EUROPEAN UNION AGENCY FOR RAILWAYS

Guide for the application of the CCS TSI 2023/1695 amended by Regulation (EU) 2026/693

In accordance with Article 19(3) of Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016

Released by European Union Agency for Railways

This guide does not contain any legally binding advice. It may serve as a clarification tool without however dictating in any manner compulsory procedures to be followed and without establishing any legally binding practice. The guide provides explanations on the provisions contained in the TSIs and should be helpful for understanding the approaches and rules described therein. However, it does not substitute for them.
The guide is publicly available, and it will be regularly updated to reflect progress with European standards and changes to the TSIs.
The reader should refer to the website of the European Union Agency for railways for information about its latest available edition.

Document History

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0.4	All	New edition after CCS TSI recast
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Version 1.1	2.7.2.9 and 3	Sections referring to ATO, FRMCS, and informative set of specifications
Version 2.0	General	General review after comments from the sector
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1. SCOPE OF THIS GUIDE

1.1. Content of the guide

This document is an annex to the "Guide for the Application of TSIs". It provides information on the application of Technical Specification for Interoperability for "Control-Command and Signalling" set out as Annex I and II to the Commission Implementing Regulation (EU) 2023/1695 [8].
This document needs to be read and used only in conjunction with the "Control-Command and Signalling" TSI. It is intended to facilitate its application, but it does not substitute for it. The general part of the "Guide for the Application of TSIs" [9] has also to be considered.
Guidance is of voluntary application. It does not mandate any requirement in addition to those set out in the "Control-Command and Signalling" TSI.
Chapter 2 provides clarifications for certain concepts and requirements of the Control-Command and Signalling TSI. To facilitate the use, this chapter has the same structure as the TSI: each section of chapter 2 refers to a point of the TSI.
Guidance is not provided where the "Control-Command and Signalling" TSI does not requires further explanations.
Chapter 3 lists the specifications and standards supporting the assessment of compliance with the TSI requirements. The scope of each standard is clarified through the reference to the corresponding basic parameter.

NOTE: *The* ***update*** *of this CCS TSI Application Guide to the Regulation (EU) 2023/1695* ***will be done in several steps****. Points without content should be completed in future updates of the document and guidance is not yet ready.*

1.2. Document reference/s

Table 1: Document reference/s

DOCUMENT REFERENCE	*TITLE* *Note: These documents shall include all their amendments even though they are not explicitly indicated in this table*	*LAST ISSUE*
[1] (EU) 2016/796	Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004	*L 138, 26.5.2016, p. 1-43*
[2] (EU) 2016/797	Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system within the European Union	*L 138, 26.5.2016, p. 44-101*
[3] (EU) 2016/798	Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety	*L 138, 26.5.2016, p. 102-149*
[4] 2012/34/EU	Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 establishing a single European railway area	*L 343, 14.12.2012, p. 32-77*

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DOCUMENT REFERENCE	*TITLE* *Note: These documents shall include all their amendments even though they are not explicitly indicated in this table*	*LAST ISSUE*
[5] 2010/713/EU	Commission Decision 2010/713/EU of 9 November 2010 on modules for the procedures for assessment of conformity, suitability for use and EC verification to be used in the technical specifications for interoperability adopted under Directive 2008/57/EC of the European Parliament and of the Council	*L 319, 4.12.2010, p. 1-52*
[6] 768/2008/EC	Decision 768/2008/EC of the European Parliament and of the Council of 9 July 2008 on a common framework for the marketing of products, and repealing Council Decision 93/465/EEC	*L 218, 13.8.2008, p. 82-128*
[7] (EC)765/2008	Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93	*L 218, 13.8.2008, p. 30-47*
[8] (EU) 2023/1695	Commission Implementing Regulation (EU) 2023/1695 of 10 August 2023 on the technical specification for interoperability relating to the control-command and signalling subsystems of the rail system in the European Union and repealing Regulation (EU) 2016/919	*L 222, 8.9.2023, p. 380-560*
[9] GUI/TSI/2023	Guide for the Application of TSIs (link) https://www.era.europa.eu/system/files/2023-12/TSI_General_Guide.pdf?t=1728291046	*v1.0 20/12/2023*
[10] (EU) 2019/776	COMMISSION IMPLEMENTING REGULATION (EU) 2019/776 of 16 May 2019 amending Commission Regulations (EU) No 321/2013, (EU) No 1299/2014, (EU) No 1301/2014, (EU) No 1302/2014, (EU) No 1303/2014 and (EU) 2016/919 and Commission Implementing Decision 2011/665/EU as regards the alignment with Directive (EU) 2016/797 of the European Parliament and of the Council and the implementation of specific objectives set out in Commission Delegated Decision (EU) 2017/1474	*L 139-I 27.5.2019 p.108*
[11] (EU) 402/2013	Commission Implementing Regulation (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment and repealing Regulation (EC) No 352/2009 Commission Implementing Regulation (EU) 2015/1136 of 13 July 2015 amending Implementing Regulation (EU) No 402/2013 on the common safety method for risk evaluation and assessment	*L 121, 3.5.2013, p. 8–25* *L 185, 14.7.2015, p. 6–10*

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DOCUMENT REFERENCE	*TITLE* *Note: These documents shall include all their amendments even though they are not explicitly indicated in this table*	*LAST ISSUE*
[12] ERA/ERTMS/033281	Index 77-ERA/ERTMS/033281 Interfaces between CCS trackside	*Version 5.0*
[13] (EU) 2019/773	Commission Implementing Regulation (EU) 2019/773 of 16 May 2019 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system within the European Union and repealing Decision 2012/757/EU (Text with EEA relevance) Amendment by: COMMISSION IMPLEMENTING REGULATION (EU) 2020/778 of 12 June 2020 COMMISSION IMPLEMENTING REGULATION (EU) 2021/2238 of 15 December 2021 COMMISSION IMPLEMENTING REGULATION (EU) 2023/1693 of 10 August 2023	*OJ L 139I 27.5.219, p. 5* *L 188 4 15.6.2020* *L 450 57 16.12.2021* *L 222 1 8.9.2023*
[14] (EU) 1302/2014	COMMISSION REGULATION (EU) No 1302/2014 of 18 November 2014 concerning a technical specification for interoperability relating to the 'rolling stock — locomotives and passenger rolling stock' subsystem of the rail system in the European Union. Amendment by: - Commission Regulation (EU) 2016/919 of 27 May 2016 L 158 1 15.6.2016 - Commission Implementing Regulation (EU) 2018/868 of 13 June 2018 L 149 16 14.6.2018 - Commission Implementing Regulation (EU) 2019/776 of 16 May 2019 L 139I 108 27.5.2019 - Commission Implementing Regulation (EU) 2020/387 of 9 March 2020 L 73 6 10.3.2020 - Commission Implementing Regulation (EU) 2023/1694 of 10 August 2023	*L 356 12.12.2014, p. 228)* *L 158 1 15.6.2016* *L 149 16 14.6.2018* *L 139I 108 27.5.2019* *L 73 6 10.3.2020* *L 222 88 8.9.2023* *L 675 1 7.4.2025*

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DOCUMENT REFERENCE	*TITLE* *Note: These documents shall include all their amendments even though they are not explicitly indicated in this table*	*LAST ISSUE*
[15] 2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast). Amended by: - Regulation (EU) 2018/1139 of 4 July 2018	*L 96 29.3.2014* *p 79*
[16] 2014/53/EU	Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to making available on the market of radio equipment and repealing Directive 1995/5/EC Amended by: - Regulation (EU) 2018/113 of the European Parliament ad of the Council of 4 July 2018 - Directive (EU) 2022/2380 of the European Parliament and of the Council of 23 November 2022 - Commission Delegated Regulation (EU) 2023/1717 of 27 June 2023	*L 153 22.5.2014 p 62*
[17] PRO_CCM_002	Procedure Change Control Management (link) https://www.era.europa.eu/sites/default/files/activities/docs/ertms_ccm_procedure_chapter2_en.pdf	*2.1*
[18] (EU) 1299/2014	COMMISSION REGULATION (EU) No 1299/2014 of 18 November 2014 on the technical specifications for interoperability relating to the 'infrastructure' subsystem of the rail system in the European Union. Amendment by: - COMMISSION IMPLEMENTING REGULATION (EU) 2019/776 of 16 May 2019 - COMMISSION IMPLEMENTING REGULATION (EU) 2023/1694 of 10 August 2023	*OJ L 356 12.12.2014, p. 1* *L 139I 108 27.5.2019* *L 222 88 8.9.2023*
[19] ECC/DC(02)O5 as amended 8 March 2013	ECC Decision of 5 July 2002 on the designation and availability of frequency bands for railway purposes in the 876 – 880 and 921 – 925 MHz bands (amended in 26 June 2009, 9 December 2011 and 8 March 2013)	-

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DOCUMENT REFERENCE	*TITLE* *Note: These documents shall include all their amendments even though they are not explicitly indicated in this table*	*LAST ISSUE*
[20] Generic ETCS driver's Handbook	Generic ETCS driver's Handbook (link) https://www.era.europa.eu/sites/default/files/activities/docs/generic_etcs_drivers_handbook_en.docx	-
[21] ERA_ERTMS_040001	Assignment of values to ETCS variables (link) https://www.era.europa.eu/sites/default/files/activities/docs/ertms_040001_etcs_variables_values_en.pdf	*1.28 or upper version*
[22] (EU) 1303/2014	Commission Regulation (EU) No 1303/2014 of 18 November 2014 concerning the technical specification for interoperability relating to 'safety in railway tunnels' of the rail system of the European Union Amendment by: COMMISSION REGULATION (EU) 2016/912 of 9 June 2016 COMMISSION IMPLEMENTING REGULATION (EU) 2019/776 of 16 May 2019	*L 356, 12.12.2014, p. 394* *L 153 28 10.6.2016* *L 139I 108 27.5.2 19*
[23] (EU) 2019/773	COMMISSION IMPLEMENTING REGULATION (EU) 2019/773 of 16 May 2019 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system within the European Union and repealing Decision 2012/757/EU Amended by: - Commission Implementing Regulation (EU) 2020/778 of 12 June 2020 - Commission Implementing Regulation (EU) 2021/2238 of 15 December 2021 - Commission Implementing Regulation (EU) 2023/1693 of 10 August 2023 - Commission Implementing Regulation (EU) 2026/693 of 19 March 2026	*L 139I , 27.5.2019, p. 5–88*

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1.3. Definitions and abbreviations

