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

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Nederlands Elektrotechnisch Comité

NEN

©2013 Nederlands Normalisatie-instituut
Postbus 5059, 2600 GB Delft
Telefoon (015) 2 690 390, Fax (015) 2 690 190

DRAFT
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Will supersede EN 50121-3-1:2006

English version

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

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

Bahnanwendungen - Elektromagnetische Verträglichkeit - Teil 3-1: Bahnfahrzeuge - Zug und gesamtes Fahrzeug

This draft European Standard is submitted to CENELEC members for CENELEC enquiry.
Deadline for CENELEC: 2014-02-28.

It has been drawn up by CLC/TC 9X.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Project: 23682

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Foreword

This document [prEN 50121-3-1:2013] has been prepared by CLC/TC 9X " Electrical and electronic applications for railways".

This document is currently submitted to the Enquiry.

This document will supersede EN 50121-3-1:2006.

prEN 50121-3-1:2013 includes the following significant technical changes with respect to EN 50121-3-1:2006:

- clarification of scope (Clause 1);
- set dated normative references (Clause 2);
- clarification of definition (Clause 3);
- clarification of applicability (Clause 4);
- clarification of interference on outside party telecommunication lines (6.2), psophometric current (Annex A) and adding an example of a national rule (Annex C);
- the limits of the radiated H-field in the frequency range 9 kHz to 150 kHz have been removed 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 to the compatibility with internal railway apparatus,
  - the intra EMC in this frequency range is covered in other procedures and standards like EN 50238 series,
  - there is low reproduceability.

EN 50121 "*Railway applications – Electromagnetic compatibility*" consists of the following parts:

- *Part 1: General;*
- *Part 2: Emission of the whole railway system to the outside world;*
- *Part 3-1: Rolling stock – Train and complete vehicle;*
- *Part 3-2: Rolling stock – Apparatus;*
- *Part 4: Emission and immunity of the signalling and telecommunications apparatus;*
- *Part 5: Emission and immunity of fixed power supply installations and apparatus.*

This European Standard is to be read in conjunction with EN 50121-1.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

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 European Standard defines requirements for the apparatus installed in the rolling stock, since it is impractical to test the complete unit. An EMC plan includes equipment covered by this European Standard.

1 Scope

This European Standard 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.

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

The scope of this part of the standard ends at the interface of the rolling stock with its respective energy inputs and outputs. In the case of locomotives, 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 minimise these effects.

This part of the standard specifies the emission requirements of the rolling stock to the outside world.

There may be additional compatibility requirements within the railway system identified in the EMC plan (e.g. as specified in EN 50238).

Basically, all apparatus to be integrated into a vehicle shall meet the requirements of Part 3-2 of this European Standard. In exceptional cases, where apparatus meets another EMC Standard, but full compliance with Part 3-2 is not demonstrated, EMC shall 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.

The electromagnetic interference concerning the railway system as a whole is dealt with in EN 50121-2.

These specific provisions are to be used in conjunction with the general provisions in EN 50121-1.

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.

EN 50121-1	date	Railway applications - Electromagnetic compatibility Part 1: General
EN 50121-2	Date	Railway applications - Electromagnetic compatibility Part 2: Emission of the whole railway system to the outside world
EN 55016-1-1 + A1	03.2010 10.2010	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus (IEC/CISPR 16-1-1:2010 + A1: 2010)
EN 50238	02.2003	Railway applications - Compatibility between rolling stock and train detection systems

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1
traction stock
electric and diesel locomotive, high speed trainset, elementary fixed combination of traction stock and hauled stock, electric and diesel multiple unit (no locomotive, distributed traction equipment), Light Railway Vehicle (LRV) such as tram, trolley bus or any other electrical vehicle for urban mass transit, underground trainset.

3.1.2
hauled stock
independent passenger coaches and freight wagons (if they contain electric apparatus such as freezing equipment) which may be hauled in random combinations by different types of locomotives

3.1.3
main line vehicles
vehicles such as high-speed trains, suburban trains, freight trains, mainly designed to operate between cities

3.1.4
urban vehicles
vehicles such as underground trainsets, trams, LRV (Light Rail Vehicles), trolleybuses, mainly designed to operate within the boundary of a city

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

AC	Alternating current
AT	Autotransformer
CCITT	Comité Consultatif International Téléphonique et Télégraphique
DC	Direct current
E	electric (field)
EMC	Electromagnetic compatibility
EMF	Electromagnetic fields
EUT	Equipment under test
FFT	Fast fourier transform
H	magnetic (field)
IGBT	insulated-gate bipolar transistor
ISDN	Integrated Services Digital Network
LRV	Light rail vehicle
MSC	Mutual screening conductor

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