

# INTERNATIONAL STANDARD



**Metallic communication cable test methods –  
Part 4-3: Electromagnetic compatibility (EMC) – Surface transfer impedance –  
Triaxial method**



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IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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Triaxial method**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**METALLIC COMMUNICATION CABLE  
TEST METHODS –****Part 4-3: Electromagnetic compatibility (EMC) –  
Surface transfer impedance – Triaxial method**

## FOREWORD

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International Standard IEC 62153-4-3 has been prepared by IEC 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. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) now three different test configurations are described;
- b) formulas to calculate the maximum frequency up to which the different test configurations can be used are included (Annex E: Cut-off frequency of the triaxial set-up for the measurement of the transfer impedance);
- c) the effect of ground loops is described (Annex F: impact of ground loops on low frequency measurements).

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

FDIS	Report on voting
46/471/FDIS	46/482/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.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

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

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## INTRODUCTION

IEC 62153 consists of the following parts, under the general title *Metallic communication cable test methods*:

- Part 1-1: *Metallic communication cables test methods – Part 1-1: Electrical – Measurement of the pulse/step return loss in the frequency domain using the Inverse Discrete Fourier Transformation (IDFT)*
- Part 1-2: *Metallic communication cables test methods – Part 1-2: Electrical – Reflection measurement correction<sup>1</sup>*
- Part 4-0: *Metallic communication cable test methods – Part 4-0: Electromagnetic compatibility (EMC) – Relationship between surface transfer impedance and screening attenuation, recommended limits*
- Part 4-1: *Metallic communication cable test methods – Part 4-1: Electromagnetic compatibility (EMC) – Introduction to electromagnetic (EMC) screening measurements*
- Part 4-2: *Metallic communication cable test methods – Part 4-2: Electromagnetic compatibility (EMC) – Screening and coupling attenuation – Injection clamp method*
- Part 4-3: *Metallic communication cable test methods – Part 4-3: Electromagnetic compatibility (EMC) – Surface transfer impedance – Triaxial method*
- Part 4-4: *Metallic communication cable test methods – Part 4-4: Electromagnetic compatibility (EMC) – Shielded screening attenuation, test method for measuring of the screening attenuation as up to and above 3 GHz*
- Part 4-5: *Metallic communication cables test methods – Part 4-5: Electromagnetic compatibility (EMC) – Coupling or screening attenuation – Absorbing clamp method*
- Part 4-6: *Metallic communication cable test methods – Part 4-6: Electromagnetic compatibility (EMC) – Surface transfer impedance – Line injection method*
- Part 4-7: *Metallic communication cable test methods – Part 4-7: Electromagnetic compatibility (EMC) – Test method for measuring the transfer impedance and the screening – or the coupling attenuation – Tube in tube method*
- Part 4-8: *Metallic communication cable test methods – Part 4-8: Electromagnetic compatibility (EMC) – Capacitive coupling admittance*
- Part 4-9: *Metallic communication cable test methods – Part 4-9: Electromagnetic compatibility (EMC) – Coupling attenuation of screened balanced cables, triaxial method*
- Part 4-10: *Metallic communication cable test methods – Part 4-10: Electromagnetic compatibility (EMC) – Shielded screening attenuation test method for measuring the screening effectiveness of feed-throughs and electromagnetic gaskets double coaxial method*
- Part 4-11: *Metallic communication cable test methods – Part 4-11: Electromagnetic compatibility (EMC) – Coupling attenuation or screening attenuation of patch cords, coaxial cable assemblies, pre-connectorized cables – Absorbing clamp method*

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<sup>1</sup> Under consideration.

Part 4-12: *Metallic communication cable test methods – Part 4-12: Electromagnetic compatibility (EMC) – Coupling attenuation or screening attenuation of connecting hardware – Absorbing clamp method*

Part 4-13: *Metallic communication cable test methods – Part 4-13: Electromagnetic compatibility (EMC) – Coupling attenuation of links and channels (laboratory conditions) – Absorbing clamp method*

Part 4-14: *Metallic communication cable test methods – Part 4-14: Electromagnetic compatibility (EMC) – Coupling attenuation of cable assemblies (Field conditions) absorbing clamp method*

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## METALLIC COMMUNICATION CABLE TEST METHODS –

### Part 4-3: Electromagnetic compatibility (EMC) – Surface transfer impedance – Triaxial method

#### 1 Scope

This part of IEC 62153 determines the screening effectiveness of a cable shield by applying a well-defined current and voltage to the screen of the cable and measuring the induced voltage in order to determine the surface transfer impedance. This test measures only the magnetic component of the transfer impedance.

NOTE The measurement of the electrostatic component (the capacitance coupling impedance) is described in IEC 62153-4-8 [1]<sup>2</sup>.

The triaxial method of measurement is in general suitable in the frequency range up to 30 MHz for a 1 m sample length and up to 100 MHz for a 0,3 m sample length, which corresponds to an electrical length less than about 1/6 of the wavelength in the sample.

#### 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/TR 62153-4-1:2010, *Metallic communication cable test methods – Part 4-1: Electromagnetic compatibility (EMC) – Introduction to electromagnetic (EMC) screening measurements*

IEC 60050 (all parts), *International Electrotechnical Vocabulary (IEV)* (available at <<http://www.electropedia.org>>)

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050 as well as the following apply.

##### 3.1

##### **inner circuit**

circuit consisting of the screens and the conductor(s) of the test specimen

Note 1 to entry: Quantities relating to the inner circuit are denoted by the subscript “1”. See Figure 1 and Figure 2.

##### 3.2

##### **outer circuit**

circuit consisting of the screen surface and the inner surface of a surrounding test jig

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<sup>2</sup> Numbers in square brackets refer to the bibliography.