SLOVENSKI STANDARD
oSIST prEN 50121-4:2021

01-julij-2021

Železniške naprave - Elektromagnetna združljivost - 4. del: Sevanje in odpornost signalnih in telekomunikacijskih naprav

Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus

Bahnanwendungen - Elektromagnetische Verträglichkeit - Teil 4: Störaussendungen und Störfestigkeit von Signal- und Telekommunikationseinrichtungen

Applications ferroviaires - Compatibilité électromagnétique - Partie 4: Emission et immunité des appareils de signalisation et de télécommunication

Ta slovenski standard je istoveten z: **prEN 50121-4:2021**

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33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
45.020	Železniška tehnika na splošno	Railway engineering in general

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EUROPEAN STANDARD

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Will supersede EN 50121-4:2016 and all of its amendments and corrigenda (if any)

English Version

Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus

Applications ferroviaires - Compatibilité électromagnétique - Partie 4: Emission et immunité des appareils de signalisation et de télécommunication

Bahnanwendungen - Elektromagnetische Verträglichkeit - Teil 4: Störaussendungen und Störfestigkeit von Signal- und Telekommunikationseinrichtungen

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2021-10-15.

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.

This draft European Standard was established by CENELEC 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.

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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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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

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Contents

European foreword

This document (prEN 50121-4:2021) has been prepared by CLC/TC 9X “Electrical and electronic applications for railways”.

The following dates are proposed:

• latest date by which the existence of this document has to be announced at national level	(doa)	dor + 6 months
• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	dor + 12 months
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	dor + 36 months (to be confirmed or modified when voting)

This document will supersede EN 50121-4:2016 and all of its amendments and corrigenda (if any).

prEN 50121-4:2021 includes the following significant technical changes with respect to EN 50121-4:2016:

— clarification of scope (Clause 1);

— set dated normative references (Clause 2);

— Update of Clause 5;

— Introduction of performance criteria (Clause 6.1);

— Update of Clause 6.2, paragraph from Clause 1 was introduced;

— revision of Annex ZZ.

This European Standard is 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.

This standard forms Part 4 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

This document has been prepared in the form of a Product Standard.

It defines the immunity and emission test requirements for apparatus defined in the scope in relation to the electromagnetic disturbances likely to be experienced in the railway. In particular, the test requirements represent the essential electromagnetic immunity requirements and have been selected to ensure an adequate level of immunity for apparatus installed on the railway locations.

Test requirements are specified for each port considered.

Safety considerations are not covered by this document.

In specific situations, where the level of disturbances may exceed the levels considered in this standard, e.g. at a special location or where a hand-held transmitter is used in very close proximity to an apparatus, special mitigation measures may have to be employed.

1 Scope

This document applies to railway signalling and telecommunication apparatus. Signalling and telecommunication apparatus mounted in vehicles is covered by prEN 50121-3-2:2021, signalling and telecommunication apparatus installed inside the substation and connected to substation equipment is covered by prEN 50121-5:2021.

This document specifies limits for emission and immunity and provides performance criteria for signalling and telecommunications (S&T) apparatus (including power supply systems belonging to S&T) which may interfere with other apparatus inside the railway environment, or increase the total emissions for the railway environment and so risk causing Electro-Magnetic Interference (EMI) to apparatus outside the railway system.

The document does not specify basic personal safety requirements for apparatus such as protection against electric shock, unsafe operation, insulation co-ordination and related dielectric tests. The requirements were developed for and are applicable to this set of apparatus when operating under normal conditions. Fault conditions of the apparatus have not been taken into account.

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

For products in the scope of EN 61000-3-2, EN 61000-3-3, EN 61000-3-11 or EN 61000-3-12 the requirements of those document also apply.

These specific provisions are to be used in conjunction with the general provisions in EN 50121-1:2016.