Table 2: Definitions

TERM	*DEFINITION/ SOURCE*
AD-mode	Automatic Driving mode, as described in 4.4.16 of SS-026 V.4.0.0
Basic parameter	Any regulatory, technical or operational condition which is critical to interoperability and is specified in the relevant TSIs (Article 2(12) of Directive (EU) 2016/797)
Conformity assessment	Process demonstrating whether specified requirements relating to a product, process, service, subsystem, person or body have been fulfilled (Article 2(41) of Directive (EU) 2016/797)
Conformity assessment body	Body that has been notified or designated to be responsible for conformity assessment activities, including calibration, testing, certification and inspection; a conformity assessment body is classified as a 'notified body' following notification by a Member State; a conformity assessment body is classified as a 'designated body' following designation by a Member State (Article 2(42) of Directive (EU) 2016/797)
Contracting entity	Public or private entity which orders the design and/or construction or the renewal or upgrading of a subsystem (Article 2(20) of Directive (EU) 2016/797)
European Register of Authorised Types of Vehicles (ERATV)	Register of types of vehicles authorised by the Member States for placing in service. It contains the technical characteristics of vehicles' types as defined in the relevant TSIs, the manufacturer's name, dates, references and Member States granting authorisations, restrictions and withdrawals (Article 48 of Directive (EU) 2016/797)
Harmonised standard	European standard adopted on the basis of a request made by the Commission for the application of Union harmonising legislation (Article 2(1)(c) of Regulation (EU) No 1025/2012)
Infrastructure Manager	Anybody or firm responsible for the operation, maintenance and renewal of railway infrastructure on a network, as well as responsible for participating in its development as determined by the Member State within the framework of its general policy on development and financing of infrastructure (Article 3(2) of Directive 2012/34/EU)
Intend to operate	There is a realistic and agreed plan between RU/IM to operate in a certain part of the network
Non-application of a TSI	Certain circumstance, by which projects can be exempted from having to comply with all or part of a TSI or TSIs (Article 7 of Directive (EU) 2016/797)
Normal service	As defined in SS-104 clause 5.1.1.5: *"The expression `train running a normal service' shall be understood as `train which is not penalised because of a reduction of performance or safety"*.
Open point	Certain technical aspect corresponding to the essential requirements, which cannot be explicitly covered in a TSI (Article 4(6) of Directive (EU) 2016/797)

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Table 2: Definitions

TERM	*DEFINITION/ SOURCE*
Placing in service	All the operations by which a subsystem is put into its operational service (Article 2(19) of Directive (EU) 2016/797)
Placing on the market	First making available on the Union's market of an interoperability constituent, subsystem or vehicle ready to function in its design operating state (Article 2(35) of Directive (EU) 2016/797)
Project at an advanced stage of development	Any project the planning or construction stage of which has reached a point where a change in the technical specifications may compromise the viability of the project as planned (Article 2(23) of Directive (EU) 2016/797)
Railway Undertaking	Railway undertaking as defined in point (1) of Article 3 of Directive 2012/34/EU, and any other public or private undertaking, the activity of which is to provide transport of goods and/or passengers by rail on the basis that the undertaking is to ensure traction; this also includes undertakings which provide traction only (Article 2(45) of Directive (EU) 2016/797)
Register of infrastructure (RINF)	Register of infrastructure indicates the main features of fixed installations, covered by the subsystems: infrastructure, energy and parts of control-command and signalling. It publishes performance and technical characteristics mainly related to interfaces with rolling stock and operation (Article 49 of Directive (EU) 2016/797)
Renewal	Any major substitution work on a subsystem or part of it, which does not change the overall performance of the subsystem. (Article 2(15) of Directive (EU) 2016/797)
Specific case	Any part of the rail system which needs special provisions in the TSIs, either permanent, because of geographical, topographical or urban environment constraints or those affecting compatibility with the existing system, in particular railway lines and networks isolated from the rest of the Union, the loading gauge, the track gauge or space between the tracks and vehicles strictly intended for local, regional or historical use, as well as vehicles originating from or destined for third countries (Article 2(13) of Directive (EU) 2016/797)
Substitution in the framework of maintenance	Any replacement of components by parts of identical function and performance in the framework of preventive or corrective maintenance (Article 2(17) of Directive (EU) 2016/797)
Upgrading	Any major modification work on a subsystem or part of it which results in a change in the technical file accompanying the 'EC' declaration of verification, if that technical file exists, and which improves the overall performance of the subsystem (Article 2(14) of Directive (EU) 2016/797)

Table 3: Abbreviations

ABBREVIATION	*FULL TEXT*
ATO	Automatic Train Operation
BX	Baseline X

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ABBREVIATION	*FULL TEXT*
BCA	Baseline Compatibility Assessment
BDC	Basic Design Characteristics
CCM	Change Control Management
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CCS	Command Control and Signalling
CER	The Community of European Railway and infrastructure companies
CES	Conditional Emergency Stop
CMD	Cold Movement Detector
CR	Change Request
DAS	Driver Advisory System
DeBo	Designated Body
DMI	Driver-Machine Interface
ECC	Electronic Communications Committee
EDOR	ETCS Data Only Radio
EEA	European Economic Area
EEC	European Economic Community
EIM	European Rail Infrastructure Managers
EIRENE	European Integrated Radio Enhanced Network
ERA	European Union Agency for Railways also called “the Agency”
ERADIS	Interoperability and Safety database managed by the European Union Agency for railways European Railway Agency Database of Interoperability and Safety
ERATV	European Register of Authorised Types of Vehicles
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
ETS	European Telecommunications Standard
ETSI	European Telecommunications Standards Institute
EU	European Union
FFFIS	Form fit functional interface specification
FIS	Functional interface specification
FRMCS	Future Railway Mobile Communication System
GSM-R	Global System for Mobile communications - Railway

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ABBREVIATION	*FULL TEXT*
IC	Interoperability Constituent
IEC	International Electrotechnical Commission
IM	Infrastructure Manager
INF	Infrastructure
ISO	International Organisation for Standardisation
ISV	Intermediate Statement Verification
MS	EU or EEA Member State
NoBo	Notified Body
NSA	National Safety Authority
NTR	National Technical Rule
OB	On-board
OJ	Official Journal of the European Union
RAMS	Reliability, Availability, Maintainability and Safety
RINF	Register of Infrastructure
RMR	Railway Mobile Radio
RR	Revision Request
RRA	Revision Request Author
RST	Rolling Stock
SMB	Stop Marker Board
SRT	Safety in Railway Tunnels
SS	Subset
STM	Specific Transmission Module
TC	Technical Committee
TR	Technical Report
TS	Trackside
TSI	Technical Specification for Interoperability
UIP	International Union of Private Wagons Owners (Union Internationale d'associations de Propriétaires de wagons de particuliers)
UNIFE	Union of the European Railway Industries (
UNISIG	Union Industry of Signalling (working party within UNIFE): steering committee involved in the development and implementation of ERTMS

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2. GUIDANCE ON THE APPLICATION OF THE CCS TSI

2.1. CCS TSI 1. Introduction

Bullet (2) of this point refers to special vehicles. The CCS TSI shall apply to special vehicles as defined in point 2.2.2 (C) of the LOC&PAS TSI if they are equipped with a driving cab, and used, or intended to be used in running mode as defined in point 3 of EN 14033-1:2017 and further explained in CEN TR 17498:2020.

2.1.1. CCS TSI 1.1. Technical scope

No additional clarification is necessary.

2.1.2. CCS TSI 1.2 Geographical scope

No additional clarification is necessary.

2.1.3. CCS TSI 1.3 Content of this TSI

No additional clarification is necessary.

2.2. CCS TSI 2. Subsystem definition and Scope

2.2.1. CCS TSI 2.1. Introduction

No additional clarification is necessary.

2.2.2. CCS TSI 2.2. Scope

The Figure 1 gives an overview of the scope of the TSI Control-Command and Signalling.

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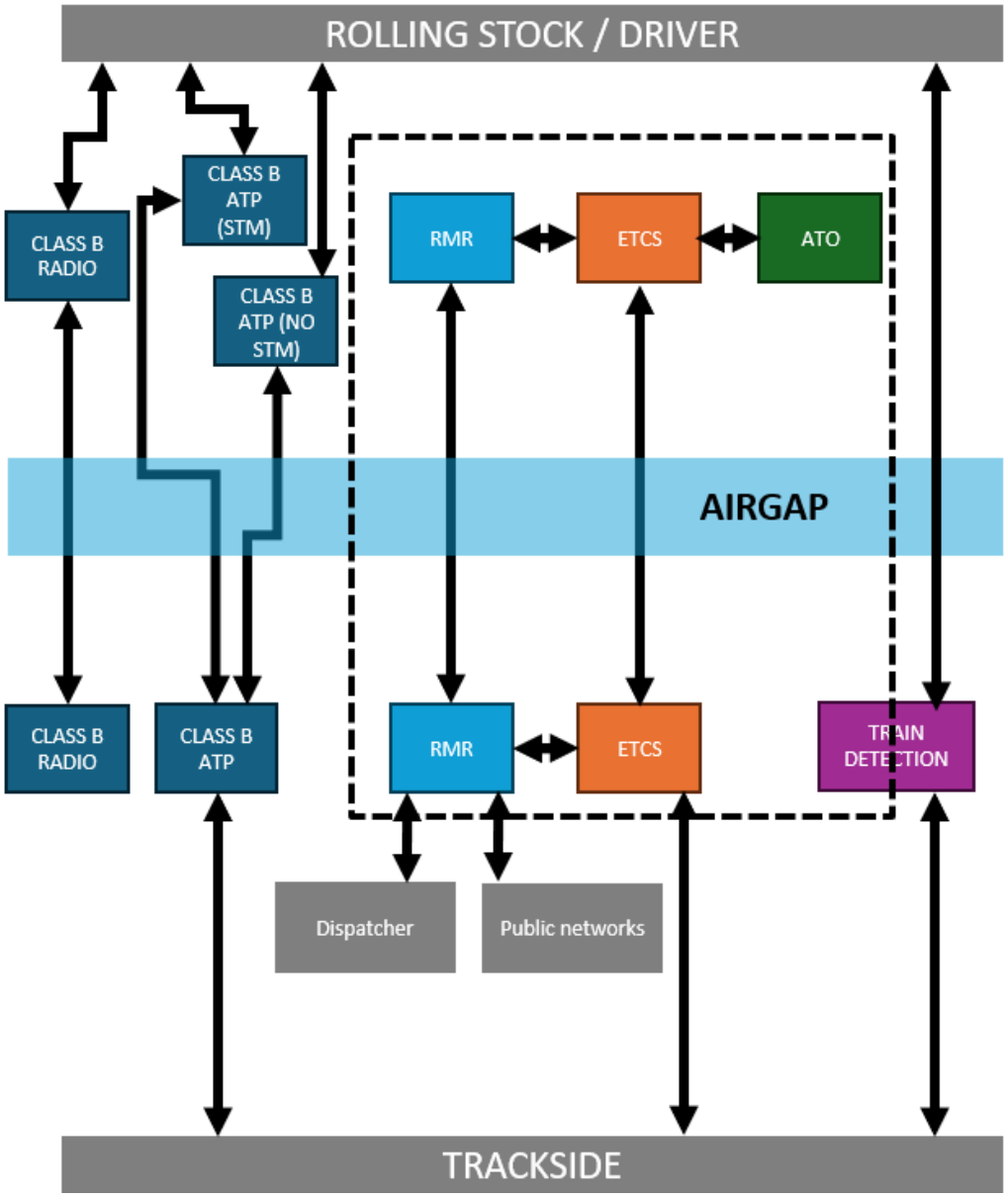

Figure 1. Scope of TSI Control-Command and Signalling

The picture shows the Control-Command and Signalling subsystems and their interface with rolling stock and operators.

