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AMENDMENT 2
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INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

Amendment 2

Specification for radio disturbance and immunity measuring apparatus and methods –

Part 1-4: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Radiated disturbances

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*

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FOREWORD

This amendment has been prepared by CISPR subcommittee A: Radio interference measurements and statistical methods.

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

FDIS	Report on voting
CISPR/A/614/FDIS	CISPR/A/633/RVD

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

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Add, after the Annexes, the title of the Bibliography as follows:

Bibliography

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Add, after the existing subclause 5.8, the following new subclause 5.9:

5.9 Evaluation of set-up table and antenna tower

5.9.1 Introduction

A set-up table as specified in Clause D.5 typically positions the EUT for field strength measurements. The shape, construction and material permittivity of the set-up table can influence the field strength measurement results (see Bibliography). The following subclause (5.9.2) describes a procedure to determine the influence of the set-up table for the 30 MHz to 1 000 MHz frequency range and to estimate its related uncertainty contribution to field strength measurements.

NOTE Only horizontal polarisation of a transmit antenna above the setup table is used in the evaluation. This polarisation accounts for the worst-case effects from the table.

The antenna tower does not require additional evaluation because any perturbation effects will be included in the NSA measurement.

5.9.2 Evaluation procedure for set-up table influences (table-top equipment)

The type, shape, and component materials of a set-up table may affect the field strength measurement results. An evaluation procedure shall be performed to determine these effects, and to estimate the standard uncertainties caused by the table. To evaluate set-up table influences, two transmission measurements are performed with a specific transmit antenna in a specific arrangement with and without the set-up table. This difference between the measurement results with and without the set-up table gives an estimate of the influence caused by the set-up table. The measurement procedure is as follows:

The set-up table shall be placed in the typical position on the test site with the largest dimension (i.e. the diagonal for a set-up table with a rectangular top, or the radius for a table with circular a top) facing the receive antenna direction (see Figure 13). For the frequency range up to 1 000 MHz a small biconical antenna with an overall length of less than 0,40 m is placed above the set-up table in horizontal polarization. The distance between the surface of the set-up table and the balun centre is 0,1 m (see Figure 14). The small biconical antenna is positioned with the reference point (balun) midway between the centre and the edge of the setup table top in the direction of the receive antenna. A signal generator feeds the transmit antenna above the set-up table. The frequency steps shall be less than or equal to 0,5% of the highest frequency used. The receive antenna voltage shall be at least 20 dB above the noise level of the measurement equipment. The feed cable is routed horizontally to the rear for approximately 2 m at the same height as the antenna. Ferrite tubes should be placed on the receive antenna feed cable at suitable intervals to prevent the feed cable from influencing measurements.

Two transmission measurements shall be performed to investigate the maximum voltage V_r at the receive antenna, with transmit antenna position unchanged for each test – one with and one without the set-up table. In the frequency range below 1 GHz, measurements shall be performed at least in the frequency range of 200 MHz[1)] to 1 GHz. The receive antenna is height scanned between 1 m and 4 m for an OATS or SAC, while in a FAR the receive antenna is at a fixed height.

The difference $\Delta(f)$ between the two measurement results is then calculated using the Equation (11), with measured voltages are in dB(μV),

$$\Delta(f) = \left| V_{\text{r/with}} - V_{\text{r/without}} \right| \tag{11}$$

where

$V_{\text{r/without}}$ is voltage measured at a specific frequency without the set-up table;

$V_{\text{r/with}}$ is voltage measured at a specific frequency with the set-up table.

The magnitude of the maximum difference $\Delta_{\max}$ in the frequency range of 200 MHz to 1 000 MHz is used as the estimated maximum deviation, with $\Delta_{\max}$ is in dB,

$$\Delta_{\max} = \max \left| V_{\text{r/with}} - V_{\text{r/without}} \right|_{200\,\text{MHz}-1\,000\,\text{MHz}} \tag{12}$$

The standard uncertainty u_{table} caused by the set-up table is estimated by assuming a rectangular distribution for the measured maximum difference $\Delta_{\max}$. So u_{table} (in dB) can be calculated using Equation (13).

$$u_{\text{table}} = \frac{1}{\sqrt{3}} \cdot \Delta_{\max} \tag{13}$$

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1) Below about 200 MHz the influence of the set-up table is negligible when applying this verification procedure.

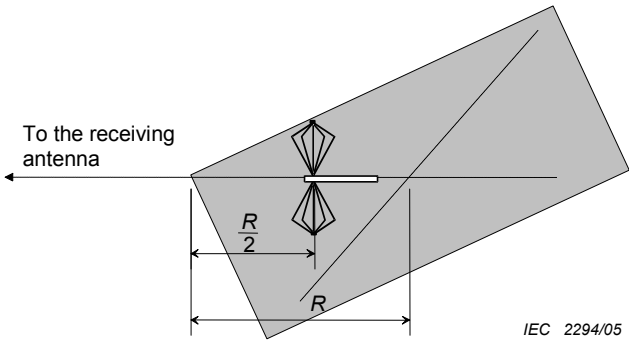

Figure 13 – Position of the antenna relative to the edge above a rectangle set-up table (top view)

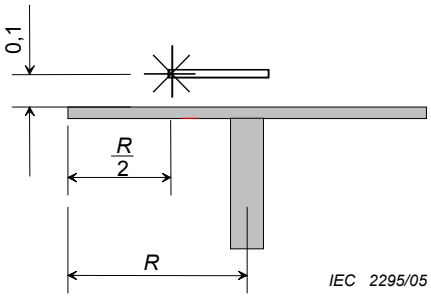

Figure 14 – Antenna position above the set-up table (side view)

NOTE – Test laboratories typically may apply different types of tables of which the construction and the type of materials may differ. It is sufficient to determine the worst-case value of Δ (or $V_{r/with}$) in the determination of u_{table}.

5.9.3 Evaluation procedure for set-up table influences (floor standing equipment)

The set-up table for a floor-standing EUT shall be constructed using a non-conducting, low-permittivity material. If the set-up table perimeter is less than or equal to the EUT perimeter at the base (footprint), evaluation of table is not required.

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Annex D – Construction details for open area test sites in the frequency range of 30 MHz to 1 000 MHz

D.5 Turntable

Replace, on page 106, the title and text of Clause D.5 by the following new Clause D.5:

D.5 Turntable and set-up table

A turntable and a table for supporting the EUT are recommended for convenience in measuring electromagnetic emissions from all sides of the EUT. The turntable contains the rotation assembly, and the set-up table is used for positioning the EUT on the test site. The following three set-up and turntable configurations are considered in this clause.

– For turntables with rotation assembly below the ground, the rotating surface (top) shall be flush with and electrically-connected to the ground plane. The rotating top carries the actual set-up table.

  - For table-top equipment the height of the set-up table shall be 0,8 m ± 0,01 m, and the set-up table is placed such that its centre in the horizontal plane is at the centre of the turntable which is the unit performing the rotation. The set-up table shall be removed for the NSA measurement.
  - For floor-standing equipment the EUT is to be insulated from the conductive surface of the turntable (which is flush with the ground plane). The height of the insulating support shall be up to 0,15 m, or as required by the product committee. The insulating support is not required when non-metallic roller casters are provided by the product. The insulating support shall be removed for the NSA measurement.