

**norm****NEN-EN 50121-3-1**

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

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Voorbeeld  
Preview

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 completsBahnanwendungen -  
Elektromagnetische Verträglichkeit -  
Teil 3-1: Bahnfahrzeuge -  
Zug und gesamtes Fahrzeug

This draft European Standard is submitted to CENELEC members for CENELEC enquiry.  
Deadline for CENELEC: 2014-02-28.

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.

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Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung**CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels**

1	<b>Contents</b>	Page
2	<b>Foreword</b> .....	4
3	<b>Introduction</b> .....	5
4	<b>1 Scope</b> .....	6
5	<b>2 Normative references</b> .....	6
6	<b>3 Terms, definitions and abbreviations</b> .....	7
7	<b>3.1 Terms and definitions</b> .....	7
8	<b>3.2 Abbreviations</b> .....	7
9	<b>4 Applicability</b> .....	8
10	<b>5 Immunity tests and limits</b> .....	8
11	<b>6 Emission tests and limits</b> .....	8
12	<b>6.1 Interference on outside party telecommunication lines</b> .....	9
13	<b>6.1.1 Digital telecommunication lines</b> .....	9
14	<b>6.1.2 Analogue telecommunication lines</b> .....	9
15	<b>6.2 Radiated electromagnetic disturbances</b> .....	9
16	<b>6.2.1 Test site</b> .....	9
17	<b>6.2.2 Test conditions</b> .....	10
18	<b>6.2.3 Emission limits</b> .....	11
19	<b>Annex A (informative) Interference on telecommunication lines</b> .....	13
20	<b>A.1 Harmonics in the traction current</b> .....	13
21	<b>A.1.1 Relationship between currents in railway system and noise on telecommunication lines</b> .....	13
22	<b>A.2 Psophometric current definition</b> .....	14
23	<b>A.3 Limits and test conditions</b> .....	14
24	<b>A.4 Measurement of the psophometric current</b> .....	15
25	<b>A.5 Calculation of the overall psophometric current of a trainset</b> .....	15
26	<b>A.5.1 Current of one tractive unit</b> .....	15
27	<b>Annex B (normative) Radiated electromagnetic disturbances – Test procedure</b> .....	17
28	<b>B.1 Purpose</b> .....	17
29	<b>B.2 Measuring equipment and test method</b> .....	17
30	<b>Annex C (informative) Interference on telecommunication lines – Example of a national rule</b> .....	18
31	<b>C.1 Purpose</b> .....	18
32	<b>C.2 Definition of limits of susceptibility of telecommunication systems</b> .....	21
33	<b>C.3 Modelling and verification of line parameters</b> .....	21
34	<b>C.4 Transfer function validation</b> .....	23
35	<b>C.5 Test configuration for data collection</b> .....	23
36	<b>C.6 Calculations of transfer function from practical results</b> .....	23
37	<b>C.7 Verification of transfer function</b> .....	24
38	<b>Annex D (informative) Emission values for lower frequency range</b> .....	26
39	<b>Annex ZZ (informative) Coverage of Essential Requirements of EU Directives</b> .....	28
40	<b>Bibliography</b> .....	29
41		

42	Figure 1 — Limits for stationary test (QP, 10 m) .....	11
43	Figure 2 — Limits for slow moving test (Peak, 10 m).....	12
44	Figure C.1 — Limits for Rolling Stock Current emissions to protect Digital Telecommunications .....	18
45	Figure C.2 — Weighting, $\alpha(f_i)$ , for current emissions .....	20
46	Figure C.3 — Immunity limits for telecoms systems and train current limits (emissions from RST).....	21
47	Figure C.4 — Comparison of measured VT with VT predicted from transfer function VT/I and traction	
48	current .....	25
49	Figure D.1 — Emission values for stationary rolling stock .....	26
50	Figure D.2 — Emission values for slow moving rolling stock .....	27
51		
52	Table B.1 — Guideline for test.....	17
53	Table C.1 — Limit Line/Frequency Breakpoints .....	19
54	Table C.2 — Weighting function .....	20
55	Table C.3 — LCR measurements .....	22
56	Table C.4 — Measurement results.....	24
57		
58		

Preview  
 01213-1:2013

**prEN 50121-3-1:2013 (E)****59 Foreword**

60 This document [prEN 50121-3-1:2013] has been prepared by CLC/TC 9X "Electrical and electronic  
61 applications for railways".

62 This document is currently submitted to the Enquiry.

63 This document will supersede EN 50121-3-1:2006.

64 prEN 50121-3-1:2013 includes the following significant technical changes with respect to EN 50121-3-1:2006:

- 65 — clarification of scope (Clause 1);
- 66 — set dated normative references (Clause 2);
- 67 — clarification of definition (Clause 3);
- 68 — clarification of applicability (Clause 4);
- 69 — clarification of interference on outside party telecommunication lines (6.2), psophometric current  
70 (Annex A) and adding an example of a national rule (Annex C);
- 71 — the limits of the radiated H-field in the frequency range 9 kHz to 150 kHz have been removed due to the  
72 fact that
  - 73 — there are very few outside world victims (e.g. radio services),
  - 74 — the radiated emission measured at 10 m is not representative to the compatibility with internal railway  
75 apparatus,
  - 76 — the intra EMC in this frequency range is covered in other procedures and standards like EN 50238  
77 series,
  - 78 — there is low reproduceability.