The requirements of the TSI apply to the parts within the dotted line; the light blue horizontal line (airgap) separates Control-Command and Signalling On-board and Trackside subsystem. The TSI Control-Command and Signalling does not require full standardisation of all Control-Command and Signalling functions, but only of the ones that are strictly necessary to achieve interoperability while complying with the essential requirements.

The TSI Control-Command and Signalling gives harmonised solutions for the functions, performance and interfaces that are relevant for interoperability and makes their implementation mandatory[1] for the on-board (to ensure that vehicles may move uninterrupted throughout the EU) but allows flexibility for their

[1] There are some optional functionalities defined in point 4.2.2 of CCS TSI.

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implementation trackside. Consequently, it is the responsibility of each trackside implementation to define, for example, if shunting operations are allowed/supervised, if train integrity is required, etc.

The TSI Control-Command and Signalling does not address compliance with the requirements of other European regulations. Compliance with other European regulations is specified in the corresponding Directives.

2.2.3. CCS TSI 2.3. Trackside Application Levels (ETCS)

No additional clarification is necessary.

2.3. CCS TSI 3. Essential requirements

2.3.1. CCS TSI 3.1. General

The essential requirements are described in point 3 of the TSI Control-Command and Signalling, which also provides, for each essential requirement, the link with the corresponding basic parameter(s).

Compliance with the basic parameters specified in the TSI Control-Command and Signalling ensures that the corresponding essential requirement is respected.

2.3.2. CCS TSI 3.2. Specific Aspects of the Control-Command and Signalling Subsystems

2.3.2.1. CCS TSI 3.2.1 Safety

No additional clarification is necessary.

2.3.2.2. CCS TSI 3.2.2 Reliability and Availability

No additional clarification is necessary.

2.3.2.3. CCS TSI 3.2.3 Technical Compatibility

This point in the CCS TSI covers the technical compatibility of the subsystem with external elements. Do not mix the concept with the ETCS or Radio Combability between the infrastructure and the on-board.

The electromagnetic compatibility between the railway system and the “external world” is part of the “Environmental protection” essential requirements and is fully covered by [15] and [16], together with the harmonised standards.

The “Technical compatibility” essential requirement addresses the interferences between equipment inside the railway system.

The Directives [15] and [16] (with the support of the harmonised standards) cover these aspects, with a relevant exception, i.e., the compatibility between vehicle and trackside Control-Command and Signalling equipment (e.g., track circuits and axle counters); the Control-Command and Signalling TSI defines therefore requirements and verification procedures for this issue, more specifically, in the Index 77-ERA/ERTMS/033281 [12] “Interfaces between CCS trackside and other subsystems”).

2.3.3. CCS TSI 3.3 Essential requirements not directly covered by this TSI

2.3.3.1. CCS TSI 3.3.1 Safety

No additional clarification is necessary.

2.3.3.2. CCS TSI 3.3.2 Health

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As stated in CCS TSI Basic Parameter 4.2.16, the requirements for materials referred to in TSI LOC&PAS [14] should be respected regarding the essential requirements “Health” and “Environmental protection”.

2.3.3.3. CCS TSI 3.3.3 Environmental Protection

No additional clarification is necessary.

2.3.3.4. CCS TSI 3.3.4 Technical Compatibility

No additional clarification is necessary.

2.3.3.5. CCS TSI 3.3.5 Accessibility

According to the principle stated above, the TSI Control-Command and Signalling specifies no requirements or checks in addition to the ones foreseen by the other regulations applicable for the essential requirements “Accessibility”.

2.4. CCS TSI 4. Characterisation of the subsystem

2.4.1. CCS TSI 4.1. Introduction

2.4.1.1. CCS TSI 4.1.1. Basic parameters

No additional clarification is necessary.

2.4.1.2. CCS TSI 4.1.2. Overview of the requirements

No additional clarification is necessary.

2.4.1.3. CCS TSI 4.1.3. Parts of Control-command and Signalling Subsystems

No additional clarification is necessary.

2.4.2. CCS TSI 4.2. Functional and technical specifications of the Subsystems

CCS TSI 4.2.1. Control-Command and Signalling reliability, availability and safety characteristics relevant to interoperability

This basic parameter refers to both the essential requirement “safety” and the essential requirement “availability/reliability”. In the scope of the TSI Control-Command and Signalling only the availability/reliability aspects that may negatively affect the system safety are taken into consideration.

More stringent availability/reliability requirements for commercial reasons are possible, but being not part of the essential requirement, they can be managed in the context of contracts between IMs and RUs and not as criteria for authorisation to place in the market or to determine technical compatibility or safe integration.

The safety requirements for Control-Command and Signalling subsystems are expressed in terms of technical performances (functions, tolerable hazard rates) of equipment.

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Compliance with the safety requirements specified in CCS TSI should be demonstrated in order to ensure the safe integration of Control-Command and Signalling subsystems into the railway system, respecting the safety objective for the service, as determined according to the provisions of [3].

To achieve interoperability, the TSI requires that every on-board Control-Command and Signalling subsystem fully respects the mandatory requirements. The TSI does not forbid less stringent safety requirements for a trackside Control-Command and Signalling implementation, when they are enough to achieve the safety objective for the service and as far as the safe movement of vehicles equipped with TSI compliant Control-Command and Signalling subsystem is not hindered.

Exported constraints due to "incorrect application of this TSI, see §6.5" are not allowed. Exported constraints can nevertheless be accepted if:

- it is not due to incorrect application of this TSI (errors in the product)

- the exported constraint has been agreed and accepted by the organisation to whom it is exported to

2.4.2.1. CCS TSI 4.2.2. On-Board ETCS functionality

The implementation of certain functions and interfaces specified in the TSI Control-Command and Signalling is optional. These optional functions and interfaces shall not be used as criteria for granting or refusing vehicle authorisations, nor for defining, limiting, or specifying requirements related to the technical compatibility or safe integration of on-board and trackside subsystems that hold an EC Declaration of Verification. There are exceptions for some specific conditions, listed in the appropriate sections of point 4 of the CCS TSI and summarised in point 7.2.9 related to on-board implementation of: (not exhaustive list)

1. In-fill (Euroloop and radio in-fill) for Trackside Level 1 Applications.
2. Train integrity supervision on-board.
3. “K interface” for STM.
4. ATO on-board (Under certain conditions, see transition periods, Figure 14).
5. RMR (GSM-R and/or FRMCS).
6. Cold movement detector (CMD) (Under certain conditions, see transition periods Figure 12).

According to point 7.4.1 of the CCS TSI, Euroloop and radio infill data transmission shall not be installed, nor operated, except if it is defined as specific case in point 7.7 of the CCS TSI.

The ability of the on-board to provide information about train integrity and train length can be very important on lines where innovative block systems, like Hybrid Train Detection or Moving Block, are used. Regarding the matter of the length of the train, the RUs should be aware that 2 types of train lengths are possible according to the TSI: the overall consist length (from which the safe consist length is derived; see SS-034 2.6.2) and the traditional train length (see SS-026 3.18.3.2.b). They allow different performances. In particular to maintain the continuity of the confirmation of the integrity after a change of direction of the train, it is necessary to acquire the overall consist length. A good communication between Infrastructure Managers, Railway Undertakings and Industry Suppliers about the necessary on-board functionalities is recommended in order to reach the maximum benefit from those innovative block systems.

2.4.2.2. CCS TSI 4.2.3. Trackside ETCS functionality

No additional clarification is necessary.

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2.4.2.3. CCS TSI 4.2.4. Mobile communication functions for railways RMR

The TSI Control-Command and Signalling describes the radio communication functions that must be implemented in the On-board and the Trackside subsystems. These functions must follow the general principle on which the TSI is based, as expressed in its point 4.1.2, to enable a Trackside subsystem to be compatible with CCS TSI compliant On-board subsystems. The flexibility that is allowed in the configuration of the Trackside subsystem shall not limit the operation of TSI-compliant On-board subsystems.

This implies that the Trackside subsystem has to be configured in a way that any TSI compliant On-board subsystem can use the functionality offered by the Trackside subsystem.

Note: Further clarifications will be included with FRMCS description if needed.

2.4.2.4. CCS TSI 4.2.5. RMR, ETCS and ATO air gap interfaces

The Control-Command and Signalling TSI specifies technical characteristics of equipment and includes the operational frequency band for the radio communication.

To operate RMR, it is necessary that Member States allow the use of this frequency band. The most appropriate way is the implementation of the relevant ECC recommendations [19].

NOTE: Asking for a more stringent protection against interferences on-board to a supplier is possible, but it may not be imposed since different technical requirements to those in the CCS TSI may not be requested to access to an infrastructure.

The CCS TSI specifies that the On-board subsystems shall be protected against interference. This requirement applies at the subsystem level. The Interoperability Constituents (RMR voice cab radio and RMR EDOR) compliant with the TSI already provide this protection. In point 2.6.3.3 of this Application Guide, guidance is provided for Interoperability Constituents certified for older TSIs.

Note: Further clarifications will be included with FRMCS description if needed

2.4.2.5. CCS TSI 4.2.6. On-Board Interfaces Internal to Control-Command and Signalling

No additional clarification is necessary.

2.4.2.6. CCS TSI 4.2.7. Trackside Interfaces Internal to Control-Command and Signalling

No additional clarification is necessary.

2.4.2.7. CCS TSI 4.2.8. Key Management

The cryptographic keys are used by the ETCS train to track communication protocol to calculate a code that protects the integrity and the authenticity of the exchanged messages.

If the key used to calculate the protection code for the messages is kept confidential, defenses to the several threats identified in EN 50159 (e.g. insertion, corruption, masquerade) are supported.

