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Connectors for electronic equipment - Tests and measurements - Part 25-2: Test 25b: Attenuation (insertion loss) (IEC 60512-25-2:2002)

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EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 60512-25-2

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English version

Connectors for electronic equipment - Tests and measurements Part 25-2: Test 25b: Attenuation (insertion loss) (IEC 60512-25-2:2002)

Connecteurs pour équipements électroniques -
Essais et mesures
Partie 25-2: Essai 25b: Atténuation (perte d'insertion)
(CEI 60512-25-2:2002)

Steckverbinder für elektronische Einrichtungen -
Mess- und Prüfverfahren
Teil 25-2: Prüfung 25b: Dämpfung (Einfügedämpfung)
(IEC 60512-25-2:2002)

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

The text of document 48B/1154/FDIS, future edition 1 of IEC 60512-25-2, prepared by SC 48B, Connectors, of IEC TC 48, Electromechanical components and mechanical structures for electronic equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60512-25-2 on 2002-05-01.

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) 2003-02-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-05-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex A is normative and annex B is informative.

Endorsement notice

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The text of the International Standard IEC 60512-25-2:2002 was approved by CENELEC as a European Standard without any modification.

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Connecteurs pour équipements électroniques – Essais et mesures –

Partie 25-2:
Essai 25b – Atténuation (perte d'insertion)

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Connectors for electronic equipment – Tests and measurements –

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Part 25-2:
Test 25b – Attenuation (insertion loss)

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CONNECTORS FOR ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 25-2: Test 25b – Attenuation (insertion loss)

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60512-25-2 has been prepared by subcommittee 48B: Connectors, of IEC technical committee 48: Electromechanical components and mechanical structures for electronic equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
48B/1154/FDIS	48B/1208/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annex A forms an integral part of this standard.

Annex B is for information only.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

CONNECTORS FOR ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 25-2: Test 25b – Attenuation (insertion loss)

1 General

1.1 Scope and object

This part of IEC 60512 is applicable to electrical connectors, sockets, cable assemblies or interconnection systems.

This standard describes a frequency and a time domain method to measure attenuation/ insertion loss as a function of frequency.

NOTE "Attenuation" is referenced throughout the document. Test professionals must use the appropriate term (attenuation or insertion loss) when summarizing and reporting the test measurements according to the type of specimen and transmission line being measured.

1.2 Definitions

For the purpose of this part of IEC 60512, the following definitions apply.

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1.2.1
attenuation
the reduction of power during the transmission from the input to the output of the specimen, usually measured in decibels (dB)

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1.2.2
insertion loss
the loss of power resulting from the insertion of a connector or similar device into a transmission line, usually measured in dB

1.2.3
specimen environment impedance
the impedance presented to the signal conductors by the fixture. This impedance is a result of transmission lines, termination resistors, attached receivers or signal sources, and fixture parasitics

2 Test resources

2.1 Equipment

2.1.1 Frequency domain

A network analyzer is preferred. When a greater dynamic range is desired, a signal generator and spectrum analyzer or vector network analyser (for measurement with full 2-port calibration) may alternatively be used. If necessary, additional equipment increasing the measurement sensitivity (e.g. broadband output amplifiers or low-noise pre-amplifiers) may be used. For differential measurements, a multiport network analyzer with appropriate software or baluns may be used.

2.1.2 Time domain

A time domain reflectometer (TDR), triggered impulse generator and appropriate fast Fourier transform (FFT) software are preferred.

2.2 Fixture

Unless otherwise specified in the reference document, the specimen environment impedance shall match the impedance of the test equipment. Typically, this will be 50 Ω for single-ended measurements and 100 Ω for differential measurements.

2.2.1 Specimen conductor assignments

For each measurement, the line to be measured shall be fixed as indicated in the referencing document. The far end (destination) and the near end (driven) of the line shall be terminated in the specimen environment impedance specified using one of the methods in figures A.2 or A.3. In the special case where the drive signal is differential and not balanced, the common mode energy shall be terminated. Signal lines adjacent to these should likewise be terminated, if possible.

NOTE Electrically long adjacent signal lines may resonate adding error to the results.

Unless otherwise specified, a 1:1 signal-to-ground ratio (2:1 if differential measurements are performed) shall be used with each end having all grounds commoned. (For an example, see figure A.4).

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2.2.2 Specimen fixture and signal line terminations for specimen environment impedance

Care should be taken to minimize the reactances of the resistive terminations over the range of test frequencies.

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NOTE The fixture geometry and materials may impact the measurements due to the fixture parasitics. Usually, the product's intended use dictates the most meaningful way to fix it.

2.2.3 Insertion technique

The fixture shall be designed to allow the measurement of attenuation with and without the specimen, see figure A.1a. If baluns are used for a measurement, or minimum loss pads used for impedance matching, these are included in the fixture. Figures A.2 and A.3 show typical configurations with minimum loss pads.

2.2.4 Reference fixture technique

In this technique, a separate fixture that combines both near end and far end is used for the fixture attenuation measurement; see figure A.1b. This fixture shall be a duplicate of the specimen fixture, only without the specimen. Traces, if used, shall include fixture connectors, vias, bends and corners. If baluns are used for a differential measurement, or minimum loss pads used for impedance matching, these are included in the fixture. Figures A.2 and A.3 show typical configurations with minimum loss pads.