

FINAL VERSION

VERSION FINALE



**Metallic communication cable test methods –
Part 4-7: Electromagnetic compatibility (EMC) – Test method for measuring of transfer impedance Z_T and screening attenuation a_s or coupling attenuation a_c of connectors and assemblies up to and above 3 GHz – Triaxial tube in tube method**

**Méthodes d'essai des câbles métalliques de communication –
Partie 4-7: Compatibilité électromagnétique (CEM) – Méthode d'essai pour mesurer l'impédance de transfert Z_T et l'affaiblissement d'écrantage a_s ou l'affaiblissement de couplage a_c des connecteurs et des cordons jusqu'à 3 GHz et au-dessus – Méthode triaxiale en tubes concentriques**

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	8
3 Terms and definitions	8
4 Physical background.....	10
5 Principle of the test methods	10
5.1 General.....	10
5.2 Transfer impedance	12
5.3 Screening attenuation	12
5.4 Coupling attenuation	12
6 Test procedure	13
6.1 General.....	13
6.2 Tube in tube procedure	13
6.3 Test equipment	14
6.4 Calibration procedure.....	15
6.5 Connection between extension tube and device under test	15
6.6 Dynamic range respectively noise floor	15
6.7 Impedance matching.....	16
6.8 Influence of Adapters	16
7 Sample preparation	17
7.1 Coaxial connector or device	17
7.2 Balanced or multiconductor device.....	17
7.3 Cable assembly	19
8 Measurement of transfer impedance	19
8.1 General.....	19
8.2 Principle block diagram of transfer impedance	19
8.3 Measuring procedure – Influence of connecting cables	19
8.4 Measuring.....	20
8.5 Evaluation of test results.....	20
8.6 Test report	20
9 Screening attenuation.....	21
9.1 General.....	21
9.2 Impedance matching.....	21
9.2.1 General	21
9.2.2 Evaluation of test results with matched conditions	21
9.2.3 Measuring with mismatch.....	22
9.2.4 Evaluation of test results	22
9.3 Test report	23
10 Coupling attenuation.....	23
10.1 Procedure	23
10.2 Expression of results	23
10.3 Test report	24
10.4 Balunless procedure	25

Annex A (normative) Determination of the impedance of the inner circuit	26
Annex B (informative) Example of a self-made impedance matching adapter	27
Annex C (informative) Measurements of the screening effectiveness of connectors and cable assemblies	29
C.1 General.....	29
C.2 Physical basics	29
C.2.1 General coupling equation	29
C.2.2 Coupling transfer function.....	31
C.3 Triaxial test set-up	33
C.3.1 General	33
C.3.2 Measurement of cable assemblies	34
C.3.3 Measurement of connectors.....	35
C.4 Conclusion.....	38
Annex D (informative) Influence of contact resistances	39
Annex E (informative) Direct measurement of screening effectiveness of connectors.....	41
E.1 General.....	41
E.2 Test set-up	41
E.3 Construction details of test set-up.....	42
Bibliography.....	44
Figure 1 – Definition of Z_T	9
Figure 2 – Principle of the test set-up to measure transfer impedance and screening or coupling attenuation of connectors with tube in tube	11
Figure 3 – Principle of the test set-up to measure transfer impedance and screening attenuation of a cable assembly.....	14
Figure 4 – Principle set-up for verification test	16
Figure 5 – Preparation of balanced or multiconductor connectors	18
Figure 6 – Test set-up (principle) for transfer impedance measurement according to test method B of IEC 62153-4-3.....	19
Figure 7 – Measuring the screening attenuation with tube in tube with impedance matching device.....	21
Figure 8 – Measuring the coupling attenuation with tube in tube and balun	23
Figure 9 – Typical measurement of a connector of 0,04 m length with 1 m extension tube	24
Figure 10 – Measuring the coupling attenuation with multiport VNA (balunless procedure is under consideration).....	25
Figure B.1 – Attenuation and return loss of a 50 Ω to 5 Ω impedance matching adapter, log scale	27
Figure B.2 – Attenuation and return loss of a 50 Ω to 5 Ω impedance matching adapter, lin scale	28
Figure C.1 – Equivalent circuit of coupled transmission lines	30
Figure C.2 – Summing function S	31
Figure C.3 – Calculated coupling transfer function ($l = 1$ m; $e_{r1} = 2,3$; $e_{r2} = 1$; $Z_F = 0$).....	32
Figure C.4 – Triaxial set-up for the measurement of the screening attenuation a_S and the transfer impedance Z_T	33
Figure C.5 – Simulation of a cable assembly (logarithmic scale)	35
Figure C.6 – Simulation of a cable assembly (linear scale)	35

