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Network Rail ETCS System Compatibility Checks GB ESC/RSC Technical Document

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Issue record

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0.2	13/01/20	Updated to peer review workshop and extremity details as per ORR authorisation letters for Thameslink and Heathrow branch
1.0	14/01/20	First formal issue
1.1	15/01/20	Revised formal issue incorporating minor changes to section 2.1
1.2	25/01/21	Updated draft for internal review to reflect: a) The evolution of Network Rail's approach to compatibility demonstration, b) The ESC Type identifiers allocated by the Agency, c) The UK's departure from the European Union.
1.3	09/03/21	Updated draft for internal review reflecting meeting held on 17/02/21
1.4	25/10/23	Updated to include NCL trackside area
1.5	24/11/23	Update to Modular format
1.6	28/04/26	Updated to include: a) Clarity on applicability of NR5 b) NR7 for East Coast South trackside area c) Bringing document in line with NTSN Issue 2, including renaming of 'Definition Document' to 'Technical Document' d) RSC Checks in Table 3

Disclaimer

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References

The following documents are referenced (reference should be made to the latest version unless a specific version is stated below):

- [R1] Commission Implementing Regulation (EU) 2023/1695 on the technical specification for the interoperability relating to the control-command and signalling subsystems of the rail system in the European Union and repealing Regulation (EU) 2016/919. 10th August 2023
- [R2] Guide for the Application of the CCS TSI, GUI/CCS TSI/2019, version 7.3
- [R3] National Technical Specification Notice Control, Command and Signalling (CCS), Issue 2, 2nd May 2025.
- [R4] Not used.
- [R5] ESC/RSC Technical Document, TD/011REC1028
- [R6] Network Rail Long-Term Deployment Plan Appendix 160222-NWR-REP-ESG-000002

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1 PURPOSE

This document defines the European Train Control System (ETCS) System Compatibility (ESC) and Radio System Compatibility (RSC) checks applicable to infrastructure for which Network Rail Infrastructure Limited (NR) is the Infrastructure Manager within the United Kingdom.

2 SCOPE

This document defines the number and geographical scope of the ESC/RSC Types on NR infrastructure.

3 ABBREVIATIONS AND DEFINITIONS

Abbreviations are explained in full on first use within the document or module.

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4 INTRODUCTION

This documentation suite conforms to section 4.2.17 of the GB National Technical Specification Notice Command, Control and Signalling (NTSN CCS) [R3] and can be identified as the GB ESC/RSC Technical Document. Compliance with ESC checks in GB is verified by an Approved Body (ApBo), which has a role equivalent to a Notified Body (NoBo) in European legislation.

The ESC types have been defined to enable checks to be undertaken by suppliers of systems or by those putting systems into use. There are three broad groups of ESC check types that may be defined:

- **Generic** – to enable suppliers to check compatibility with systems that meet published requirements, i.e. TSI, NTSN and SR&I suite.
This level of check is the minimum to support applications for authorisation to place into service.
This level of check is applicable to ETCS fitted trains that intend to run in L-NTC in areas that are not fitted with ETCS infrastructure.
- **Supplier Specific** – to enable suppliers to check compatibility with systems that meet supplier generic products at current (latest) configuration.
- **Site Specific** – to enable entities to check compatibility with known systems applied at a site or area.

Undertaking the Generic check and a relevant Site-Specific check is the minimum to justify putting an ETCS subsystem into operational use for the defined area. Contact Details – the 'first point of contact' for requesting further information regarding each ESC/RSC check is by email to ESC@networkrail.co.uk

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5 DEFINED DATA OF ESC TYPES AND AREAS ON NETWORK RAIL INFRASTRUCTURE

Table 1 sets out the current definition of ESC Types. The ESC data categories in Table 1 are defined as follows:

1. **NR ESC Type** – this records the ESC Type by defined by NR.
2. **NR ESC Applicable Area** – this records the unique identifier which has been assigned for the areas where ESC Type are applicable for NR managed infrastructure.
3. **Colloquial Name** – this identifies the ‘natural language’ name by which the ESC Type is colloquially known, as used in the title of the relevant document part.
4. **Document Module** – this identifies which part of this document suite lists the ESC checks applicable to the ESC Type.
5. **Document Issue** - this identifies the current issue number of the document module
6. **Status** – this identifies whether the ESC Type is defined as:
 - 6.1. Valid
 - 6.2. “Reserved” meaning that the ESC/RSC identifier has been assigned but the content of the ESC/RSC is still under revision.
 - 6.3. “Removed” meaning that this type cannot be used anymore.
 - 6.4. “For information” meaning that the competent authority/delegate did not perform any assessment/verification of the checks
7. **Date Applicable** – this identifies when the ESC checks associated with this ESC Type become applicable. For those ESC Types where the checks are applicable from the date of submission to the Agency this column will state ‘Immediately’.
8. **ETCS Trackside Baseline** – this identifies the current ETCS trackside sub-system baseline for the ETCS application(s) associated with the ESC Type (where known).
9. **ETCS Trackside Supplier** – this identifies the ETCS trackside supplier for the ETCS application(s) associated with the ESC Type (where known).

