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## Järnvägstillämpningar – Elektromagnetisk kompatibilitet (EMC) – Del 3-1: Fordon – Tåg och kompletta lok och vagnar

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

Som svensk standard gäller europastandarden EN 50121-3-1:2017. Den svenska standarden innehåller den officiella engelska språkversionen av EN 50121-3-1:2017.

### Nationellt förord

Standarden ska användas tillsammans med SS-EN 50121-1.

Tidigare fastställd svensk standard SS-EN 50121-3-1, utgåva 3, 2015, gäller ej fr o m 2019-10-24.

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ICS 33.100.01; 45.060.01

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Denna standard är fastställd av SEK Svensk Elstandard, som också kan lämna upplysningar om **sakinnehållet** i standarden.  
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### *Standarder underlättar utvecklingen och höjer elsäkerheten*

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

### *SEK är Sveriges röst i standardiseringsarbetet inom elområdet*

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

### *Stora delar av arbetet sker internationellt*

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

### *Var med och påverka!*

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

### **SEK Svensk Elstandard**

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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

This European Standard was approved by CENELEC on 2016-10-24. 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.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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.

## EN 50121-3-1:2017 (E)

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*.

## 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.

## 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*