All the technical characteristics of the protocols are completely defined in the mandatory specifications. The requirements for the confidentiality of the keys with respect to risks related to safety of railway operations are not in the scope of the TSI Control-Command and Signalling.

The CCS TSI requires the ETCS equipment to comply with the specified interfaces to store, modify and delete keys, while possible requirements for their management are the responsibility of Infrastructure

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Managers and Railway Undertakings (and determined, for example, by regulations of authorities responsible for the security of the transport systems). Compliancy of the interfaces KMC-ETCS entity/KMAC entity to SS-038, SS-114, SS-137 fall into the point 5 (a, b, c, d) of Table 6.3 of CCS TSI [14]. In addition, if KMC is present, only the interfaces as defined in SS-038 and SS-137, and, if applicable, the generation of certificates have to be checked.

Considering that requirements related to security might become an obstacle to the free movement of trains (like it may happen with national safety rules; see art. 8 of [3], Member States should communicate them to the European Commission, in order to have a coordinated approach.

2.4.2.8. CCS TSI 4.2.8. ETCS-ID Management

No additional clarification is necessary.

2.4.2.9. CCS TSI 4.2.10. Trackside Train Detection Systems

Note: Further information on this point can be found in GUI/ERA_ERTMS_033281/2025. https://www.era.europa.eu/sites/default/files/2025-06/ag%20era_ertms_0033281v5_v1.pdf

2.4.2.10. CCS TSI 4.2.11. Electromagnetic Compatibility between Rolling Stock and Control-Command and Signalling trackside equipment

For this basic parameter the TSI Control-Command and Signalling refers to the specification in its Annex A, Index 77, which defines the parameters of the interface between the train detection systems (which are part of the Control-Command and Signalling trackside subsystem) and other subsystems – mainly rolling stock. Additional information can be found in the dedicated Application guide for Train detection systems GUI/ERA_ERTMS_033281/2025. https://www.era.europa.eu/sites/default/files/2025-06/ag%20era_ertms_0033281v5_v1.pdf

2.4.2.11. CCS TSI 4.2.12. ETCS DMI (Driver-Machine Interface)

Acknowledging the lack of a harmonized manual for the use of ETCS, ERA developed a generic ETCS driver's handbook [20] to address the needs of the users. This Handbook can be used to characterise baseline 3 and baseline 4 On-board units, meaning those applying sets of specifications #2 and #3 of CCS TSI Annex A (2.3.0d on-board units are not in scope because the Driver Machine Interface is not harmonized under set of specifications #1). Please refer to the Agency web page section for further details: Generic ETCS Driver's Handbook | European Union Agency for Railways (https://www.era.europa.eu/content/generic-etcs-drivers-handbook)

The Handbook covers both B3 software versions (SRS 3.4.0 and SRS 3.6.0) and B4 (SRS 4.0.0), all possible operated system versions X.Y (up to 3.0), all operating levels, modes, on-board unit options and screen technologies. It is provided in -format .docx and HTML versions, in English, French and German.

This Handbook is meant to serve the following uses (indicative list):

- Be a reference user's manual for all possible configurations of B3 and B4 on-board units;
- Be used to derive dedicated drivers' manuals for specific on-board unit implementations in different rolling stock types (customization instructions are provided);
- Constitute a comprehensive harmonized tutorial for drivers' training purposes;
- Serve to elaborate questions for drivers' competence certification;

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2.4.2.12. CCS TSI 4.2.13. RMR DMI (Driver-Machine Interface)

No additional clarification is necessary.

2.4.2.13. CCS TSI 4.2.14. Interface to Data Recording for Regulatory Purposes

No additional clarification is necessary.

2.4.2.14. CCS TSI 4.2.15. Trackside Control-Command and Signalling objects

No additional clarification is necessary.

2.4.2.15. CCS TSI 4.2.16. Construction of equipment used in CCS subsystems

The mandatory environmental conditions for some equipment (e.g., debris for Eurobalise defined in 5.7.9 of SS036) are defined in the corresponding specifications.

In addition, point 6 of the TSI Control-Command and Signalling, requires that for each interoperability constituent and subsystem the applicable working conditions are indicated.

2.4.2.16. CCS TSI 4.2.17. ETCS and Radio System Compatibility

Note: Further information on ESC / RSC will be added to the application guide as output of the ESC/RSC TWG. In the meantime, the process described in the previous version of the CCS TSI Application guide could be useful for the reader. Please refer to the following link.

https://www.era.europa.eu/system/files/2022-11/Guide%20for%20the%20application%20of%20the%20CCS%20TSI%20%281%29.pdf?t=1761839332

2.4.2.17. CCS TSI 4.2.18. On-Board ATO functionality

No additional clarification is necessary.

2.4.2.18. CCS TSI 4.2.19. Trackside ATO functionality

No additional clarification is necessary.

2.4.2.19. CCS TSI 4.2.20. Technical documentation for Maintenance

The following clarification is related to the point 2.4.2.20.3 “System identifier”, especially the relationship between the system identifier at IC level and at subsystem level.

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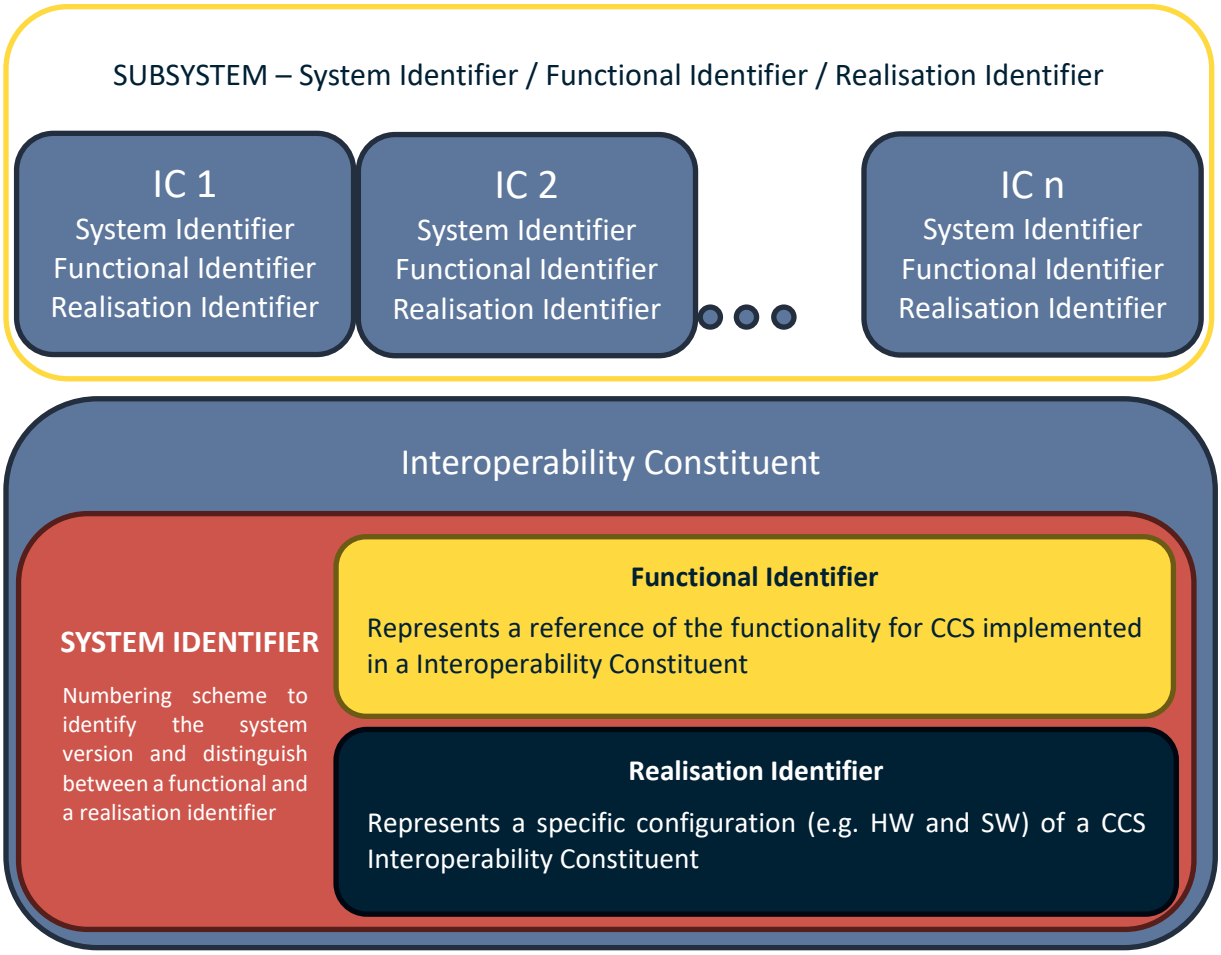

Figure 2. System Identifier, functional identifier and realisation identifier. Concept description

The subsystem is composed of 0, 1, 2 or several ICs, so the fact that one of those ICs has a system identifier, does not substitute the need for a system identifier at subsystem level.

If an IC within a subsystem is modified, an analysis shall assess whether the change affects the subsystem's basic design characteristics:

- If it does, the functional identifier of the subsystem shall be updated.
- If the IC's functional identifier changes but the subsystem's overall functionality remains unchanged, then the subsystem's functional identifier does not need to be updated; however, the realisation identifier of the subsystem shall be updated.

The key elements to identify changes affecting the functional identifier can be found in the point 7.2.2.2, Table 7.1 and point 7.2.2.3, Table 7.2 (definition of changes depending on the Basic Design Characteristics). Some examples of modifications requiring a change in the functional identifier for the trackside subsystem as defined in 7.2.2.3 can be found below:

- Change in the target functionality as defined in the original certification or authorisation. Corrections to set the target functionality to the state already expected in the original certification or authorisation are not impacting the functional identifier.
- Change in the interfaces relevant for safety and technical compatibility.
- Change in the result of the safety judgement (e.g. safety case according to EN50126).

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- Change in the SRACs or the interoperability constraints.

As stated in the CCS TSI "*target functionality is considered unchanged when applying the specification maintenance (error correction) process described in point 7.2.10 which includes the implementation of error corrections or the implementation of mitigation measures*". A change in the functional identifier of the trackside subsystem, does not necessarily mean that a re-authorisation process shall be carried out. Upgrade or renewal of trackside is described in CCS TSI 7.2.3, and the reauthorisation need is described in Article 18 (6) of Directive (EU) 2016/797.

