

Ref:	NR/L2/ELP/27325
Issue:	1
Date:	5 March 2016
Compliance date:	3 December 2016

Level 2

Specification

Train Borne Monitoring of Traction Power Contact Systems

Endorsement and Authorisation

Endorsed by:



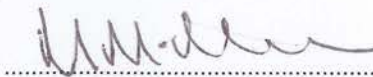
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Published and Issued by Network Rail, 2nd Floor, One Eversholt Street, London, NW1 2DN.

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User information

This Network Rail standard contains colour-coding according to the following Red–Amber–Green classification.

Red requirements – no variations permitted

- Red requirements are to be complied with and achieved at all times.
- Red requirements are presented in a red box.
- Red requirements are monitored for compliance.
- Non-compliances will be investigated and corrective actions enforced.

Amber requirements – variations permitted subject to approved risk analysis and mitigation

- Amber requirements are to be complied with unless an approved variation is in place.
- Amber requirements are presented with an amber sidebar.
- Amber requirements are monitored for compliance.
- Variations can only be approved through the national non-compliance process.
- Non-approved variations will be investigated and corrective actions enforced.

Green guidance – to be used unless alternative solutions are followed

- Guidance should be followed unless an alternative solution produces a better result.
- Guidance is presented with a dotted green sidebar.
- Guidance is not monitored for compliance.
- Alternative solutions should be documented to demonstrate effective control.

Amendment marks

- First document amendments are presented with a single black line to the right of the affected text.
- Second document amendments are presented with a double black line to the right of the affected text.

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Issue record

Issue	Date	Comments
1	March 2016	New Document

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 03 December 2016.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference documentation

Commission Regulation (EU) No 1301/2014	Technical specifications for interoperability relating to the 'energy' subsystem of the rail system in the Union
Commission Regulation (EU) No 1302/2014	Technical specification for interoperability relating to the rolling stock subsystem — 'Locomotives and passenger rolling stock' of the trans-European conventional rail system
GL/RT 1210	AC Energy Subsystem and Interfaces to Rolling Stock Subsystem
BS EN 50317	Railway applications. Current collection systems. Requirements for and validation of measurements of the dynamic interaction between pantograph and overhead contact line
BS EN 50367	Railway applications. Current collection systems. Technical criteria for the interaction between pantograph and overhead line (to achieve free access)
NR/L2/RSE/100	Network Rail Acceptance Panel processes
NR/L2/ELP/21087	Risk Based Maintenance for Overhead Line Assets
NR/L2/ELP/21088	General Maintenance Parameters for Overhead Line Electrification Equipment
NR/L3/ELP/27237	Overhead Line Work Instructions
NR/L3/ELP/27250	Conductor rail equipment work instructions

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1 Purpose

This standard specifies the requirements for the train borne monitoring of Traction Power Contact Systems. The purpose is to standardise monitoring provisions and drive improvements in safety, economy and performance.

2 Scope

This standard is applicable to Entry into Service commissioning of Contact Systems, verification of an Interoperability Constituent and routine maintenance monitoring of Traction Power Contact Systems.

The standard covers the following aspects of train borne monitoring:

- Parameters to be captured;
- Monitoring system validation and data verification;
- Data output format from the train;
- Data processing requirements and performance;
- Exceedance management.

The standard applies to Route Asset Management, Asset Information Services (or any contractors collecting or processing traction power contact system data), E&P Maintenance and Infrastructure Projects.

The scope of this standard excludes routine cab patrol inspection, as specified in NR/L3/ELP/27237 module NR/OLE B07.

3 Roles and responsibilities

The Route Asset Manager (E&P) is accountable for securing the provision of routine maintenance train borne monitoring as specified in this standard.

The Maintenance Delivery Unit E&PMEs are responsible for reviewing and actioning the output.

The Project Manager is accountable for securing the provision of train borne monitoring to support Entry into Service commissioning of Contact Systems and verification of an Interoperable Constituent.

The Head of Supply Chain within Asset Information Services is accountable for declaring an E&P train borne monitoring capability.

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4 Definitions, abbreviations and acronyms

ADP	Asset Data Processing
CRMS	Conductor Rail Measurement System
CSV	.CSV file is a comma separated values file, which allows data to be saved in a table structured format.
Discrete feature	Features in the contact system, i.e. neutral sections, section insulators, overbridge, level crossings for Overhead Contact Systems.
DPE	Designated Project Engineer
Ellipse	Network Rail work and asset management system used to manage work
ELR	Engineers Line Reference
E&P	Electrification and Plant
E&PME	Electrification and Plant Maintenance Engineer
Fm	Mean contact force
FMS	Fault Management System
GPS	Global Positioning System
Interoperable pantograph	A pantograph which meets the dynamic performance characteristics in the LOC & PAS TSI. The pantograph head can have insulated or conductive horns (BS EN 50367:2012 Figures A.6 and B.6.)
IP	Infrastructure Projects
LADS	Linear Asset Decision Support
LHS	Left hand side
OLE Ex	System used for storage of OLE train borne monitoring data.
RHS	Right hand side
Sampling rate	The sample rates included in this standard are rates of data capture.
SPOT	Spatial Position on Track – Engineers Line Reference, Mileage and Track ID.
Train Borne Monitoring	TBM - The process of collecting contact system data using dedicated or in service trains or other vehicles.
TSI	Technical Specification for Interoperability
V	Train speed in kph
Validation	A process to confirm the accuracy and repeatability of the data output from a train borne measurement system and / or processing software.

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Verification	The process of reviewing each data set in order to provide assurances the data is correct and representative.
σ	Standard deviation

5 Accepted systems of measurement

Overhead Contact System and Conductor Rail measurement systems shall be accepted for use on Network Rail infrastructure via the Product Acceptance process, NR/L2/RSE/100.

6 Output Parameters

The parameters detailed in Section 6.1 and 6.2 are the minimum requirements.

The measures of exceedance tabulated are reporting criteria and not compliance limits for the Contact Systems. The data output from the train requires review by the E&PME or DPE against the system compliance limits detailed in NR/L2/ELP/21088 and NR/L3/ELP/27250.

The output parameters can be captured by different vehicles.

6.1 Overhead Contact System

6.1.1 Supporting information

For routine maintenance train borne monitoring, the required supporting data is listed in Table 1.

Parameter	Unit of measure	Accuracy of measurement	Sampling rate
SPOT	-	+/- 1m	Event
GPS location	-	-	-
Structure number reference	-	-	All support structures
Span lengths between adjacent registrations	M	+/- 1m	Event
Discrete feature marker (<i>Asset features, e.g. Neutral Sections, & Railway features, e.g. level crossings and station platforms</i>)	M	+/- 1m	Event
Maximum line speed	mph and kph	-	As required
Vehicle speed	mph and kph	+/- 5%	<0.2m
Track cant	mm	+/- 5mm	Every support and registration
Ambient temperature	deg C	+/- 1 deg C	Per km
Contact wire size and type	-	-	Per span