuation [c] (including matching pads if used)	≤ 10 dB
Return loss, bi-directional	≥ 6 dB
Power rating	To accommodate the power of the generator and amplifier (if applicable)
Output signal balance [d]	≥ 50 dB from 30 MHz to 100 MHz ≥ 30 dB from 100 MHz to 1 GHz

[a] Primary impedance may differ if necessary to accommodate analyzer outputs other than 50 Ω.

[b] Balanced outputs of the test baluns shall be matched to the nominal impedance of the balanced patch cord / cable pair. 100 Ω shall be used for termination of 120 Ω cabling.

[c] The operational attenuation of a balun shall be mathematically deduced from 3 operational attenuation measurements with 3 baluns back-to-back.

[d] Measured per ITU-T Recommendations G.117 and O.9.

4.1.3 Test head and extension cable requirements

Unscreened balanced test heads and extension cables shall be used for testing unscreened, balanced patch cords. Screened, balanced test heads and extension cables shall be used for testing screened, balanced patch cords. Unbalanced (coaxial) test heads and extension cables shall be used for testing unbalanced patch cords.

The electrical transmission performance including electromagnetic screening and unbalance attenuation of the test head connecting hardware and the extension cable shall be better or equal to the performance of the patch cord under test. The choice of the test head extension cable shall assure the minimum operational attenuation and reflection loss of the set-up possible.

The extension cables shall have the same nominal characteristic impedance as the patch cables under test. Likewise the velocity of propagation of the extension cables shall correspond to the patch cable under test (same type of isolation e.g. foamed or solid). The operational attenuation of the near end terminating cable including test heads and set up validation cord shall be less than 1 dB up to 100 MHz.

The test head connecting hardware, the extension cables, the connection between the test head and the extension cable cables shall have a balance (when measuring balanced patch cords) and shall have a screen (when measuring screened patch cords) as good as possible. To further enhance the measurement sensitivity the connection between the test head connecting hardware and the extension cable may be improved since it does not form part of the device under test. It is not allowed to improve the contact from the plug of the patch cord under test to the test heads used. The measurement sensitivity shall be 6 dB better than the specified requirement limit for the patch cord under test. See 4.4.2.1 for determination of the measurement sensitivity.

In case of doubt regarding the interoperability between the test head connecting hardware and the plug of the patch cord under test, it is recommended to use the connecting hardware specified or advised by the supplier of the patch cord under test.

For screened cables the far end termination could already be included into the test head. In that way the quality of the extension cable is not critical with respect to the test results.

4.1.4 Impedance matching

When measuring patch cords with another characteristic impedance than the impedance of the test system, impedance matching is only required when the return loss is less than 10 dB. The error that is introduced by the mismatch is max. ± 0,5 dB and thus negligible compared to the typical accuracy of the absorbing clamp test method.

4.2 Test sample

4.2.1 Length of the patch cords under test

4.2.1.1 Single ended patch cords

The minimum length of the patch cord under test shall be 1 m.

4.2.1.2 Double ended patch cords

In case of a double ended patch cord (a patch cord with two connectors) any length of cord can be measured. If the cord is longer than 6 m, only one connector will be within the tested length of the set-up (see 4.2.3). In this case the test result will be showing higher values.

4.2.2 Length of extension cables connected to patch cord under test

The length of the extension cables, which terminates the test heads are:

A: Extension cable at reflector plate (near end)

The length of the extension cable between the reflector plate and the near end test head shall be 100 cm ± 10 cm.

B: Extension cable in termination end (far end)

The entire length of the far end extension cable shall be 10 m ± 0,5 m.

4.2.3 Tested length

The effective test length of the test specimen is limited by the absorbing clamp and the ferrite tube, as shown in Figure 1. This length shall be 600 cm ± 10 cm.

4.2.4 Preparation of extension cable and test head

The diameter of the extension cables must be selected to allow insertion in the bore of the absorbing clamp.

When a special type of socket interface is specified for termination of the patch cord such interface shall be used in the test head in question.

4.2.4.1 Balanced patch cords

Differential and common mode termination is required for each pair at the far end of the extension cable, see Figure 2.