BS EN 50121-1:2015

BSI Standards Publication

Railway applications — Electromagnetic compatibility

Part 1: General

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National foreword

This British Standard is the UK implementation of EN 50121-1:2015. It supersedes BS EN 50121-1:2006 which is withdrawn.

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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Foreword

This document (EN 50121-1:2015) 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) 2016-01-05
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2018-01-05

This document supersedes EN 50121-1:2006.

EN 50121-1:2015 includes the following significant technical changes with respect to EN 50121-1:2006:

- deleting of references to 91/440/EEC and EN 50238 (Clause 4).

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

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Introduction

The railway system EMC set of product-specific European Standards is intended, in the main, to permit compliance with the EMC Directive, but also to provide a means of prescribing compatibility between internal parts of the railway system. It consists of five parts described at the end of this introduction.

The set of standards provides both a framework for managing the EMC for railway systems and also specifies the limits for the electromagnetic (EM) emission of the railway system as a whole to the outside world and for the EM emission and immunity for equipment operating within the railway system. The latter is intended to be compatible with the emission limits set for the railway system as a whole and also provides for establishing confidence in equipment being Fit For Purpose in the Railway environment. There are different stationary emission limits set for trams/trolleybuses and for metro/mainline railway systems. The frequency covered by the standards is in the range from d.c. to 400 GHz. No measurements need to be performed at frequencies where no requirement is specified. The limits for EMC phenomena are set so that the railway system as a whole satisfies the Directive on electromagnetic compatibility with the outside world, and so that EMC is achieved between the various parts of the railway system. Any specific problems in complying with the limits are intended to be addressed by the procedures given in the EMC Directive. Throughout the set of standards, the immunity levels are chosen to ensure a reasonable level of EMC with other apparatus within the local railway environment and with emissions which enter the railway system from the outside world. Limits are also placed on EM emission by railway systems into the outside world.

The compatibility between railway system emissions and their external environment is based upon emission limits from the railway systems being set by considering the results from measurements at the time that the EMC Directive became enforceable. Given that the general compatibility between railway systems and their environment was satisfactory at the time these measurements were made and subsequent experience of applying the limits has confirmed their acceptability, compliance with this Standard has been judged to give satisfactory compatibility. The immunity and emission levels do not of themselves guarantee that the railway system will have satisfactory compliance with its neighbours. In exceptional circumstances, for instance near a “special location” which has unusually high levels of EM interference, the railway system may require additional measures to be taken to ensure proper compatibility. Particular care should be taken when in proximity to equipment not covered by the EMC Directive such as radio transmission equipment, military or medical installations. Attention is particularly drawn to any magnetic imaging equipment in hospitals that may be near to urban transport. In all these cases, compatibility should be achieved with consultation and co-operation between the interested parties.

The immunity and emission levels do not of themselves guarantee that integration of the apparatus within the railway system will necessarily be satisfactory. The standard cannot cover all the possible configurations of apparatus, but the test levels are sufficient to achieve satisfactory EMC in the majority of cases. In exceptional circumstances, for instance near a “special location” which has unusually high levels of EM interference, the system may require additional measures to be taken to ensure proper operation. The resolution of this is a matter for discussion between the equipment supplier and the project manager, infrastructure manager or equivalent.

The railway apparatus is assembled into large systems and installations, such as trains and signalling control centres. Details are given in annex A. It is not, therefore, possible to establish immunity tests and limits for these large assemblies. The immunity levels for the apparatus will normally ensure reliable operation, but it is necessary to prepare an EMC management plan to deal with complex situations or to deal with specific circumstances. For example, the passage of the railway line close to a high power radio transmitter which produces abnormally high field strengths. Special conditions may have to be applied for railway equipment which has to work near such a transmitter and these will be accepted as National Conditions for the specification.

The series of standards EN 50121, *Railway applications - Electromagnetic compatibility*, contains the following parts:

- **Part 1: General:** This part gives a description of the electromagnetic behaviour of a railway system; it specifies the performance criteria for the whole set. A management process to achieve EMC at the interface between the railway infrastructure and trains is referenced.

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