

Anechoic chambers —

Part 2: Alternative test site suitability with respect to site attenuation

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ICS 17.220.01; 29.020

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National foreword

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Cross-reference

Publication referred to	Corresponding British Standard
IEC 50 (161):1990	BS 4727 <i>Glossary of electrotechnical, power, telecommunication, electronics, lighting and colour terms</i> Part 1 <i>Terms common to power, telecommunications and electronics</i> Group 09:1991 <i>Electromagnetic compatibility</i>

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 20, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Anechoic chambers

Part 2: Alternative test site suitability with respect to site attenuation

Chambres anéchoïques
Partie 2: Aptitude d'un emplacement d'essai de
substitution en ce qui concerne
l'affaiblissement de l'emplacement

Absorberräume
Teil 2: Eignung alternativer Meßplätze
bezüglich Meßplatzdämpfung

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

Central Secretariat: rue de Stassart 36, B-1050 Brussels

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Foreword

This European Standard was prepared by working group WG 4 of CENELEC Technical Committee TC 210, EMC.

It was submitted to the CENELEC Unique Acceptance procedure (UAP) in August 1994 and was approved by CENELEC as EN 50147-2 on 1995-07-04.

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) 1996-09-01
- latest date by which national standards conflicting with the EN have to be withdrawn (dow) 1996-09-01

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1 Scope

There are many different test sites and facilities that have been constructed to make radiated emission measurements at frequencies above 30 MHz according to CISPR 16-1. Most are protected from the weather and the adverse effects of the radio frequency ambient noise. These include all weather covered open area test sites and absorber lined shielded enclosures.

Whenever construction material encloses a test site, there exists the possibility that the result of a single normalized site attenuation measurement as specified in subclause 16.6 of CISPR 16-1 is not adequate to show such alternate site suitability.

NOTE Radiated emission sources located near dielectric interfaces have been shown to have variations in current distribution that can affect the radiated properties of the source at that location. When the EUT can be located near these interfaces, additional site attenuation measurements are required.

This standard specifies requirements for alternative test sites regarding site attenuation. As long as the document CISPR/A(CO) 63 is not published as part of CISPR 16, this standard shall be used for test site qualification.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

IEC 50(161) 1990, *International Electrotechnical Vocabulary (IEV) — Chapter 161: Electromagnetic Compatibility*.

CISPR 16-1 1993, *Specification for radio disturbance and immunity measuring apparatus and methods — Part 1: Radio disturbance and immunity measuring apparatus*.

3 Abbreviations and definitions

3.1 Abbreviations

EUT	equipment under test (test sample including cabling)
NSA	normalized site attenuation (according to CISPR 16-1)

3.2 Definitions

For the purposes of this standard, the following definition and the definitions contained in IEC 50(161) apply.

3.2.1

alternative test site

a location other than an open area test site, such as an all weather protected site, an absorber-lined room, a salt mine, a tunnel etc.

4 Requirements

The alternative test site is considered suitable for performing radiated emission testing if all NSA measurements prescribed in clause 5 meet the requirements of 4.1 and the ground plane requirements of 4.2 below:

4.1 Site attenuation

A measurement site shall be considered acceptable for radiated electromagnetic field measurements if the measured horizontal and vertical NSA values are within ± 4 dB of the theoretical normalized site attenuation for an ideal site given in annex A.

NOTE Studies are underway to determine if any further tests are required to show alternative test site suitability.

4.2 Conducting ground plane

A conducting ground plane is required at a radiated emission test site.

The conducting ground plane shall extend at least 1 m beyond the periphery of the EUT and the largest measurement antenna, and cover the entire area between the EUT and the antenna. It shall be of metal with no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement.

A larger size conducting ground plane may be required if the NSA measurements do not meet the 4 dB criterion.

NOTE Ongoing studies may indicate the need for specifying minimum conducting ground plane size.

5 Test procedure

For alternative test sites, a single NSA measurement is insufficient to pick up possible reflections from the construction and/or rf-absorbing material comprising the walls and ceiling of the facility. For these sites, a “test volume” is defined as that volume traced out by the largest equipment or system to be tested as it is rotated about its centre location through 360 degrees by, for example, a turntable.

In evaluating an alternative test site, a maximum of twenty separate site attenuation measurements may be required. See Figure 1a and Figure 1b.

The twenty measurements are derived from: five positions in the horizontal plane (centre, left, right, front and rear, measured with respect to the centre and a line drawn from the centre to the position of the measuring antenna), for two polarizations (horizontal and vertical), and for two heights (1 and 2 m horizontal, 1 and 1.5 m vertical).

These measurements are carried out with broadband antennas and distances are measured with respect to the centre of the antenna. The transmit and receive antennas shall be aligned with the antenna elements parallel to each other and orthogonal to the measurements axis.

NOTE The measurements axis is the line between the centres of the transmit and receive antennas.

For vertical polarization, the eccentric (off-centre) positions of the transmit antenna are at the periphery of the test volume. Furthermore, the lower tip of the antenna shall be more than 25 cm from the floor, which may require the centre of the antenna to be slightly higher than 1 m for the lowest height measurement.

For horizontal polarization measurements in the left and right positions, if the distance between the construction and/or absorbing material on the side walls and EUT periphery is at least 1 m, the centre of the antenna is moved towards the centre position so that the extreme tip of the antenna is either at the periphery or distant from the periphery by not more than 10 % of the test volume diameter. The front and rear positions are at the periphery of the test volume.

The number of required measurements can be reduced under the following circumstances.

- 1) The vertical and horizontal polarization measurements in the rear position may be omitted if the closest point of the construction and/or absorbing material is at a distance greater than 1 m from the rear boundary of the test volume.
- 2) The total number of horizontal polarization measurements along the test volume diameter joining the left and right positions may be reduced to the minimum number necessary for the antenna footprints to cover 90 % of the diameter.
- 3) The vertical polarization measurements at the 1,5 m height may be omitted if the top of the EUT including any table mounting is less than 1,5 m in height.

- 4) If the test volume is no larger than 1 m in depth by 1,5 m in width by 1,5 m in height including table (if used), horizontal polarization measurements need be made at only the centre, front and rear positions but at both the 1 m and 2 m heights. If 1) above applies, the rear position may be omitted. This will require a minimum of eight measurements: four positions vertical polarization (left, centre, right and front) for one height and four positions horizontal polarization (centre and front) and for two heights; see Figure 1c and Figure 1d.

NSA measurements shall be performed with the transmit and receive antenna separation held constant. The receive antenna shall be moved to maintain the appropriate separation along a line towards the turntable centre, see Figure 1a, Figure 1b, Figure 1c and Figure 1d.