Table 2 defines the areas where the ESC types are applicable on Network Rail infrastructure. The ESC data categories in Table 2 are defined as follows:

10. **ELR** – this identifies the Engineer’s Line References (ELRs) which are contained within the geographical scope of the ESC Type. Note: Each unique route section on Network Rail’s infrastructure is assigned an ELR identity. Each ESC Type may encompass elements of multiple ELRs.
11. **Whole or Part ELR** – this identifies whether the ESC Type contains the whole geographical extent of the identified ELR or only part of it.
12. **Lines** – this identifies the specific line names/identities within the ELR which are within the scope of the ESC Type. Where multiple lines within an ELR are in the scope of the ESC Type but between differing geographical limits, separate rows are provided in the table. See also item 13 below. Where all lines within the ELR are in the scope of the ESC Type this is indicated by the entry ‘All Lines’.
13. **Extremity 1 on ELR and Extremity 2 on ELR** – these identify the extremity locations on the ELR between which the ESC Type applies. The primary definition of the extremity locations is by distance from the ELR datum point (expressed in miles and chains). The

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names of stations and junctions are provided as supplementary information in those cases where the extremity is at, or in close proximity to, a station or junction.

14. **Rationale** – this identifies why this specific ESC Type has been defined.
15. **Gradients** – Gradients of over 1:50 identified in accordance with TRATIM Gradients document found on the ESC/RSC Website.

Table 1: ESC Types on Network Rail infrastructure

NR ESC Type	NR ESC Applicable Area	Colloquial Name	NEPT/ERTMS/ESC/0001 Document Module	Document Issue	Status	Date Applicable	ETCS Trackside Baseline	ETCS Trackside Supplier	Rationale
ESC-UK-01	NR1	Cambrian	01	1.4	Valid	Immediately	Baseline 2, set of specifications #1, SV 1.0	Hitachi STS (formerly Ansaldo STS)	This ESC Type is required to reflect the specific configuration of the Cambrian route which includes features distinct from other areas.
ESC-UK-02	NR2	Watton-at-Stone	02	N/A	Removed	N/A	Not applicable when test track dormant	Not applicable when test track dormant	This ESC Type is required to reflect the specific constraints which need to be met by ETCS fitted trains to allow them to operate in normal service in Level NTC through the Watton-At-Stone test track (when the test track is dormant) without being adversely impacted by interaction with the test track's ETCS trackside sub-system.
ESC-UK-03	NR3	Thameslink	03	2.2	Valid	Immediately	Baseline 2, set of specifications #1, SV 1.0	Siemens	This ESC Type is required to reflect the specific configuration of the Thameslink route which includes features distinct from other areas.
ESC-UK-04	NR4	Great Western 0-12	04	4.1	Valid	Immediately	Baseline 3, set of specifications #2, SV 2.0	Alstom	This ESC Type is required to reflect the specific configuration of the Great Western 0-12 route which includes features distinct from other areas. Note: Heathrow Airports Limited (HAL) is the Infrastructure Manager for part of ELR HLL (that part with mileages greater than 12m 30ch); however, the whole ELR has been included in this NR ESC Type as the ETCS trackside sub-system on HAL infrastructure is consistent with the rest of this ESC Type.
ESC-UK-05	NR5	GB Generic	05	3.0	Valid	1 st January 2021	Baseline 3, set of specifications #3, SV 2.1	All	To enable the operation of ETCS fitted trains on baseline NR infrastructure. This module will also be applicable to ETCS fitted trains that intend to run in L-NTC in areas that are not fitted with ETCS infrastructure. *Note: Additional checks maybe required for specific areas of use.
ESC-UK-06	NR6	NCL	06	2.0	Valid	Immediately	Baseline 2, set of specifications #1, SV 1.0	Siemens	This ESC Type is required to reflect the specific configuration of the Northern City Line route which includes features distinct from other areas.
ESC-UK-07	NR7	East Coast South	07	0.7	Valid. It is to be noted that this is an interim checklist until System assurance for the trackside subsystem is complete	Immediately	Baseline 3, set of specifications #3, SV 2.1	Siemens	This ESC Type is required for the Welwyn to Hitchin ETCS project, with a scope of being expanded to operations on ECML South.

