NR/L2/SIG/30097/AppD
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Appendix D, *Non-functional requirements*

Network Rail specification

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1 Introduction

1.1 Background

The concept of Modular Signalling has been adopted and developed within Network Rail to introduce new products and changes in the implementation of signalling projects to bring about significant cost savings.

1.2 Purpose

This specification forms a part of the Modular Signalling Handbook. It defines the non-functional requirements that shall apply to both the selection and deployment of Modular Signalling systems on secondary lines. It defines principal requirements that shall apply and provides guidance to projects on how non-functional requirements can be met and demonstrated.

1.3 Scope

This document covers the following areas of non-functional requirements:

- Safety
- Dependability, Reliability and Availability
- Configuration Management
- Electro-magnetic Compatibility
- Environmental Performance

Ergonomic requirements are covered in Appendix D1.

Maintenance requirements are covered in Appendix E.

1.4 Definitions

Common definitions are contained in the main section of the Handbook.

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2 Safety

2.1 Safety requirements

The following safety requirements shall apply:

The safety of the modular signalling system shall be at least as safe as other comparable computer-based signalling systems approved by Network Rail. **[MSSC 6.1D]**

The system shall meet all relevant safety requirements that are contained in Group and Network Rail standards. **[MSSC 6.2D]**

The interlocking and other safety-critical functions shall conform to the SIL4 safety standard as defined by the Euro-norm standards EN 50126, EN 50128 and EN 50129. **[MSSC 6.3D]**

Safety-related signalling functions, for example the signalling control functions, shall conform to a minimum of the SIL1 standard as defined by the Euro-Norm standards; EN 50126, EN 50128 and EN 50129. **[MSSC 6.4D]**

The hazards and safety risks associated with the design, construction and installation any modular signalling scheme shall be negligible or at least tolerable and reduced to a level as low as reasonable practicable (ALARP). **[MSSC 6.5D]**

No single point of failure shall lead to an unsafe condition. **[MSSC 6.6D]**

Modular Signalling systems not previously approved by Network Rail shall be supported by a System Safety Case that shall be submitted to Network Rail for Acceptance and this safety case shall be supported by an independent safety assessment. **[MSSC 3.1D]**

Suppliers shall continue to follow the safety management and engineering guidance specified in “Engineering Safety Management” (i.e. the Yellow Book) for the development and application of modular signalling systems and schemes. **[MSSC 6.7D]**

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2.2 Guidance

2.2.1 Guidance on the requirements

MSSC 6.1D:

Modular Signalling is concerned with reducing the cost of resignalling but not be at the expense of safety, and hence this requirement is explicitly stated.

MSSC 6.2D:

All approved non-compliances to Network Rail and Railway Group standard are listed in Appendix F of the MS Handbook (although none of these relate to safety requirements).

The premise is that, unless a derogation is listed in the Handbook, suppliers of Modular Signalling systems will continue to need to comply with Network Rail standards and hence any safety requirements written in these standards. This requirement does not impose any additional requirements pertaining to the production of evidence that is above and beyond the requirement to produce a safety case.

MSSC 6.3D & MSSC 6.4D:

Product SIL demonstration for new or novel products or sub-systems will form part of the product acceptance process. Acceptance Requirements should be established and specified through “Professional Head” route.

MSSC 3.1D:

It is expected that evidence of conformance with this requirement is provided on a scheme-by-scheme basis as part of a Specific Application Safety case or equivalent.

MSSC 6.7D:

This requirement is standard for safety-critical systems. However, given that architectural decisions could, in principle, impact upon this requirement, it is explicitly stated.

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