The immunity and emission levels do not of themselves guarantee that the integration of apparatus will necessarily be satisfactory. The document cannot cover all the possible configurations of the apparatus, but the test levels are sufficient to achieve satisfactory EMC in the majority of cases.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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 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*

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

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

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

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

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

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

EN IEC 61000-6-4:2019, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
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: CDV2015, 821-11-36]

3.1.2
enclosure port
physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

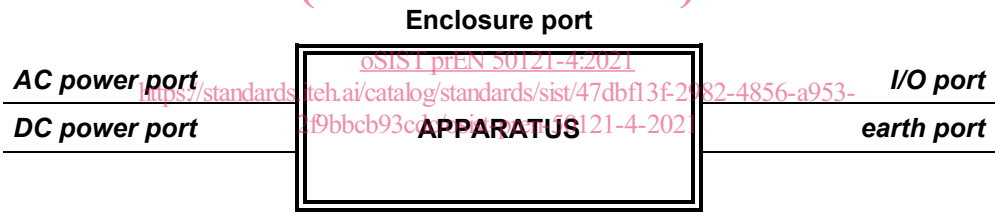

Figure 1 — Main categories of ports

3.1.3
3 m zone
area along the railway line within a distance of 3 m from the centreline of the nearest track at both sides of the track

3.1.4
10 m zone
area along the railway line within a distance of 10 m from the centreline of the nearest track at both sides of the track

3.2 Abbreviations

AC	Alternating current
AM	Amplitude modulation
DC	Direct current
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
I/O	Input / Output
ITU	International Telegraph Union
S&T	Signalling and telecommunication

4 Description of location

The railway environment is characterized as described in EN 50121-1:2017.

5 Emission limits for apparatus

The emission tests and limits for apparatus covered by this standard are given on a port by port basis.

Measurements shall be performed in well-defined and reproducible conditions for each type of disturbance.

The radiated emission limits defined for enclosure port in EN IEC 61000-6-4:2019, Table 3 shall be complied with. The description of the test, the test methods and the test set-up are given in Basic Standards which are referred to in EN IEC 61000-6-4.

The description of the conducted emission tests, the test methods and the test set-up are given in Basic Standards which are referred to in Table 1.

The conducted emission limits shall apply to both AC and DC power ports. Where the apparatus is intended to be used in an environment other than the railway environment, then the emission limits given in the appropriate standards shall apply.

Table 1 — Emission — AC or DC power ports (input and output)

	Port	Test specification		Basic Standard	Test set-up	Applicability note	Remarks
1.1	**AC or DC power ports**	150 kHz to 500 kHz	79 dBµV quasi-peak 66 dBµV average	EN 55016-2-1	EN 55016-2-1	See [a]	
		500 kHz to 30 MHz	73 dBµV quasi-peak 60 dBµV average				

[a] Impulse noise (clicks) which occur less than five times per minute is not considered. For clicks appearing more often than 30 times per minute the limits apply. For clicks appearing between 5 and 30 times per minute, a relaxation of the limits is allowed of 20 log 30/N dB (where N is the number of clicks per minute). Criteria for separated clicks may be found in CISPR 14-1.

6 Immunity

6.1 Performance criteria

A functional description and a definition of the specific performance criteria of the equipment under test (EUT), identifying acceptable degradation from normal performance during or as a consequence of immunity testing, shall be provided in the equipment's test specification and noted in the test report. Acceptable degradation is a deviation of performance of the equipment that a reasonable user accepts, when used as intended.

NOTE 1: Generally, the acceptable degradation of performance can be determined from an understanding of the purpose of the equipment (e.g. from its functional description, documentation or common specifications for that type of equipment).

The EUT's specific performance criteria shall be consistent with the following general criteria for each test as specified in Table 2 to Table 6:

Performance criterion A:

During and after the immunity test, the equipment shall;

— continue to operate and to remain controllable as intended within the identified acceptable degradation from normal performance,

— not unintentionally change its operating state,

— not unintentionally change any critical stored data.

Performance criterion B:

The immunity test shall not result in;

— the mode of operation after the test being different to that at the beginning of the test,

— unintentional change to critical stored data

After the immunity test, the equipment shall operate as intended.

Performance criterion C:

The immunity test may result in loss of function, provided the function is self-recoverable, or can be restored by the operation of the controls by the user. A reboot or re-start operation is allowed. The immunity test shall not result in an unintentional change to critical stored data.

NOTE 2: critical data includes data previously saved by the user.

6.2 Immunity requirements

The requirements specified in this standard apply for:

— vital equipment such as interlocking or command and control;

— 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.

Other apparatus not covered by at least one of these given cases should be in compliance with EN 61000-6-2.

The immunity requirements for apparatus covered by this standard are given on a port by port basis.