BS EN 50121-3-1:2017+A1:2019

BSI Standards Publication

Railway applications - Electromagnetic compatibility

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

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National foreword

This British Standard is the UK implementation of EN 50121-3-1:2017+A1:2019. It supersedes BS EN 50121-3-1:2017, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CENELEC text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment 1 is indicated by [A1] [A1].

The UK participation in its preparation was entrusted to Technical Committee GEL/9, Railway Electrotechnical Applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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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

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

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European foreword

This document (EN 50121-3-1:2017) has been prepared by CLC/TC 9X: “Electrical and electronic applications for railways”.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2017-10-24
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2019-10-24

This document supersedes EN 50121-3-1:2015.

EN 50121-3-1:2016 includes the following significant technical changes with respect to EN 50121-3-1:2015:

— 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).

— 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:

  a) there are very few outside world victims (e.g. radio services);

  b) the radiated emission measured at 10m is not representative to the compatibility with internal railway apparatus;

  c) the EMC with other railway apparatus in this frequency range is covered in other procedures and standards like the EN 50238 series;

  d) there is low reproduceability;

— editorial corrections in the European foreword, the Scope and Annex A.

— revision of Annex ZZ.

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.

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

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This standard forms Part 3-1 of the EN 50121 series published under the general title “Railway applications - Electromagnetic compatibility”. The series consists of:

— 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.*

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Introduction

High power electronic equipment, together with low power microcontrollers and other electronic devices, are 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. EN 50121-3-2 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 standard.

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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. This European standard specifies the emission limits of the rolling stock to the outside world.

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 minimize these effects.

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 meet the requirements of EN 50121-3-2. In exceptional cases, where apparatus meets another EMC Standard, but full compliance with EN 50121-3-2 is not demonstrated, EMC is ensured by adequate integration measures of the apparatus into the vehicle system and/or by an appropriate EMC analysis and test which justifies deviating from EN 50121-3-2.

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.

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, 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 50121-2:2017, *Railway applications - Electromagnetic compatibility - Part 2: Emission of the whole railway system to the outside world*

EN 55016-1-1:2010+A2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus (CISPR 16-1-1:2010)*

EN 50121-1:2017, *Railway applications - Electromagnetic compatibility - Part 1: General*

EN 50121-3-2:2016, *Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus*

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

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