2.4.3. CCS TSI 4.3. Functional and technical specifications of the interfaces to other Subsystems

CCS TSI point 4.3 contains the tables with the interfaces and interdependencies with other TSIs, in order to correctly interface and integrate all subsystems in the Union rail system. The guidance provided in this Application Guide aims to clarify some points where doubts have been raised and not to provide an exhaustive review of the interfaces:

The ETCS Stop Marker Board (SMB) and other markers, defined in document EN 16494 (index 38 of Table A2) constitutes:

- a functional interface with OPE TSI Appendix A (4.3.1, through the rules describing the operational effect of the SMB when driving under ETCS);
- a functional and technical interface with LOC & PAS TSI [14] (4.3.2, through the provisions ensuring good visibility of the SMB by the driver);

a technical interface with INF TSI [18] (4.3.3, through the requirement to observe the clearance gauge when installing the SMB).

Regarding the interface with the SRT TSI [22], the SRT TSI in Clause 4.2.1.8 of the SRT TSI states that, for tunnels longer than 1 km: *"Radio communication between the train and the infrastructure manager control centre shall be provided in each tunnel with GSM-R"*. The reason for having this requirement is to make sure that communication is possible inside the tunnel for workers, rescue teams and for those trains equipped with a RMR cab radio. When installing RMR, the infrastructure manager will have it assessed and certified by a NoBo for the CCS TSI, not by a NoBo for the SRT TSI. The NoBo for SRT should only check that tunnels longer than 1 km have RMR installed, for which the EC Certificate for the RMR should be present.

Note: SRT TSI has not been updated yet with the reference to RMR instead of GSM-R.

Regarding the interface with LOC&PAS TSI [14] and the LOC&PAS requirements for kinematic gauge in point 4.2.3.1, it should also be considered the position of the radio antennas, for voice and/or data, as for CCS TSI point 4.2.4. The verification of the kinematic gauge is part of the assessment of the LOC&PAS NoBo.

2.4.3.1. CCS TSI 4.3.1. Interface to the Operation and Traffic Management Subsystem

No additional clarification is necessary.

2.4.3.2. CCS TSI 4.3.2. Interface to the Rolling Stock Subsystem

No additional clarification is necessary.

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2.4.3.3. CCS TSI 4.3.3. Interfaces to Infrastructure Subsystem

No additional clarification is necessary.

2.4.3.4. CCS TSI 4.3.4. Interfaces to Energy Subsystem

No additional clarification is necessary.

2.4.4. CCS TSI 4.4. Operating rules

Refer to the Application Guide 2.4.2.11, the Appendix A of OPE TSI [13] and for a better understanding to the generic ETCS driver's handbook.

2.4.5. CCS TSI 4.5. Maintenance rules

No additional clarification is necessary.

2.4.6. CCS TSI 4.6. Professional competences

No additional clarification is necessary.

2.4.7. CCS TSI 4.7. Health and safety conditions

No additional clarification is necessary.

2.4.8. CCS TSI 4.8. Registers

No additional clarification is necessary.

2.4.9. CCS TSI 4.9. Route compatibility checks before the use of authorised vehicles

Note: To be completed in future version of the application guide.

2.5. CCS TSI 5. Interoperability constituent(s)

Principle

The TSI Control-Command and Signalling specifies a set of "basic interoperability constituents" and allows their "grouping" to allow flexibility for development and implementation.

The TSI only specifies interfaces that are necessary to achieve interoperability; for interfaces between trackside and on-board the TSI requires that their implementation (functions, protocols, electrical and physical aspects) complies with the mandatory specifications.

For other interfaces (e.g., between equipment allocated either on-board or trackside) different solutions are acceptable, provided that functional, safety and performance requirements relevant for the achievement of interoperability are respected. These mandatory requirements are part of the basic parameters of the TSI.

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Special considerations RBC

The functions implemented in an RBC depend on its integration with trackside signalling, which is not harmonised in the scope of the TSI Control-Command and Signalling. It must be noted that other functions or interfaces are standardised.

The specifications with a "mandatory" status only define requirements for the functions implemented in the RBC, in order to achieve interoperability.

The necessity of implementing functions (e.g., if and in which conditions to authorise shunting, to send commands to raise/lower pantographs, etc.) depends upon the characteristics of the specific application.

As a consequence, different "types" of RBC interoperability constituents will be developed, to interface and cooperate with different trackside signalling functions.

The design documentation for the RBC will indicate which functions are implemented.

The advantage of defining the RBC as an Interoperability Constituent is twofold:

1. functions, interfaces and performance certified will not require repetitions of testing when the RBC is integrated into a Control-Command and Signalling trackside subsystem

2. the availability on the market of already certified RBCs will support the harmonisation of the overall trackside design, to exploit existing products and reduce the need to search for new technical solutions.

2.5.1. CCS TSI 5.1. Definition

No additional clarification necessary.

2.5.2. CCS TSI 5.2 List of interoperability constituents

The CCS TSI, in point 5.2.2, allows to group interoperability constituents, without fixing a restricted number of options in the groups. In that sense, it is not possible to foresee all possible combinations of certificates for group of ICs to be registered in ERADIS. In the ERADIS database the current examples mentioned in the CCS TSI tables 5.1 and 5.2 are available. If at the time of registering a certificate of a Group of ICs in ERADIS, the corresponding option is not available, the Agency should be contacted in order to include that group of ICs into the possible options in ERADIS. This can be done through the contact us form in the Agency webpage: Frequently Asked Questions | European Union Agency for Railways (https://www.era.europa.eu/can-we-help-you/faq_en)

2.5.3. CCS TSI 5.3 Constituents' performance and specifications

No additional clarification necessary.

2.6. CCS TSI 6. Conformity assessment and EC verification

2.6.1. CCS TSI 6.1. Introduction

2.6.1.1. CCS TSI 6.1.1. General principles

No additional clarification necessary.

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2.6.1.2. CCS TSI 6.1.2. Principles for testing ETCS, ATO and RMR

2.6.1.2.1. CCS TSI 6.1.2.1. Principle

No additional clarification necessary.

2.6.1.2.2. CCS TSI 6.1.2.2. Operational Test Scenarios

The certification of Trackside subsystems is a critical step to achieve interoperability. In this respect, the operational test scenarios (see definition in point 6.1.2.2 of the TSI Control-Command and Signalling) are a very important tool:

1. A verification that design and installation of the Trackside subsystem will not require on-board functions or performance conflicting with requirements of the TSI can be done checking the operational test scenarios specified by the applicant. See point 6.1.2.3 of the TSI Control-Command and Signalling;
2. once this check has been successfully passed, the operational test scenarios will be the test cases for the certification of Control-command and Signalling Trackside subsystem.

2.6.2. CCS TSI 6.2. Interoperability Constituents

2.6.2.1. CCS TSI 6.2.1. Assessment procedures for Control-Command and Signalling Interoperability Constituents

No additional clarification is necessary.

2.6.2.2. CCS TSI 6.2.2. Modules for Control-Command and Signalling Interoperability Constituents

No additional clarification is necessary.

2.6.2.3. CCS TSI 6.2.3. Assessment requirements

No additional clarification is necessary.

2.6.2.4. CCS TSI 6.2.4. Special issues

2.6.2.4.1. CCS TSI, point 6.2.4.1 – Mandatory test for the on-board ETCS

In order to clarify the cases where an interoperability constituent shall perform a test campaign using SUBSET-076, a link to its system identifier is done following this principle:

- The first time the IC is certified, or if the functional part of its system identifier is changed, the complete list of test sequences defined in the SUBSET-076 shall be performed. Note: this case covers the situation of an upgrade to a higher envelope of on-board supported system version.
- If only the realisation part of its system identifier is changed, it is up to the supplier, in agreement with its NoBo, to determine, if any, the list of test sequence of SUBSET-076 to be performed.

This statement is independent from the proprietary tests that the supplier should perform based on its safety management system in agreement with the AsBo (recommended), in case of changes. Moreover, during the applicability of the transition regime for Indexes 31, 37b, 37c and 37d as laid out in point 2.8.2.5 of this guide, it is still allowed to apply the version defined in the Regulation (EU) 2023/1695 for the Subsets referenced by these Indexes: 31 (v. 3.1.0), 37b (v. 3.3.0), 37c (v. 3.2.0) and 37d (v 3.3.0) linked to

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CCS TSI point 6.2.4.1 (2) up to SV 2.1. The use of CCS TSI point 6.2.4.1 (1) is also allowed during the transition regime.

During the transition regime, and as per Technical Opinion OPI-2025-4, the use of the indexes published in ERA recommendation ERA1218-2 is highly recommended and constitute an acceptable mean of compliance when performing the tests for on-board ETCS products.

The tests and assessments carried out from the entry into force of 2023/1695 and until the end of the transition period that could have been done on a product remain valid and do not need to be repeated. It is the responsibility of the manufacturer to demonstrate that the test campaign covers the necessary tests for the certification of the product.

2.6.2.4.2. CCS TSI, point 6.2.4.2 – Class B interfaces

No additional clarification is necessary.

2.6.2.4.3. CCS TSI 6.2.4.3. ETCS and Radio system compatibility checks for Interoperability Constituents

Note: Further information will be included in the application guide with FRMCS in a future phase

2.6.3. CCS TSI 6.3. Control-Command and Signalling Subsystems

2.6.3.1. CCS TSI 6.3.1. Assessment procedures for Control-Command and Signalling Subsystems

No additional clarification is necessary.

2.6.3.2. CCS TSI 6.3.2. Modules for Control-Command and Signalling Subsystems

The aim is to minimise the certification effort and to reuse assessments already done.

2.6.3.2.1. CCS TSI 6.3.2.1 On-board subsystem

No additional information is needed

2.6.3.2.2. CCS TSI 6.3.2.2 Trackside subsystem

Regarding the use of the module SB (in combination with SD or SF), the results of this module from one application can be reused in other applications provided that the other applications are engineered according to the engineering rules which have been assessed in the first application.

2.6.3.3. CCS TSI 6.3.3. Assessment requirements for an On-board Subsystem

Assessment requirements for an On-board Subsystem, GSM-R SIM card

As indicated in row 1a of Table 6.2.1 of the TSI Control-Command and Signalling, the On-board Subsystem has to be assessed with a GSM-R SIM card that is compliant with the requirements of the TSI. Due to the special characteristics of this Interoperability Constituent, the replacement of a TSI compliant GSM-R SIM card by another TSI compliant GSM-R SIM card does not affect the compliancy to the TSI of the On-board

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Subsystem. This implies that there is no need to reassess the On-board Subsystem in the case of replacement of a GSM-R SIM TSI compliant card with another one which also compliant to the TSI.

