



BSI Standards Publication

Railway applications - Electromagnetic compatibility

Part 3-2: Rolling stock - Apparatus

National foreword

This British Standard is the UK implementation of EN 50121-3-2:2016+A1:2019. It supersedes BS EN 50121-3-2:2016, which is withdrawn.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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Published by BSI Standards Limited 2019

ISBN 978 0 539 04610 6

ICS 45.060.01; 29.280; 33.100.01

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2017.

Amendments/corrigenda issued since publication

Date	Text affected
31 May 2019	Implementation of CENELEC amendment A1:2019

English Version

Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus

Applications ferroviaires - Compatibilité électromagnétique -
Partie 3-2: Matériel roulant - Appareils

Bahnanwendungen - Elektromagnetische Verträglichkeit -
Teil 3-2: Bahnfahrzeuge - Geräte

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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

Contents

Page

European foreword.....	3
1 Scope.....	5
2 Normative references.....	5
3 Terms, definitions and abbreviations	6
3.1 Terms and definitions	6
3.2 Abbreviations.....	7
4 Performance criteria.....	7
5 Conditions during testing.....	8
6 Applicability	8
7 Emission tests and limits	8
8 Immunity requirements.....	11
Annex A (informative) Examples of apparatus and ports	16
Annex B (informative) Conducted disturbances generated by power converters	22
Annex ZZ (informative) Relationship between this European Standard and the essential requirements of Directive 2014/30/EU [2014 OJ L96] aimed to be covered.....	23
Bibliography.....	24

European foreword

This document (EN 50121-3-2:2016) 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) [2017-07-24]
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) [2019-10-24]

This document supersedes EN 50121-3-2:2015.

EN 50121-3-2:2016 includes the following significant technical changes with respect to EN 50121-3-2:2015:

- clarification of scope (Clause 1);
- set dated normative references (Clause 2);
- new definition of ports and clarification in Tables 1 to 5;
- 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;
- revision of Annex B;
- editorial corrections in Figure 1 and Table B.1;
- 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 3-2 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*.

1 Scope

This European Standard applies to emission and immunity aspects of EMC for electrical and electronic apparatus intended for use on railway rolling stock. EN 50121-3-2 applies for the integration of apparatus on rolling stock.

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

The application of tests shall depend on the particular apparatus, its configuration, its ports, its technology and its operating conditions.

This standard takes into account the internal environment of the railway rolling stock and the external environment of the railway, and interference to the apparatus from equipment such as hand-held radio-transmitters.

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 is not intended to be applicable to the intentional transmission from a radio-transmitter as defined by the ITU.

Immunity limits do not apply in the exclusion bands as defined in the corresponding EMC related standard for radio equipment.

This standard does not apply to transient emissions when starting or stopping the apparatus.

The objective of this standard is to define limits and test methods for electromagnetic emissions and immunity test requirements in relation to conducted and radiated disturbances.

These limits and tests represent essential electromagnetic compatibility requirements.

Emission requirements have been selected so as to ensure that disturbances generated by the apparatus operated normally on railway rolling stock do not exceed a level which could prevent other apparatus from operating as intended. The emission limits given in this standard take precedence over emission requirements for individual apparatus on board the rolling stock given in other standards.

Likewise, the immunity requirements have been selected so as to ensure an adequate level of immunity for rolling stock apparatus.

The levels do not however cover all cases which may occur with an extremely low probability of occurrence in any location. Specific requirements which deviate from this standard shall be specified.

Test requirements are specified for each port considered.

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

EN 50121-3-1:2017, *Railway applications - Electromagnetic compatibility - Part 3-1: Rolling stock - Train and complete vehicle*

EN 50155:2007, *Railway applications - Electronic equipment used on rolling stock*

EN 55016-2-1:2014, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements (CISPR 16-2:2014)*

 deleted text 

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 61000-4-5:2014, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test (IEC 61000-4-5:2014)*

EN 61000-4-6:2014, *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-5:2013)*

EN 61000-4-30:2015, *Electromagnetic compatibility (EMC) - Part 4-30: Testing and measurement techniques - Power quality measurement methods (IEC 61000-4-30:2015)*

EN 61000-6-4:2007¹, *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

rolling stock apparatus

finished product with an intrinsic function intended for implementation into the rolling stock installation

3.1.2

port

particular interface of the specified apparatus with the external environment

EXAMPLE AC power port, DC power port, I/O (input/output) port, earth port.

[SOURCE: IEC 60050-821:2015, 821-11-36]

¹ As impacted by EN 61000-6-4:2007/A1.

3.1.3

enclosure port

physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

Note 1 to entry: The main categories of ports for rolling stock apparatus are presented in Figure 1.

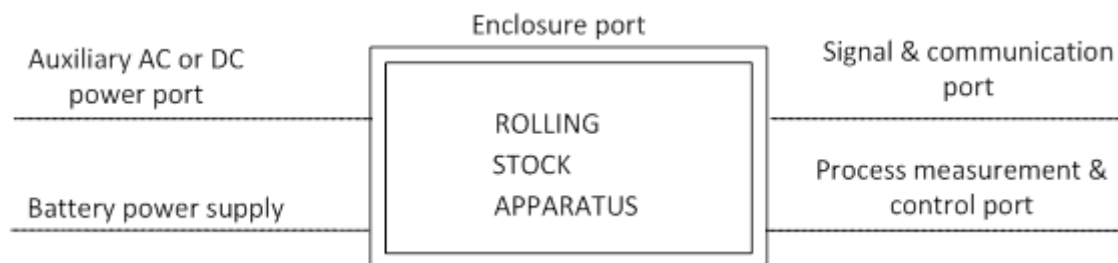


Figure 1 — Main categories of ports

Typical examples of rolling stock apparatus with their ports are listed in Annex A

Traction power ports are not covered in this European Standard see Annex B

3.2 Abbreviations

AC	Alternating current
AM	Amplitude modulation
CISPR	Comité international spécial des perturbations radioélectriques
DC	Direct current
EMC	Electromagnetic compatibility
I/O	Input / Output
ITU	International Telegraph Union
PC	Personal computer
THD	Total harmonic distortion
TV	Television

4 Performance criteria

The variety and the diversity of the apparatus within the scope of this standard make it difficult to define precise criteria for the evaluation of the immunity test results.

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report, based on the criteria A, B, C defined in EN 50121-1:2017.