SVENSK STANDARD SS-EN IEC 63185

Fastställd	Utgåva	Sida	Ansvarig kommitté
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Mätning av av det komplexa permittivitetstalet hos dielektriska substrat med låga förluster

Measure of the complex permittivity for low-loss dielectric substrates balanced-type circular disk resonator method

Som svensk standard gäller europastandarden EN IEC 63185:2021. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 63185:2021.

Nationellt förord

Europastandarden EN IEC 63185:2021

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 63185, First edition, 2020 - Measure of the complex permittivity for low-loss dielectric substrates balanced-type circular disk resonator method**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 33.120.30

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 63185

January 2021

ICS 33.120.30

English Version

Measurement of the complex permittivity for low-loss dielectric substrates balanced-type circular disk resonator method (IEC 63185:2020)

Méthode au résonateur à disque circulaire de type symétrique pour mesurer la permittivité complexe des substrats diélectriques à faible perte (IEC 63185:2020)

Messung der komplexen Dielektrizitätskonstante für verlustarme dielektrische Substrate nach dem symmetrischen Kreisscheibenresonatorverfahren (IEC 63185:2020)

This European Standard was approved by CENELEC on 12 January 2021. CEN and 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN and 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 CEN and CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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SEK Svensk Elstandard SS-EN IEC 63185, utg 1:2021

European foreword

The text of document 46F/523/FDIS, future edition 1 of IEC 63185, prepared by SC 46F "RF and microwave passive components" of IEC/TC 46 "Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 63185:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-10-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-01-12

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Endorsement notice

The text of the International Standard IEC 63185:2020 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61338-1-3	1999	Waveguide type dielectric resonators - Part 1-3: General information and test conditions - Measurement method of complex relative permittivity for dielectric resonator materials at microwave frequency	EN 61338-1-3	2000
IEC 62810	2015	Cylindrical cavity method to measure the complex permittivity of low-loss dielectric rods	EN 62810	2015

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MEASUREMENT OF THE COMPLEX PERMITTIVITY FOR LOW-LOSS DIELECTRIC SUBSTRATES BALANCED-TYPE CIRCULAR DISK RESONATOR METHOD

FOREWORD

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International Standard IEC 63185 has been prepared by subcommittee 46F: RF and microwave passive components, of IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
46F/523/FDIS	46F/531/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

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MEASUREMENT OF THE COMPLEX PERMITTIVITY FOR LOW-LOSS DIELECTRIC SUBSTRATES BALANCED-TYPE CIRCULAR DISK RESONATOR METHOD

1 Scope

This document relates to a measurement method for complex permittivity of a dielectric substrates at microwave and millimeter-wave frequencies. This method has been developed to evaluate the dielectric properties of low-loss materials used in microwave and millimeter-wave circuits and devices. It uses higher-order modes of a balanced-type circular disk resonator and provides broadband measurements of dielectric substrates by using one resonator, where the effect of excitation holes is taken into account accurately on the basis of the mode-matching analysis.

In comparison with the conventional method described in IEC 62810 and IEC 61338-1-3, this method has the following characteristics:

- the values of the relative permittivity ε_r' and loss tangent $\tan\delta$ normal to dielectric plate samples can be measured accurately and non-destructively;
- this method presents broadband measurements by using higher-order modes by one resonator;
- this method is applicable for the measurements on the following condition:
  - frequency: $10\ \text{GHz} \le f \le 110\ \text{GHz}$;
  - relative permittivity: $1 \le \varepsilon_r' \le 10$;
  - loss tangent: $10^{-4} \le \tan\delta \le 10^{-2}$.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 61338-1-3:1999, *Waveguide type dielectric resonators – Part 1-3: General information and test conditions – Measurement method of complex relative permittivity for dielectric resonator materials at microwave frequency*

IEC 62810:2015, *Cylindrical cavity method to measure the complex permittivity of low-loss dielectric rods*