For SIM cards placed on the market after entry into force of Control-command and Signalling TSI specifying the GSM-R SIM card as Interoperability Constituent, compliance with TSI is ensured by the EC Declaration of conformity. Regarding SIM cards placed on the market before the entry into force of that TSI (and therefore without EC Declaration of conformity):

1. where a Notified Body has evidence (e.g. from their previous use or from check of relevant documentation) that they are compliant with the requirements of the TSI, those SIM cards can be used to verify Control-command and Signalling On-board subsystems;
2. where a manufacturer or contracting entity can justify that their use does not affect the compliancy with the TSI of the On-board Subsystem, then, as per the article 110.1 [8] in the replacement of the SIM card can be considered a "substitution in the framework of maintenance", like in the case of SIM cards holding an EC Declaration of conformity.

Interoperability Constituents certified for a different version of the TSI

The CCS TSI (row 1c of Table 6.2.1) permits the use of Interoperability Constituents that have been certified against a different version of the TSI, provided the Notified Body assesses that the certificate of Verification of the subsystem still ensures compliance with the requirements of the TSI in force.

In Table 6.2.1 row 2c, it is indicated to check that the values of ETCS ID are in the allowed range and, if required by this TSI, to have a unique value. These checks should be performed according to the Agency document "ERA_ERTMS_040001 – Assignment of values to ETCS variables" [21] in the latest available version on the date of assessment.

2.6.3.3.1. CCS TSI 6.3.3.1. ETCS and radio system compatibility checks

Note: Further information on ESC/RSC will be added to the application guide as output of the ESC/RSC TWG In the meantime, the process described in the previous version of the CCS TSI Application guide could be useful for the reader. Please refer to the following link.

https://www.era.europa.eu/system/files/2022-11/Guide%20for%20the%20application%20of%20the%20CCS%20TSI%20%281%29.pdf?t=1761839332

2.6.3.4. CCS TSI 6.3.4. Assessment requirements for a Trackside Subsystem

The CCS TSI (row 1c of Table 6.3) permits the use of Interoperability Constituents that have been certified against a different version of the TSI, provided that the Notified Body assesses that the certificate of Verification of the subsystem still ensures compliance with the requirements of the TSI in force.

The CCS TSI Table 6.3 rows 6b requires tests with two certified on-board subsystems. In general, a complete on-board subsystem is needed, since Table 6.3 row 6b indicates that it should cover Basic Parameters 4.2.3 Trackside ETCS functionality, 4.2.4 mobile communication (both voice and data) and 4.2.5 RMR, ETCS and ATO GSM-R air gap interfaces. This on-board subsystem should be able to process all the functions configured by the trackside, i.e. process all the packets with the higher M_VERSION (X,Y) from trackside. The test can be done in a laboratory, test lines or real implementations.

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In CCS TSI Annex table 6.3 row 2c, it is indicated to check that the values of ETCS ID are in the allowed range and, if required by this TSI, to have a unique value. These checks should be performed according to the Agency document "ERA_ERTMS_040001 – Assignment of values to ETCS variables" [21] in the latest available version on the date of assessment.

2.6.4. CCS TSI 6.4. Provisions in case of the partial fulfilment of TSI requirements

2.6.4.1. CCS TSI 6.4.1. Assessment of parts of control-command and signalling subsystems

Parts should not be confused with Groupings of Interoperability Constituents. A grouping should be treated as an IC for certification purposes. A grouping targets normally to group functions of basic interoperability constituents (e.g. ETCS on-board and Odometry, LEU and Balise, LEU and Euroloop,…).

Parts can be used for certification purposes. The basic parameters, in accordance with the relevant essential requirements, are allocated to each part (see Table 4.1 of CCS TSI). A part targets normally to not re-certify CCS solutions or at least to minimise it to the relevant interfaces. Parts were introduced to allow the migration of Subsystems (on-board and trackside) in a "natural way" for the IMs and RUs: it is common to upgrade/install the radio separately from the signalling system, in many cases with years of difference, and this mechanism permits the authorisation based on a full certificate only covering the Part. When the Subsystem is only including Class A for one of the defined Parts, the Subsystem certificate covers that Part and the integration of the Part in the corresponding Subsystem.

In any case, applicants cannot use the addition of parts as substitution of the EC declaration of verification of the subsystem and/or EC certificates of verification of subsystems, because the integration between parts shall be checked by the NoBo in charge of the verification of the subsystem (it is only true if there is one single part in the vehicle).

The following figures illustrate the components inside an EC declaration of verification of the CCS on-board subsystem following each of the possibilities offered in 6.4.1. Figure 3 depicts the first option where the EC certificate of verification of the CCS On-board subsystem covers all parts.

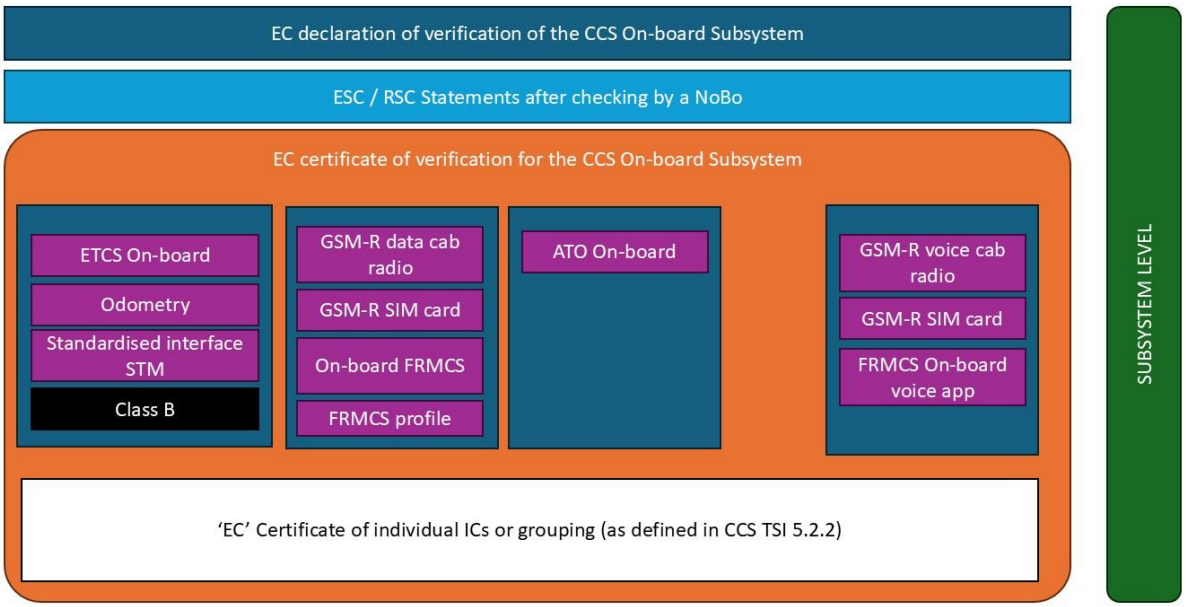

Figure 3: Option 1. EC certificate of verification covers all the parts of the CCS On-board subsystem

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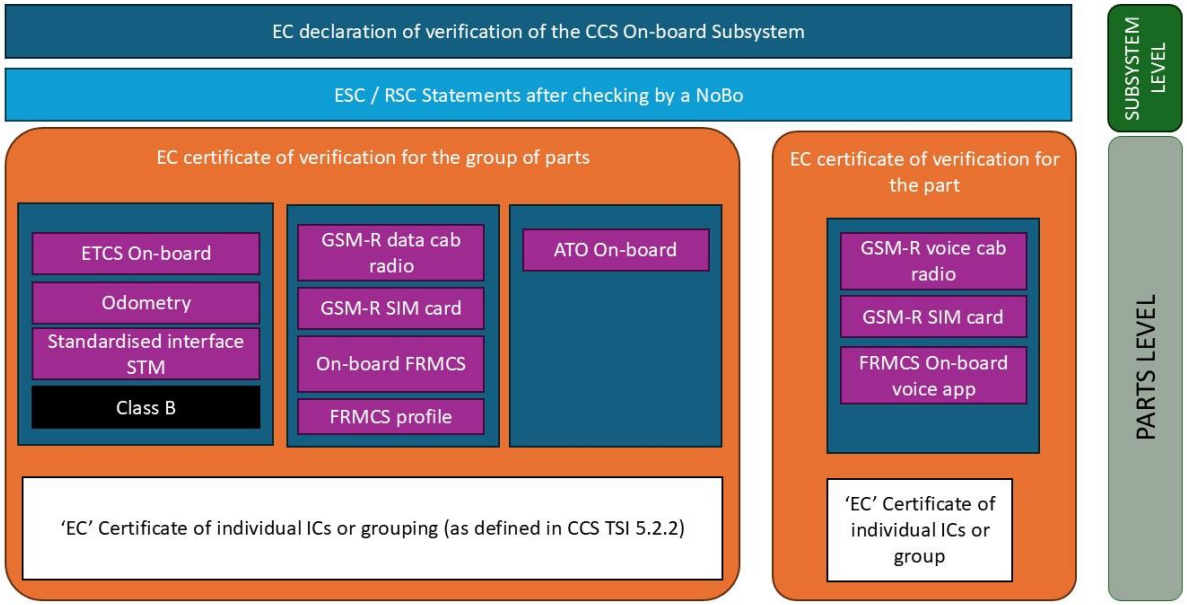

Figure 4.-Option 2. EC certificate of verification for each of the parts of the CCS On-board subsystem

Figure 4 depicts the situation where different certificates of verification shall be issued for each of the parts.

2.6.4.2. CCS TSI 6.4.2. Intermediate Statement of Verification

No additional clarification is necessary.

2.6.5. CCS TSI 6.5. Management of errors

Functional enhancement and error correction of the ETCS, ATO and RMR specifications is managed by the Agency, as system authority, applying its procedures for management of documents and the procedures for ERTMS Change Control Management [17]

The application of the principles for system version management ensures that the evolution of the ETCS, ATO and RMR specifications respects the conditions and limitations of backward compatibility.

In case of deviation a corrective (and credible) action plan shall always be made available and assessed by the concerned conformity bodies.

2.6.5.1. CCS TSI 6.5.1. Content of EC certificates

Appendix D of the CCS TSI 2023/1695 shall be used

2.6.5.2. CCS TSI 6.5.2. Content of EC declarations

Appendix D of the CCS TSI 2023/1695 shall be used

2.7. Implementation

2.7.1. CCS TSI 7.1. Introduction

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No additional clarification is necessary.

2.7.2. CCS TSI 7.2. Generally applicable rules

2.7.2.1. CCS TSI 7.2.1. Upgrading or renewing the Control-Command Subsystems or parts of them

No additional clarification necessary.

