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Railway applications – Electromagnetic compatibility – Part 3-1: Rolling stock – Train and complete vehicle

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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RAILWAY APPLICATIONS – ELECTROMAGNETIC COMPATIBILITY –

Part 3-1: Rolling stock – Train and complete vehicle

FOREWORD

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This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 62236-3-1 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This third edition cancels and replaces the second edition published in 2008. It constitutes a technical revision and has been developed on the basis of EN 50121-3-1:2015.

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

a) clarification of scope (Clause 1);

b) clarification of definitions (Clause 3);

c) clarification of applicability (Clause 4);

d) clarification of interference on outside party telecommunication lines (6.2), psophometric current (Annex A);

e) moving emission values for radiated H-field in the frequency range 9 kHz to 150 kHz into new Annex C due to the fact that:

   – there are very few outside world victims (e.g. radio services),

   – the radiated emission measured at 10 m is not representative of the compatibility with internal railway apparatus,

   – the EMC with other railway apparatus in this frequency range is covered in other procedures and standards like IEC 62427 series,

   – there is low reproducibility.

This International Standard is to be read in conjunction with IEC 62236-1.

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

FDIS	Report on voting
9/2337/FDIS	9/2367/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 in the IEC 62236 series, published under the general title *Railway applications – Electromagnetic compatibility*, can be found on the IEC website.

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

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- replaced by a revised edition, or
- amended.

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INTRODUCTION

High powered electronic equipment, together with low power microcontrollers and other electronic devices, is being installed on trains in great numbers. Electromagnetic compatibility has therefore become a critical issue for the design of train-related apparatus as well as of the train as a whole.

This Product Standard for rolling stock sets limits for electromagnetic emission and immunity in order to ensure a well functioning system within its intended environment.

Immunity limits are not given for the complete vehicle. Part 3-2 of this series defines requirements for the apparatus installed in the rolling stock, since it is impractical to test the complete unit. An EMC plan ~~should be established for~~ includes equipment covered by this document.

RAILWAY APPLICATIONS – ELECTROMAGNETIC COMPATIBILITY –

Part 3-1: Rolling stock – Train and complete vehicle

1 Scope

This part of IEC 62236 specifies the emission and immunity requirements for all types of rolling stock. It covers traction stock, hauled stock and trainsets including urban vehicles for use in city streets. This document specifies the emission limits of the rolling stock to the outside world.

The scope of this document ends at the interface of the rolling stock with its respective energy inputs and outputs. In the case of ~~locomotives~~ traction units, trainsets, trams, etc., this is the current collector (pantograph, shoe gear). In the case of hauled stock, this is the AC or DC auxiliary power connector. However, since the current collector is part of the traction stock, it is not entirely possible to exclude the effects of this interface with the power supply line. The slow moving test has been designed to minimize these effects.

~~Basically, all apparatus to be integrated into a vehicle should meet the requirements of Part 3-2 of this standard. In exceptional cases, where apparatus meets another EMC standard, but full compliance with Part 3-2 is not demonstrated, EMC should be assured by adequate integration measures of the apparatus into the vehicle system and/or by an appropriate EMC analysis and test which justifies deviating from Part 3-2.~~

There may be additional compatibility requirements within the railway system identified in the EMC plan (e.g. as specified in IEC 62427).

~~The electromagnetic interference concerning~~ Electromagnetic emissions of the railway system as a whole ~~is~~ are dealt with in IEC 62236-2.

These specific provisions are ~~to be~~ used in conjunction with the general provisions in IEC 62236-1.

The frequency range considered is from 0 Hz (DC) to 400 GHz. No measurements need to be performed at frequencies where no requirement is specified.

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 62236-1:2018, *Railway applications – Electromagnetic compatibility – Part 1: General*

IEC 62236-2:2018, *Railway applications – Electromagnetic compatibility – Part 2: Emission of the whole railway system to the outside world*

IEC 62236-3-2:2018, *Railway applications – Electromagnetic compatibility – Part 3-2: Rolling stock – Apparatus*

~~IEC 62427, *Railway applications – Compatibility between rolling stock and train detection systems*~~

CISPR 16-1-1:2015, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

~~ITU-T, *Directive concerning the protection of telecommunication lines against harmful effects from electrical power and electrified railway lines – Volume VI: Danger and disturbances*~~

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Railway applications – Electromagnetic compatibility – Part 3-1: Rolling stock – Train and complete vehicle

Applications ferroviaires – Compatibilté électromagnétique – Partie 3-1: Matériel roulant – Trains et véhicules complets



IEC 62236-3-1:2018-02(en-fr)

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPLICATIONS FERROVIAIRES – COMPATIBILTÉ ÉLECTROMAGNÉTIQUE –

Partie 3-1: Matériel roulant – Trains et véhicules complets

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La Norme internationale IEC 62236-3-1 a été établie par le comité d'études 9 de l'IEC: Matériels et systèmes électriques ferroviaires.