79 EN 50121 "Railway applications – Electromagnetic compatibility" consists of the following parts:

- 80 — *Part 1: General;*
- 81 — *Part 2: Emission of the whole railway system to the outside world;*
- 82 — *Part 3-1: Rolling stock – Train and complete vehicle;*
- 83 — *Part 3-2: Rolling stock – Apparatus;*
- 84 — *Part 4: Emission and immunity of the signalling and telecommunications apparatus;*
- 85 — *Part 5: Emission and immunity of fixed power supply installations and apparatus.*

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

87 This document has been prepared under a mandate given to CENELEC by the European Commission and the  
88 European Free Trade Association, and supports essential requirements of EU Directive(s).

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

## 90 Introduction

91 High powered electronic equipment, together with low power microcontrollers and other electronic devices, is  
92 being installed on trains in great numbers. Electromagnetic compatibility has therefore become a critical issue  
93 for the design of train related apparatus as well as of the train as a whole.

94 This Product Standard for rolling stock sets limits for electromagnetic emission and immunity in order to  
95 ensure a well functioning system within its intended environment.

96 Immunity limits are not given for the complete vehicle. Part 3-2 of this European Standard defines  
97 requirements for the apparatus installed in the rolling stock, since it is impractical to test the complete unit. An  
98 EMC plan includes equipment covered by this European Standard.

Preview

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**prEN 50121-3-1:2013 (E)****99 1 Scope**

100 This European Standard specifies the emission and immunity requirements for all types of rolling stock.  
101 It covers traction stock, hauled stock and trainsets including urban vehicles for use in city streets.

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

104 The scope of this part of the standard ends at the interface of the rolling stock with its respective energy inputs  
105 and outputs. In the case of locomotives, trainsets, trams etc., this is the current collector (pantograph, shoe  
106 gear). In the case of hauled stock, this is the AC or DC auxiliary power connector. However, since the current  
107 collector is part of the traction stock, it is not entirely possible to exclude the effects of this interface with the  
108 power supply line. The slow moving test has been designed to minimise these effects.

109 This part of the standard specifies the emission requirements of the rolling stock to the outside world.

110 There may be additional compatibility requirements within the railway system identified in the EMC plan (e.g.  
111 as specified in EN 50238).

112 Basically, all apparatus to be integrated into a vehicle shall meet the requirements of Part 3-2 of this European  
113 Standard. In exceptional cases, where apparatus meets another EMC Standard, but full compliance with Part  
114 3-2 is not demonstrated, EMC shall be assured by adequate integration measures of the apparatus into the  
115 vehicle system and/or by an appropriate EMC analysis and test which justifies deviating from Part 3-2.

116 The electromagnetic interference concerning the railway system as a whole is dealt with in EN 50121-2.

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

**118 2 Normative references**

119 The following documents, in whole or in part, are normatively referenced in this document and are  
120 indispensable for its application. For dated references, only the edition cited applies. For undated references,  
121 the latest edition of the referenced document (including any amendments) applies.

EN 50121-1	<b>date</b>	Railway applications - Electromagnetic compatibility Part 1: General
EN 50121-2	<b>Date</b>	Railway applications - Electromagnetic compatibility Part 2: Emission of the whole railway system to the outside world
EN 55016-1-1 + A1	03.2010 10.2010	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus (IEC/CISPR 16-1-1:2010 + A1: 2010)
EN 50238	02.2003	Railway applications - Compatibility between rolling stock and train detection systems



## 122 3 Terms, definitions and abbreviations

### 123 3.1 Terms and definitions

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

#### 125 3.1.1

##### 126 **traction stock**

127 electric and diesel locomotive, high speed trainset, elementary fixed combination of traction stock and hauled  
128 stock, electric and diesel multiple unit (no locomotive, distributed traction equipment), Light Railway Vehicle  
129 (LRV) such as tram, trolley bus or any other electrical vehicle for urban mass transit, underground trainset.

#### 130 3.1.2

##### 131 **hauled stock**

132 independent passenger coaches and freight wagons (if they contain electric apparatus such as freezing  
133 equipment) which may be hauled in random combinations by different types of locomotives

#### 134 3.1.3

##### 135 **main line vehicles**

136 vehicles such as high speed trains, suburban trains, freight trains, mainly designed to operate between cities

#### 137 3.1.4

##### 138 **urban vehicles**

139 vehicles such as underground trainsets, trams, LRV (Light Rail Vehicles), trolleybuses, mainly designed to  
140 operate within the boundary of a city

### 141 3.2 Abbreviations

142 For the purposes of this document, the following abbreviations apply.

143	AC	Alternating current
144	AT	Autotransformer
145	CCITT	Comité Consultatif International Téléphonique et Télégraphique
146	DC	Direct current
147	E	electric (field)
148	EMC	Electromagnetic compatibility
149	EMF	Electromagnetic fields
150	EUT	Equipment under test
151	FFT	Fast fourier transform
152	H	magnetic (field)
153	IGBT	insulated-gate bipolar transistor
154	ISDN	Integrated Services Digital Network
155	LRV	Light rail vehicle
156	MSC	Mutual screening conductor

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