2.7.2.2. CCS TSI 7.2.2. Changes to an existing On-Board subsystem

Each of the rows in Table 7.1 is directly linked to an ERATV's parameters for a vehicle type.

The following picture describes a basic flowchart on the software changes on the CCS on-board changes, regarding the BDC "on-board ETCS implementation":

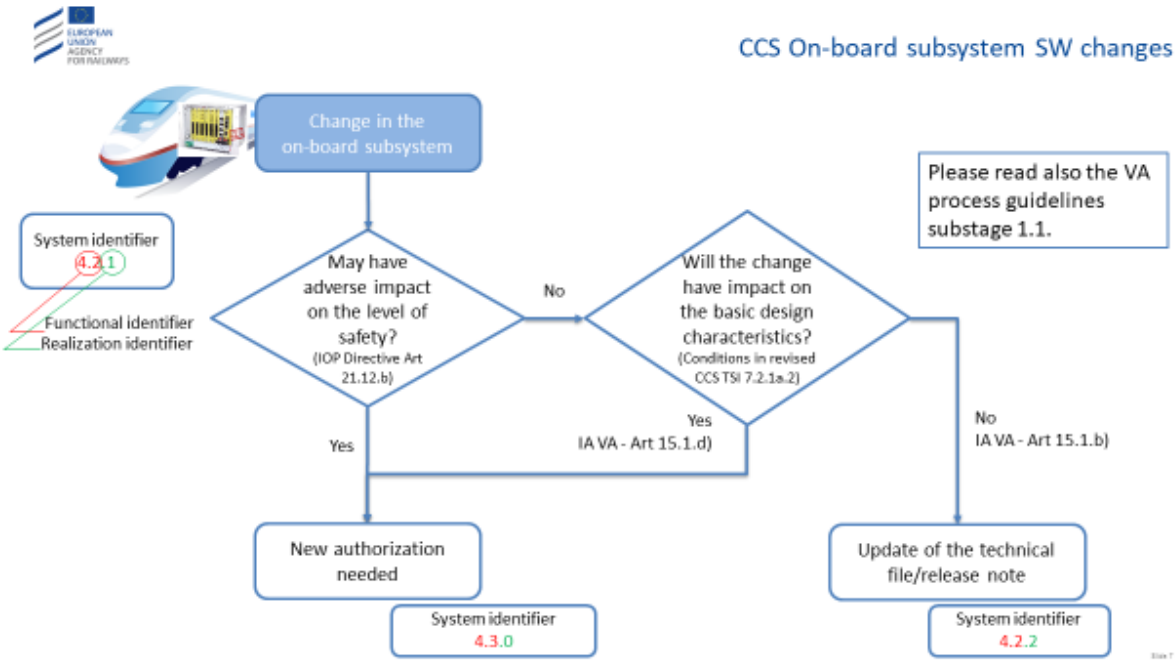

Figure 5.- Example of CCS On-board software changes

2.7.2.2.1. CCS TSI 7.2.2.1. Rules to manage changes in on-board CCS subsystems

No additional clarification is necessary.

2.7.2.2.2. CCS TSI 7.2.2.2. Conditions for a change in the On-board ETCS Functionality that does not impact the basic design characteristics

No additional clarification is necessary.

2.7.2.2.3. CCS TSI 7.2.2.3. Conditions for a change in the on-board mobile communication functions for railways or in the ATO on-board functionality that does not impact the basic design characteristics

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No additional clarification is necessary.

2.7.2.2.4. CCS TSI 7.2.2.4. Conditions for a change in the on-board subsystem regarding ETCS or Radio system compatibility that does not impact the basic design characteristics

No additional clarification is necessary.

2.7.2.3. CCS TSI 7.2.3. Upgrade or renewal of existing trackside subsystem

No additional clarification is necessary.

2.7.2.4. CCS TSI 7.2.4. EC type or design examination certificates

2.7.2.4.1. CCS TSI 7.2.4.1 CCS On-Board Subsystems

The transition phase for implementation of the changes from a TSI for vehicles could be different according to 4 different phases:

a) design phase started before TSI enters into force: the notified body of the CCS on-board subsystem is contracted before 28th September 2023 and the EC type or design examination certificate is not yet issued;
b) design phase started after or on the day TSI enters into force: the notified body of the CCS on-board subsystem is contracted after 28th September 2023;
c) production phase: a vehicle may be placed on the market under authorisation in conformity to type based on an EC declaration of verification referring to a valid EC type certificate or design examination certificate;
d) vehicle in operation: vehicle is in operation when it is registered with 'Valid' registration code '00' or '11' in the National Vehicle Register or in the European Vehicle Register.

Explanation on 'Design phase started before TSI enters into force'. The applicant shall justify in its application that the vehicle composed of rolling stock and CCS subsystem has its design started before the entry into force of the CCS TSI 2023/1695 and provide the evidence of:

a) the contract signed between the applicant or the CCS on-board subsystem supplier, and the notified body, and
b) the application lodged by the applicant to the notified body(ies) requesting the beginning of the EC verification procedure (or any other legally enforceable agreement/communication for the starting of the certification activities). The contract/application shall cover the area of use in question.

Example 1: In case an applicant has a framework contract signed with a notified body, the design phase is considered as not started yet if the project scope of the application is not defined, so it is considered that the second point above 'application lodged by the applicant to the notified body' is not fulfilled.

Example 2: A defined scope could be considered as a list of the vehicle types where CCS on-board is to be integrated to be submitted to the EC verification process.

Explanation on 'Production phase'. The applicant shall justify in its application that the vehicle composed of rolling stock and CCS on-board subsystem is in production phase by providing the evidence for both subsystems, being the EC declaration of verification referring to a valid EC type or design examination certificate. The production phase only concerns authorisations in conformity to type as defined in point (e) of article 14 of Commission Regulation 2018/545.

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The vehicle type authorisation process happens after the subsystem design phase, since the EC type or design examination certificate is required. The vehicle type authorisation activities are not considered in the transition regime framework, this means that the applicant needs to plan the end of the subsystem design phase significantly before the deadline of each vehicle production phase of table B1.1 in order to have enough time for the vehicle production phase, see examples 1 and 8 of section 2.8.2.2.

According to the previous definitions, Figure 6 depicts the relation among the different phases:

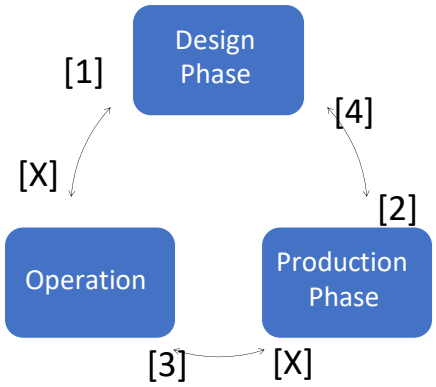

Figure 6. Transition states for CCS on-board subsystem.

The following explanation is given for the different transitions:

[1] Operation -> Design.

[2] Design -> Production.

[3] Production -> Operation.

[4] Production -> Design. While a vehicle series is being produced, the deadline indicated in the production phase is reached for some requirements (i.e. use of Baseline 4R1, implementation of CMD, ...). In such case, a new design might be needed to include these additional applicable requirements and a new contract with the NoBo is placed for those modifications. See example 8 and 9b in section 2.8.2.2.

[X] Not possible

Regarding the CCS TSI Interoperability Constituents certified according the previous CCS TSI 2016/919, as indicated in CCS TSI point 7.2.4.3, those certificates remain valid unless they are required to be revised by Appendix B, i.e. they are used in subsystems applying the transition regime or they still ensure subsystem compliance with the requirements in the CCS TSI in force, as indicated in Tables 6.2.1 and 6.3 row 1c.

In the CCS TSI amendment, vehicles assigned code “11”, defined as *vehicles intended to be stored in working order as an inactive or strategic reserve*, were included. This inclusion reflects the fact that vehicles “in working order” (code 11) benefit from regulatory treatment comparable to that applicable to vehicles “in operation” (code 00). As a result, vehicles coded “11”, together with vehicles coded “00”, are excluded from the transitional regimes laid down in Appendix B of Annex I to the CCS TSI. Those transitional regimes remain applicable to vehicles in other situations, such as the design or production phases, which are subject to more stringent requirements.

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Insofar as the effect of the provision is to extend more favourable transitional arrangements to vehicles "in working order", a broad interpretation of the term "vehicle in operation" within the context of the CCS TSI is considered acceptable.

2.7.2.4.2. CCS TSI 7.2.4.2 CCS Trackside Subsystem

The EC type or design examination certificates issued against previous versions of the CCS TSI remain valid unless a specific provision of the appendix B requires it to be revised. In this case a gap analysis shall be carried out. This gap analysis can be performed by the applicant or alternatively by the NoBo. In any case, this analysis will need to be included in the NoBo assessment file for the new certificate.

2.7.2.4.3. CCS TSI 7.2.4.3 Interoperability Constituents

No additional clarification is necessary.

2.7.2.5. CCS TSI 7.2.5. Legacy systems

No additional clarification is necessary.

2.7.2.6. CCS TSI 7.2.6. Availability of Specific Transmission Modules and interfaces to Class B on-board

No additional clarification is necessary.

2.7.2.7. CCS TSI 7.2.7. Additional Class B equipment on a line equipped with Class A

No additional clarification is necessary.

2.7.2.8. CCS TSI 7.2.8. Vehicle with Class A and Class B equipment

No additional clarification is necessary.

2.7.2.9. CCS TSI 7.2.9. Conditions for mandatory and optional functions

2.7.2.9.1. CCS TSI 7.2.9.1 ETCS

No additional clarification is necessary.

2.7.2.9.2. CCS TSI 7.2.9.2 ATO

The CCS TSI 2023/1695 introduces the Grades of Automation 1 and 2. ATO is considered as a part of CCS Subsystem as described in Table 4.1 of the CCS TSI. The high-level description of the different grades of automation is provided in Table 1 of SUBSET-125.

NOTE: GoA1 does not require DAS

The CCS TSI 2023/1695 includes only the mandatory set of ATO-specifications with the aim to achieve interoperability for ATO GoA1/2. This is based on the subsets as described in the ERTMS/ATO Reference Architecture within Figure 1 of SUBSET-125.

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Although the main objective of the ATO specifications is to describe the ATO GoA2 functionality, the specifications provide also the ATO GoA1 functionality (i.e. Driver Advisory System). There are no ATO on-board specifications for ATO GoA1 only functionality.

Although ATO is a technically compatible change, it is possible for an IM to mandate the ATO On-Board implementation (ATO GoA1/2 functionality) according to the transition regime within Appendix B, (see examples in 2.8.2.3.2 and 2.8.2.3.3).