Cette troisième édition annule et remplace la deuxième édition publiée en 2008. Elle constitue une révision technique et a été développée sur la base de EN 50121-3-1:2015.

Cette édition inclut les changements techniques significatifs suivants par rapport à l'édition précédente:

a) clarification du domaine d'application (Article 1);
b) clarification des définitions (Article 3);
c) clarification de l'applicabilité (Article 4);

d) clarification de l'inteférence sur les lignes de télécommunications de tierces parties externes (6.2), courrant psophométrique (Annexe A);

e) déplacement des valeurs d'émissions pour les champs H rayonnés de largeurs de bande 9 kHz à 150 kHz dans l'Annexe C pour les raisons suivantes:

   – il y a très peu de victimes du monde extérieur (par exemple services radio);

   – l'émission rayonnée mesurée à 10 m n'est pas représentative de la compatibilité avec les appareils ferroviaires internes;

   – la CEM avec d'autres appareils ferroviaires dans cette bande de fréquence est couverte par d'autres procédures et d'autres normes comme la série IEC 62427;

   – la reproductibilité est faible.

Cette Norme internationale doit être lue conjointement avec l'IEC 62236-1.

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

FDIS	Rapport de vote
9/2337/FDIS	9/2367/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.

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

Une liste de toutes les parties de la série IEC 62236, publiées sous le titre général *Applications ferroviaires – Compatibilité électromagnétique*, peut être consultée sur le site web de l'IEC.

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INTRODUCTION

Les équipements électroniques de forte puissance avec leurs microcontrôleurs de faible puissance et d'autres appareils électroniques sont installés en grand nombre à bord des trains. La compatibilité électromagnétique est devenue de ce fait une question importante pour la conception des appareils embarqués ainsi que pour celle des trains dans leur ensemble.

La présente norme de produit concernant le matériel roulant fixe des limites pour les émissions et l'immunité électromagnétiques afin d'assurer le bon fonctionnement du système dans son environnement.

Les limites d'immunité ne sont pas données pour le véhicule complet. La Partie 3-2 de la présente série définit les exigences pour les appareils installés à bord du matériel roulant puisqu'il est impossible, en pratique, de soumettre l'unité complète aux essais. Un plan de CEM inclut les équipements couverts par le présent document.

APPLICATIONS FERROVIAIRES – COMPATIBILTÉ ÉLECTROMAGNÉTIQUE –

Partie 3-1: Matériel roulant – Trains et véhicules complets

1 Domaine d'application

La présente partie de l'IEC 62236 spécifie les exigences d'émission et d'immunité pour tous les types de matériels roulants. Elle s'applique au matériel de traction, au matériel remorqué et aux rames, y compris les véhicules de transport urbain. Le présent document spécifie les limites d'émission du matériel roulant vers le monde extérieur.

Le domaine d'application du présent document s'arrête à l'interface du matériel roulant avec ses entrées et sorties d'énergie respectives. Dans le cas des unités motrices, des rames, des tramways, etc., il s'agit du collecteur de courant (pantographe, frotteur). Dans le cas du matériel remorqué, il s'agit du connecteur de puissance auxiliaire en courant alternatif ou en courant continu. Cependant, comme le collecteur de courant fait partie du matériel de traction, il n'est pas complètement possible d'exclure les effets de cette interface avec la ligne d'alimentation en énergie. L'essai à vitesse lente a été conçu pour minimiser ces effets.

Les systèmes ferroviaires identifiés dans le plan de CEM peuvent faire l'objet d'exigences de compatibilité supplémentaires (spécifiées dans l'IEC 62427, par exemple).

Les emmissions électromagnétiques du système ferroviaire dans son ensemble sont traitées dans l'IEC 62236-2.

Ces dispositions spécifiques sont utilisées avec les dispositions générales données dans l'IEC 62236-1.

La plage de fréquences concernée est comprise entre 0 Hz (courant continu) et 400 GHz. Aucune mesure n'est nécessaire aux fréquences pour lesquelles aucune exigence n'est spécifiée.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 62236-1:2018, *Applications ferroviaires – Compatibilité électromagnétique – Partie 1: Généralités*

IEC 62236-2:2018, *Applications ferroviaires – Compatibilité électromagnétique – Partie 2: Émission du système ferroviaire dans son ensemble vers le monde extérieur*

IEC 62236-3-2:2018, *Applications ferroviaires – Compatibilité électromagnétique – Partie 3-2: Matériel roulant – Appareils*

CISPR 16-1-1:2015, *Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Partie 1-1: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Appareils de mesure*