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Edition 2.0 2015-04

INTERNATIONAL STANDARD

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Metallic communication cable test methods – Part 4-4: Electromagnetic compatibility (EMC) – Test method for measuring of the screening attenuation a_s up to and above 3 GHz, triaxial method

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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METALLIC COMMUNICATION CABLE TEST METHODS –

Part 4-4: Electromagnetic compatibility (EMC) – Test method for measuring of the screening attenuation a_s up to and above 3 GHz, triaxial method

FOREWORD

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International Standard IEC 62153-4-4 has been prepared by technical committee 46: Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories.

This second edition cancels and replaces the first edition, published in 2006 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition. Impedance matching adapters are no longer required when measuring devices have a characteristic impedance different from the characteristic impedance of the test equipment. The reflection loss due to a mismatch is taken into account by a (calculated) correction factor.

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

FDIS	Report on voting
46/545/FDIS	46/554/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 2.

A list of all parts in the IEC 62153 series, published under the general title, *Metallic communication cable test methods*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

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METALLIC COMMUNICATION CABLE TEST METHODS –

Part 4-4: Electromagnetic compatibility (EMC) – Test method for measuring of the screening attenuation a_s up to and above 3 GHz, triaxial method

1 Scope

This part of IEC 62153 describes a test method to determine the screening attenuation a_s of metallic communication cable screens. Due to the concentric outer tube, measurements are independent of irregularities on the circumference and outer electromagnetic field.

A wide dynamic frequency range can be applied to test even super-screened cables with normal instrumentation from low frequencies up to the limit of defined transversal waves in the outer circuit at approximately 4 GHz.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62153-4-1, *Metallic communication cable test methods – Part 4-1: Electromagnetic Compatibility (EMC) – Introduction to electromagnetic screening measurements*

3 Symbols and theoretical background

3.1 Electrical symbols

Z_1	characteristic impedance of the primary circuit (cable under test)
Z_2	characteristic impedance of the secondary circuit
Z_S	normalized value of the characteristic impedance of the environment of a typical cable installation (150 Ω). It is in no relation to the impedance of the outer circuit of the test set-up Z_2 Z_S is always 150 Ω (arbitrary determined) whereas Z_2 is varying with the dimensions of the CUT and inner diameter of the tube
R	input impedance of the receiver
Z_T	transfer impedance of the cable under test in Ω/m
$Z_F = Z_1 \times Z_2 \times j\omega \times C_T$	capacitive coupling impedance of the cable under test in Ω/m
f	frequency in Hz
C_T	through capacitance of the outer conductor per unit length in F/m
ε_{r1}	relative dielectric permittivity of the cable under test
ε_{r2}	relative dielectric permittivity of the secondary circuit
$\varepsilon_{r2,n}$	normalized value of the relative dielectric permittivity of the environment of the cable
l	effective coupling length
λ_0	vacuum wavelength