Figure C.7 – Triaxial set-up with extension tube for short cable assemblies	36
Figure C.8 – Triaxial set-up with extension tube for connectors.....	36
Figure C.9 – Simulation, logarithmic frequency scale	37
Figure C.10 – Measurement, logarithmic frequency scale	37
Figure C.11 – Simulation, linear frequency scale.....	37
Figure C.12 – Measurement, linear frequency scale.....	37
Figure C.13 – Simulation, logarithmic frequency scale	38
Figure C.14 – simulation, linear frequency scale	38
Figure D.1 – Contact resistances of the test set-up.....	39
Figure D.2 – Equivalent circuit of the test set-up.....	39
Figure E.1 – Principle of the test set-up to measure transfer impedance and screening attenuation of a connector	41
Figure E.2 – Principle of the test set-up to measure transfer impedance and screening attenuation of a cable assembly.....	42
Figure E.3 – Example of sample preparing.....	42
Figure E.4 – Screening tube with separate nut.....	43
Figure E.5 – Screening fixed with associated nut	43
Table 1 – IEC 62153, Metallic communication cable test methods – Test procedures with triaxial test set-up	11

INTERNATIONAL ELECTROTECHNICAL COMMISSION

METALLIC COMMUNICATION CABLE TEST METHODS –

Part 4-7: Electromagnetic compatibility (EMC) – Test method for measuring of transfer impedance Z_T and screening attenuation a_s or coupling attenuation a_C of connectors and assemblies up to and above 3 GHz – Triaxial tube in tube method

FOREWORD

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This Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.

This Consolidated version of IEC 62153-4-7 bears the edition number 2.1. It consists of the second edition (2015-12) [documents 46/572/FDIS and 46/585/RVD], its corrigendum 1 (2016-04) and its amendment 1 (2018-05) [documents 46/679/FDIS and 46/682/RVD]. The technical content is identical to the base edition and its amendment.

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 62153-4-7 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 constitutes a technical revision.

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

The document is revised and updated. The changes of the revised IEC 62153-4-3:2013, and IEC 62153-4-4:2015, are included.

Measurements can be achieved now with mismatch at the generator site, impedance matching devices are not necessary.

This bilingual version (2016-03) corresponds to the monolingual English version, published in 2015-12.

The French version of this standard has not been voted upon.

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

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

The committee has decided that the contents of the base publication and its amendment 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The shielded screening attenuation test set-up according to IEC 62153-4-3 and IEC 62153-4-4 have been extended to take into account the particularities of electrically short elements like connectors and cable assemblies. Due to the concentric outer tube of the triaxial set-up, measurements are independent of irregularities on the circumference and outer electromagnetic fields.

With the use of an additional resonator tube (inner tube respectively tube in tube), a system is created where the screening effectiveness of an electrically short device is measured in realistic and controlled conditions. Also a lower cut off frequency for the transition between electrically short (transfer impedance Z_T) and electrically long (screening attenuation a_S) can be achieved.

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

METALLIC COMMUNICATION CABLE TEST METHODS –

Part 4-7: Electromagnetic compatibility (EMC) – Test method for measuring of transfer impedance Z_T and screening attenuation a_s or coupling attenuation a_c of connectors and assemblies up to and above 3 GHz – Triaxial tube in tube method

1 Scope

This triaxial method is suitable to determine the surface transfer impedance and/or screening attenuation and coupling attenuation of mated screened connectors (including the connection between cable and connector) and cable assemblies. This method could also be extended to determine the transfer impedance, coupling or screening attenuation of balanced or multipin connectors and multicore cable assemblies. For the measurement of transfer impedance and screening- or coupling attenuation, only one test set-up is needed.

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

IEC 62153-4-3, *Metallic communication cable test methods – Part 4-3: Electromagnetic Compatibility (EMC) – Surface transfer impedance – Triaxial method*

IEC 62153-4-4, *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*

IEC 62153-4-15, *Metallic communication cable test methods – Part 4-15: Electromagnetic compatibility (EMC) – Test method for measuring transfer impedance and screening attenuation – or coupling attenuation with Triaxial Cell*

3 Terms and definitions

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

3.1 surface transfer impedance

Z_T

for an electrically short screen, quotient of the longitudinal voltage U_1 induced to the inner circuit by the current I_2 fed into the outer circuit or vice versa, see figure 1

Note 1 to entry: The surface transfer impedance is expressed in ohms.

Note 2 to entry: The value Z_T of an electrically short screen is expressed in ohms [Ω] or decibels in relation to 1 Ω .

Note 3 to entry: See Figure 1.