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BSI Standards Publication

Railway applications - Electromagnetic compatibility

Part 5: Emission and immunity of fixed power supply installations and apparatus

bsi.

National foreword

This British Standard is the UK implementation of EN 50121-5:2017+A1:2019. It supersedes BS EN 50121-5:2017, which is withdrawn.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 A1 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.

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English Version

Railway applications - Electromagnetic compatibility - Part 5: Emission and immunity of fixed power supply installations and apparatus

Applications ferroviaires - Compatibilité électromagnétique - Partie 5 : Emission et immunité des installations fixes d'alimentation de puissance et des équipements associés

Bahnanwendungen - Elektromagnetische Verträglichkeit - Teil 5: Störaussendungen und Störfestigkeit von ortsfesten Anlagen und Einrichtungen der Bahnenergieversorgung

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Contents

Page

European foreword

This document (EN 50121-5:2017) 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)	2017-11-06
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2020-02-06

This document supersedes EN 50121-5:2015.

EN 50121-5:2017 includes the following significant technical changes with respect to EN 50121-5:2015:

- clarification of scope (Clause 1);
- set dated normative references (Clause 2);
- emission requirement extended in the frequency range 1 GHz to 6 GHz following EN 61000-6-4;
- immunity requirement extended in the frequency range 5,1 GHz to 6 GHz;
- removal of limits for radiated H-fields in the frequency range 9 kHz to 150 kHz due to the fact that:
- there are very few outside world victims;
- there is low reproducibility;
- revision of Annex ZZ.

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

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.

This standard forms Part 5 of the European Standard series EN 50121, 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

The requirements of this standard have been specified so as to ensure a level of electromagnetic emission which will cause minimal disturbance to other equipment. The levels, however, do not cover the following cases:

a) which may occur with an extremely low probability of occurrence in any location;

b) where highly susceptible apparatus will be used in close proximity of the equipment covered by this standard, in which case further measures may have to be taken.

The emission limits given are on the basis that the equipment of the product family range is installed in railway substation areas.

1 Scope

This European Standard applies to emission and immunity aspects of EMC for electrical and electronic apparatus and systems intended for use in railway fixed installations for power supply. This includes the power feed to the apparatus, the apparatus itself with its protective control circuits, trackside items such as switching stations, power autotransformers, booster transformers, substation power switchgear and power switchgear to other longitudinal and local supplies.

Filters operating at railway system voltage (for example, for harmonic suppression or power factor correction) are not included in this standard since each site has special requirements. Filters would normally have separate enclosures with separate rules for access. If electromagnetic limits are required, these will appear in the specification for the equipment.

If a port is intended to transmit or receive for the purpose of radio communication (intentional radiators, e.g. transponder systems), then the radiated emission requirement in this standard are not intended to be applicable to the intentional transmission from a radio-transmitter as defined by the ITU.

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

Emission and immunity limits are given for items of apparatus which are situated:

a) within the boundary of a substation which delivers electric power to a railway;

b) beside the track for the purpose of controlling or regulating the railway power supply, including power factor correction;

c) along the track for the purpose of supplying electrical power to the railway other than by means of the conductors used for contact current collection, and associated return conductors. Included are high voltage feeder systems within the boundary of the railway which supply substations at which the voltage is reduced to the railway system voltage;

d) beside the track for controlling or regulating electric power supplies to ancillary railway uses. This category includes power supplies to marshalling yards, maintenance depots and stations;

e) various other non-traction power supplies from railway sources which are shared with railway traction.

The immunity levels given in this standard apply for:

- vital equipment such as protection devices;

- equipment having connections to the traction power conductors;

- apparatus inside the 3 m zone;

- ports of apparatus inside the 10 m zone with connection inside the 3 m zone;

- ports of apparatus inside the 10 m zone with cable length > 30 m.

Apparatus and systems which are in an environment which can be described as residential, commercial or light industry, even when placed within the physical boundary of the railway substation, shall comply with EN 61000-6-1:2007 for immunity and EN 61000-6-3:2007 for emission requirements.

Excluded from the immunity requirements of this standard is power supply apparatus which is intrinsically immune to the tests defined in Tables 1 to 6.

NOTE An example is an 18 MVA 230 kV to 25 kV power supply transformer.

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

This part of the standard covers requirements for both apparatus and fixed installations. The sections for fixed installations are not relevant for CE marking.

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

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

EN 61000-4-2:2009, *Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test (IEC 61000-4-2:2008)*

EN 61000-4-3:2006, *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2006)*

EN 61000-4-4:2012, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — Electrical fast transient/burst immunity test (IEC 61000-4-4:2012)*

EN 61000-4-5:2006, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test (IEC 61000-4-5:2005)*

EN 61000-4-6:2009, *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2008)*

EN 61000-4-8:2010, *Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test (IEC 61000-4-8:2009)*

EN 61000-4-18:2007, *Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Damped oscillatory wave immunity test (IEC 61000-4-18:2006)*

EN 61000-6-4:2007[i], *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments (IEC 61000-6-4:2006)*

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
apparatus
electric or electronic product with an intrinsic function intended for implementation into a fixed railway installation

[i] As impacted by EN 61000-6-4:2007/A1:2011.