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TECHNICAL REPORT

colour inside

Measurement methods of the complex relative permeability and permittivity of noise suppression sheet

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MEASUREMENT METHODS OF THE COMPLEX RELATIVE PERMEABILITY AND PERMITTIVITY OF NOISE SUPPRESSION SHEET

FOREWORD

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IEC TR 63307, which is a technical report, has been prepared by IEC technical committee 51: Magnetic components, ferrite and magnetic powder materials.

The text of this Technical Specification is based on the following documents:

Draft TR	Report on voting
51/1349/DTR	51/1356/RVDTR

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

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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- withdrawn,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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INTRODUCTION

Noise suppression sheet (NSS) is used near the source of high frequency electromagnetic noise, path of noise propagation and source of emission. It is used like a patch and is different from an electromagnetic wave absorber in free space. IEC 62333-2 specifies five measurement methods in order to estimate the effect of NSS. To evaluate the effect by computer simulation, it is indispensable to know the frequency characteristics of both permeability and permittivity. And to make a rough estimate of the noise suppression effect of NSS, it is useful to understand effective permeability and effective permittivity, which are the permeability and permittivity of an actually used shape.

As most NSSs are flexible, and both complex relative permeability and complex relative permittivity have anisotropy, careful study and understanding of the principles are indispensable for the measurement of the frequency characteristics of permeability and permittivity.

There are various methods to measure permeability and permittivity under the frequency range where NSS is used. This document is intended to be used for the proper selection of the measurement method and the preparation of the test sample to achieve the above purpose when measuring permeability and permittivity, the two parameters which largely influence the noise suppression effect of the NSS.

MEASUREMENT METHODS OF THE COMPLEX RELATIVE PERMEABILITY AND PERMITTIVITY OF NOISE SUPPRESSION SHEET

1 Scope

This document provides guidelines on the methods for measuring the frequency characteristics of permeability and permittivity in the frequency range of 1 MHz to 6 GHz for a noise suppression sheet for each electromagnetic noise countermeasure.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1.1
noise suppression
suppression which consists of signal decoupling, radiation suppression and attenuation of the transmission power of noise by an electronic product

Note 1 to entry: Each function above is achieved by absorption and/or shielding.

3.1.2
noise suppression sheet
NSS
sheet which enables noise suppression and is composed of magnetic, dielectric or conductive material with electromagnetic losses

EXAMPLE Sheet made of soft magnetic metal powder and resin or rubber.

3.1.3
suppression ratio
ratio of the noise level with and without suppression sheets

Note 1 to entry: The suppression ratio is classified into intra-decoupling ratio, inter-decoupling ratio, transmission attenuation power ratio and radiation suppression ratio. It is expressed in dB.

3.2 Symbols

μ_r	complex relative permeability
μ_r'	real part of complex relative permeability
μ_r''	imaginary part of complex relative permeability
ε_r	complex relative permittivity