

REDLINE VERSION



**Metallic communication cable test methods –
Part 4-9: Electromagnetic compatibility (EMC) – Coupling attenuation of
screened balanced cables, triaxial method**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METALLIC COMMUNICATION CABLE TEST METHODS –

Part 4-9: Electromagnetic compatibility (EMC) – Coupling attenuation of screened balanced cables, triaxial method

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International Standard IEC 62153-4-9 has been prepared by IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories.

This second edition cancels and replaces the first edition published in 2008. This edition constitutes a technical revision.

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

- two test procedures, open head and standard head procedure;
- measuring with balun or with multipoint respectively mixed mode VNA;
- extension of frequency range up to and above 2 GHz.

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

FDIS	Report on voting
46/681/FDIS	46/685/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.

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

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METALLIC COMMUNICATION CABLE TEST METHODS –

Part 4-9: Electromagnetic compatibility (EMC) – Coupling attenuation of screened balanced cables, triaxial method

1 Scope

This part of IEC 62153 applies to metallic communication cables. It specifies a test method for determining the coupling attenuation a_C of screened balanced cables. Due to the concentric outer tube, measurements are independent of irregularities on the circumference and external electromagnetic fields.

A wide dynamic and 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. However, when using a balun, the upper frequency is limited by the properties of the balun.

Measurements can be performed with standard tube procedure (respectively with standard test head) according to IEC 62153-4-4 or with open tube (open test head) procedure.

The procedure described herein to measure the coupling attenuation a_C is based on the procedure to measure the screening attenuation a_S according to ~~IEC 62153-4-5~~ IEC 62153-4-4.

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 60050-726, *International Electrotechnical Vocabulary – Chapter 726: Transmission lines and waveguides*

~~IEC/TR~~ TS 62153-4-1, *Metallic communication cable test methods – Part 4-1: Electromagnetic compatibility (EMC) – Introduction to electromagnetic ~~(EMC)~~ 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) – Test method for measuring of the screening attenuation as up to and above 3 GHz, triaxial method*

IEC 62153-4-5, *Metallic communication cables test methods – Part 4-5: Electromagnetic compatibility (EMC) – Coupling or screening attenuation – Absorbing clamp method*

INTERNATIONAL STANDARD

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**Metallic communication cable test methods –
Part 4-9: Electromagnetic compatibility (EMC) – Coupling attenuation of screened
balanced cables, triaxial method**

**Méthodes d'essais des câbles métalliques de communication –
Partie 4-9: Compatibilité électromagnétique (CEM) – Affaiblissement de couplage
des câbles symétriques écrantés, méthode triaxiale**

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IEC 62153-4-5, *Metallic communication cables test methods – Part 4-5: Electromagnetic compatibility (EMC) – Coupling or screening attenuation – Absorbing clamp method*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

MÉTHODES D'ESSAIS DES CÂBLES MÉTALLIQUES DE COMMUNICATION –

Partie 4-9: Compatibilité électromagnétique (CEM) – Affaiblissement de couplage des câbles symétriques écrantés, méthode triaxiale

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Cette deuxième édition annule et remplace la première édition, parue en 2008. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- deux procédures d'essai: à tête ouverte et à tête normalisée;
- mesure avec un symétriseur ou avec un analyseur de réseau vectoriel en mode mixte ou multiport;
- extension de la plage de fréquences jusqu'à 2 GHz et au-delà.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
46/681/FDIS	46/685/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 62153, publiées sous le titre général *Méthodes d'essais des câbles métalliques de communication*, peut être consultée sur le site web de l'IEC.

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MÉTHODES D'ESSAIS DES CÂBLES MÉTALLIQUES DE COMMUNICATION –

Partie 4-9: Compatibilité électromagnétique (CEM) – Affaiblissement de couplage des câbles symétriques écrantés, méthode triaxiale

1 Domaine d'application

La présente partie de l'IEC 62153 s'applique aux câbles métalliques de communication. Elle spécifie une méthode d'essai pour la détermination de l'affaiblissement de couplage, a_C , de câbles symétriques écrantés. Grâce au tube concentrique extérieur, les mesures sont indépendantes des irrégularités de la circonférence et des champs électromagnétiques externes.

Une large plage dynamique de fréquences peut être appliquée pour soumettre aux essais des câbles même fortement écrantés avec des instruments normaux depuis les basses fréquences jusqu'à la limite des ondes transversales définies dans le circuit externe à environ 4 GHz. Toutefois, lorsque des symétriseurs sont utilisés, la fréquence supérieure est limitée par les propriétés des symétriseurs.

Des mesures peuvent être réalisées en suivant la procédure à tube normalisé (tête normalisée) selon l'IEC 62153-4-4 ou la procédure à tube ouvert (tête ouverte).

La procédure de mesure de l'affaiblissement de couplage, a_C , décrite ici est fondée sur la procédure de mesure de l'affaiblissement d'écran, a_S , de IEC 62153-4-4.

2 Références normatives

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 60050-726, *Vocabulaire Electrotechnique International (VEI) – Chapitre 726: Lignes de transmission et guides d'ondes*

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

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

IEC 62153-4-4, *Metallic communication cable test methods – Part 4-4: Electromagnetic compatibility (EMC) – Test method for measuring of the screening attenuation as up to and above 3 GHz, triaxial method* (disponible en anglais seulement)

IEC 62153-4-5, *Méthodes d'essai des câbles de métalliques de communication – Partie 4-5: Compatibilité électromagnétique (CEM) – Affaiblissement d'écran ou de couplage – Méthode de la pince absorbante*