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Table 2: Definition of ESC Areas on Network Rail infrastructure

Applicable Area	Colloquial Name	ELR	Whole or Part ELR	Lines	Extremity 1 on ELR		Extremity 2 on ELR		Gradients >1:50 (at given Mileages)
					Operating Point	Mileage	Operating Point	Mileage	
NR1	Cambrian	SHL	Part	All Lines	(Sutton Bridge Junction)	0m 68ch	(English Bridge Junction)	0m 28ch	
		SBA1	Whole	All Lines	(Sutton Bridge Junction)	0m 0ch	(Boundary with SBA2)	16m 19ch	
		SBA2	Whole	All Lines	(Boundary with SBA1)	31m 20ch	(Aberystwyth)	95m 60ch	
		DJP	Whole	All Lines	(Dovey Junction)	78m 60ch	132m 70ch (Pwllheli)	132m 70ch	1:50 at GW734: (117m 10ch -118m 4ch (-50)) (120m 13ch -121m 6ch (50))
NR2	Watton-at-Stone	HDB	Part	Down Hertford		21m 60ch	25m 60ch	25m 60ch	
NR3	Thameslink	MCL	Part	Up Moorgate		2m 71ch	(Boundary with FTL)	0m 58ch	
				Down Moorgate		2m 69ch	(Boundary with FTL)	0m 58ch	
		CBI	Part	Up Canal		0m 30ch	(Canal Junction)	0m 0ch	
				Down Canal		0m 31ch	(Canal Junction)	0m 0ch	
		FTL	Whole	All Lines	(Boundary with MCL)	0m 0ch	(Boundary with HHH)	0m 43.5ch	1:50 at Farringdon LN3216: (0m 0ch - 0m 1ch)
		HHH	Part	Up Holborn Fast	(Boundary with FTL)	0m 23ch		1m 17ch	
				Down Holborn Fast	(Boundary with FTL)	0m 23ch		0m 72ch	
				Up Holborn Slow	(Boundary with FTL)	0m 23ch		1m 17ch	
				Down Holborn Slow	(Boundary with FTL)	0m 23ch		0m 70ch	
		BMJ	Whole	Up Snow Hill	(Blackfriars)	0m 60ch	(London Bridge)	1m 18ch	
				Down Snow Hill	(Blackfriars)	0m 60ch		0m 67ch	
				Down Snow Hill Spur	(Blackfriars)	0m 60ch	(London Bridge)	1m 18ch	
		XTD	Part	Up Sussex Fast / Line 5 Up	(London Bridge)	1m 35ch		2m 72ch	
				Line 4 Down	(London Bridge)	1m 35ch		2m 38ch	
NR4	Great Western 0-12	MLN1	Part	All Lines	(Paddington)	0m 0ch	(West Drayton)		
		WEL1	Part	All Lines	(West Ealing)	6m 56ch		7m 30ch	
		HAN	Whole	All Lines	(Hanwell Junction)	0m 0ch	(Drayton Green Junction)	0m 36ch	
		HLL	Whole	All Lines	(Airport Junction)	11m 14ch	(Heathrow Terminal 4)	16m 39ch	1:50 at GW180 (12m 1ch – 12m 2ch)
				All Lines	(Heathrow Central)	14m 57ch	(Heathrow Terminal 5)	16m 12ch	
NR5	GB Generic	This covers all ELR sections and lines on NR managed infrastructure.							
NR6	NCL	MEB1	Part	Up Moorgate	(Moorgate Buffer Stop)	3m 01ch	(Moorgate Buffer Stop)		1:64 at Essex Road – Highbury (1m 59ch – 2m 21ch) 1:64 between Highbury and Drayton Park Station (2m 21ch – 2m 56ch)
				Down Moorgate		0m 0ch			
NR7	East Coast South	ECM1	Part	Up Fast	(Welwyn Feeder Station)	19m 40ch	(Arlesey North)	37m 55ch	
				Up Slow	(Welwyn Feeder Station)	19m 40ch	(Arlesey North)	37m 55ch	
				Down Fast	(Welwyn Feeder Station)	19m 20ch	(Arlesey South)	35m 18ch	
				Down Slow	(Welwyn Feeder Station)	19m 20ch	(Arlesey South)	35m 18ch	
		HDB	Part	Up Hertford	(Langley Junction)	27m 69ch	(Boundary with ECM1)	28m 07ch	
				Down Hertford (Up Direction)	(Langley Junction)	27m 70ch	(Boundary with ECM1) and (Stevenage Buffer Stop)	28m 07ch and Stevenage Buffer Stop	
				Down Hertford (Down Direction)	(Langley Junction)	27m 70ch	(Boundary with ECM1) and (Stevenage Buffer Stop)	28m 07ch and Stevenage Buffer Stop	

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Applicable Area	Colloquial Name	ELR	Whole or Part ELR	Lines	Extremity 1 on ELR		Extremity 2 on ELR		Gradients >1:50 (at given Mileages)
					Operating Point	Mileage	Operating Point	Mileage	
NR7	East Coast South	SBR	Part	Up Royston	(Cambridge Junction)	32m 15ch	(Cadwell)	33m 69ch	
				Down Royston	(Cambridge Junction)	32m 15ch	(Cadwell)	33m 43ch	
		DCF	Whole	Royston Flyover	(Boundary with SBR)	32m 33ch	(Boundary with SBR)	33m 30ch	

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6 RSC CHECKS

Table 3: RSC Types on Network Rail infrastructure

NR RSC Type	NR RSC Applicable Area	Colloquial Name	Document Number	Document Issue	Status	Date Applicable
RSC-UK-01-V	NR5	Generic	NR/TEL/RSC1	1.01	For Information	Immediately