Questions and answers:

1. Can a vehicle without ATO On-Board operate on a line with ATO Trackside?
Yes, a vehicle without ATO on-board is, from ATO point of view, technically compatible with a trackside equipped with ATO.

2. Are there any mandatory changes to the ETCS On-Board B3R2 in order to operate in AD-mode?
Yes. In order to operate a vehicle in AD-mode (on a line equipped with ATO TS compliant to the ATO B1R1 specifications), the ETCS On-Board shall be compliant with the envelope up to ETCS system version 2.2 or higher as defined within ETCS B4R1. The ETCS On-Board and the interface functionality between ETCS OB and ATO OB is restricted to a minimum set of functions, however it is not possible to safely operate without this minimum functionality as e.g. the ETCS-On Board controls if it is safe to engage the AD-mode (see SUBSET-026 and SUBSET-125).

3. Are there any mandatory changes to the ETCS Trackside (e.g. X=1) in order to implement ATO TS?
No. Since there is no harmonised functional interface between ETCS TS and ATO TS, nothing prevents from implementing ATO trackside on an ETCS trackside even if the ETCS trackside is an {X=1.0, 1.1, 2.0 or 2.1} system version.

Note: in order to align the trackside requirements related to AD-mode for trackside systems version below 2.2, there are limited changes in the requirements as listed in chapter 6 of SUBSET-026 which have as only objective to allow the deployment of ATO TS on (existing) ETCS TS lines built according to the previous sets of specifications. These changes lead to some limited (negligible) differences in AD-mode operation between ATO OB trains operated on an ETCS TS (X.Y=2.1 or lower) compared to ATO trains operated on an ETCS TS (X.Y=2.2 or higher), e.g. ETCS TS below ETCS TS 2.2 cannot determine if trains operate in AD-mode or not. The ETCS TS (X.Y=2.1 or lower) will only see trains which indicate 'FS' mode (Full Supervision) instead of 'AD'-mode (Automatic Driving) as 'AD-mode' does not exist in these ETCS TS versions (X.Y=2.1 or lower).

4. Are there any differences in the ATO OB in case of being interfaced with an ETCS OB up to SV2.2 compared to an ATO OB being interfaced with an ETCS up to SV3.0?
Yes, see section 7.9.3 of SUBSET-125 (V1.1.0).

2.7.2.9.3. CCS TSI 7.2.9.3 RMR

The CCS TSI 2023/1695 introduces the term Railway Mobile Radio which comprises the 2 radio Class A systems: GSM-R and FRMCS that may be implemented both at the same time or each of them independently.

Implementation: For the FRMCS specifications in Appendix A, note 9 indicates that these specifications, in their current version (FRMCS Baseline 0), are not considered complete for the purpose of tendering the

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FRMCS on-board equipment and as such there are no legally binding implementation requirements related to FRMCS trackside or on-board implementation yet applicable.

The CCS TSI 2023/1695 includes only the mandatory set of FRMCS-specifications with the aim to achieve interoperability when implementing FRMCS. The FRMCS reference architecture is described in indexes 95 and 96 (FRMCS FRS and SRS) of the Table A2 of CCS TSI Appendix A.

Additional voluntary functionalities are integrated into the FRMCS specifications. The difference between the mandatory versus voluntary functionalities will be described in an Annex "Interoperability requirements in EU" of each FRMCS specification.

Figure 1 (ERTMS/ETCS system and its interfaces) of chapter 2 of the SUBSET-026 describes the reference architecture and includes the interfaces between FRMCS and ETCS. In case of migration from GSM-R to FRMCS on an ETCS L2 line, there is a link with the associated ETCS system versions implemented by trackside and on-board.

Context: For operating in FRMCS-mode, the ETCS On-Board system shall support the ETCS system version 3.0 as defined within ETCS B4R1. If not, the ETCS On-Board system will not be able to communicate through the OBApp interface with FRMCS On-Board and will also not understand the new messages defined within P45 required for the use of the FRMCS radio network registration and as such will not be able to operate in FRMCS-mode even if the vehicle is equipped with a compliant FRMCS On-Board B1.

Note: FRMCS B1 specifications are not included yet in the CCS TSI 2023/1695, so the examples below are only relevant when the CCS TSI will be published with the FRMCS B1 specifications.

Questions and answers:

Is it allowed for an Infrastructure Manager to notify that GSM-R services will be stopped (condition 1 in point 7.3.1.2) before FRMCS is in service (condition 2 in point 7.3.1.2)?

According to TSI point 7.3.1.2 yes, the notification is allowed.

Can a vehicle with GSM-R B1 and ETCS developed according to set of specifications #2 of the CCS TSI 2016/919 (X.Y=2.0) operate on a line dually equipped with both GSM-R B1 and FRMCS B1 and equipped with ETCS B4R1 (X.Y=2.3) supporting both GSM-R and FRMCS?

Yes. This vehicle shall operate using GSM-R.

Can a vehicle being dually equipped with GSM-R B1 and FRMCS B1 and only being equipped with ETCS according to set of specifications #2 of the CCS TSI 2016/919 (envelope up to X.Y=2.1) operate on a line equipped with both GSM-R B1 and FRMCS B1 and an ETCS B4R1 {X=1} for which the RBC supports both GSM-R and FRMCS?

Yes, however this vehicle will operate using GSM-R as the set of specifications #2 does not provide the communication between the ETCS application and the FRMCS data communication. Normally, this on-board migration scenario should not exist as upgrading the CCS-On-Board subsystem with FRMCS B1 should be combined with an ETCS upgrade up to the envelope up of ETCS system version 3.0 supporting FRMCS. If not, the vehicle would require 2 migration cycles for the introduction of FRMCS-functionality.

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Can a vehicle being dually equipped with GSM-R B1 and FRMCS B1 and being equipped with ETCS according to B4R1 (X.Y=3.0) operate on a line equipped with GSM-R B1 and FRMCS B1 and with ETCS B4R1 {X=1} for which the RBC supports both GSM-R and FRMCS?

Yes. This vehicle shall operate using FRMCS.

Can a trackside upgrade its ETCS-part (RBC) for FRMCS-operation within B4R1 (X=1) [i.e. incorporating the necessary new messages for FRMCS operation as defined within P45 of B4R1]?

Yes, as this scenario is important in following migration scenario: an existing line is built according to set of specifications #1 of the CCS TSI 2016/919, with ETCS B2 (X=1) and GSM-R B1. During the migration phase, the IM intends to upgrade the line supporting both GSM-R B1 and FRMCS and keeping the ETCS at X=1 [no increase to X={2 or 3}] in order to allow:

The use of GSM-R operation for vehicles equipped with GSM-R only and ETCS B2 (or higher); and

the use of FRMCS operation for vehicles dually equipped with radio (both GSM-R and FRMCS B1) and ETCS B4R1 (up to system version 3.0); and

the use of FRMCS operation for vehicles equipped with FRMCS B1 only and ETCS B4R1 (up to system version 3.0);

Can a FRMCS Voice be used in a vehicle without upgrading SV to 3.0?

Yes, a vehicle can use FRMCS Voice without any additional upgrade to SV 3.0. The upgrade is needed in case the interface of ETCS interacts with FRMCS Data.

What happens if the IM successively switches off GSM-R on level 2 lines combining FRMCS and GSM-R with the corresponding lead time (5 years announcement) in RINF? After switching off the GSM-R part, can this line continue to be a SV 2.3-line, even though it is successively incompatible for SV2.x vehicles?

No. In this case, if the line can only be operated with FRMCS it needs to change the SV to 3.0 because on-boards running with SV 2.Y would not be any more compatible with the infrastructure. In this case, RINF shall be updated with the SV 3.0 to guarantee the incompatibility of SV 2.Y on-boards. Note that in this scenario, additional measures for the migration to “FRMCS only” shall be done at the trackside engineering level.

2.7.2.10. CCS TSI 7.2.10 Specification maintenance (error correction)

The purpose of this point is to describe, in a chronological order, the different responsibilities of the actors involved in the error correction process.

The process of correcting errors in the specification has only been applied to the latest version of the set of specifications with SV 2.1 or higher published in the TSI CCS version preceding the TSI CCS currently in force. For lower system versions where the cases are not covered by the BCAs there is no harmonised solution for correcting the errors and it will be up to the manufacturer to provide a technical solution, however it is recommended to follow the approach taken by the specifications of B4R1.

It affects all vehicles, including those in operation certified against previous versions of CCS TSI.

It affects all trackside implementations including those in operation certified against previous versions of CCS TSI.

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Note. This process does not cover the change control management process that needs to be carried out before, which is described in the ERA document PRO_CCM_002 V 2.1.

Note. This process is triggered only for ERRORs. Change requests catalogued as enhancements are not subject to this process.

Once a TSI release including change requests catalogued as errors preventing normal service is published according to 7.2.10.1, the Agency will produce questionnaires that will be distributed to the operators, manufacturers and infrastructure managers to assess the impact of these errors on their products and/or implementations within 6 months after the latest of these dates, the entry into force of the TSI or the distribution of the questionnaires.

If the infrastructure manager classifies the identified errors within their networks as an unacceptable risk that prevents normal service, it shall identify the affected vehicles (based on the information provided by the questionnaires or other sources of information) according to clause 7.2.10.3.1 of the CCS TSI. It will be up to the infrastructure manager to set temporary mitigations measures, for instance those described in the BCA report, to facilitate existing vehicles to continue their services until on-boards error corrections are implemented according to the transition period as defined in table B1.1. of Appendix B.

NOTE 1: The fact that a CR solution impacts only on-board requirements does not mean that there is no impact on the trackside subsystem. It shall always be checked that trackside design takes into account, at least, on-board unit behaviour compliant to the CR.

NOTE 2: If the Infrastructure Manager decides to implement mitigation measures to those errors affecting the RUs, these should be discussed between IMs and RUs with the objective to avoid as much as possible the introduction of specific operational rules during the "mitigation phase".

Manufacturers shall implement the IC's error corrections according to table B3.

The Railway Undertakings shall compare the actual implementation of the CCS TSI in their vehicles with the error corrections registered in RINF by the IM for the area of use of the vehicle. For the errors affecting on-board subsystems, railway undertakings shall implement the error corrections in accordance with table B1.1 of the appendix B (see examples in section 2.8.2.2).

For the errors preventing normal service affecting trackside subsystems, infrastructure managers shall implement the error corrections in accordance with table B2 of the appendix B.

When allowed, as described in point 7.4.1.2 of CCS TSI, if a network deploys a previous set of specifications (#1, #2, #3) all the relevant corrections to the errors preventing normal service, shall be included in the implementation.

Figure 7 depicts the workflow for the management of error corrections.

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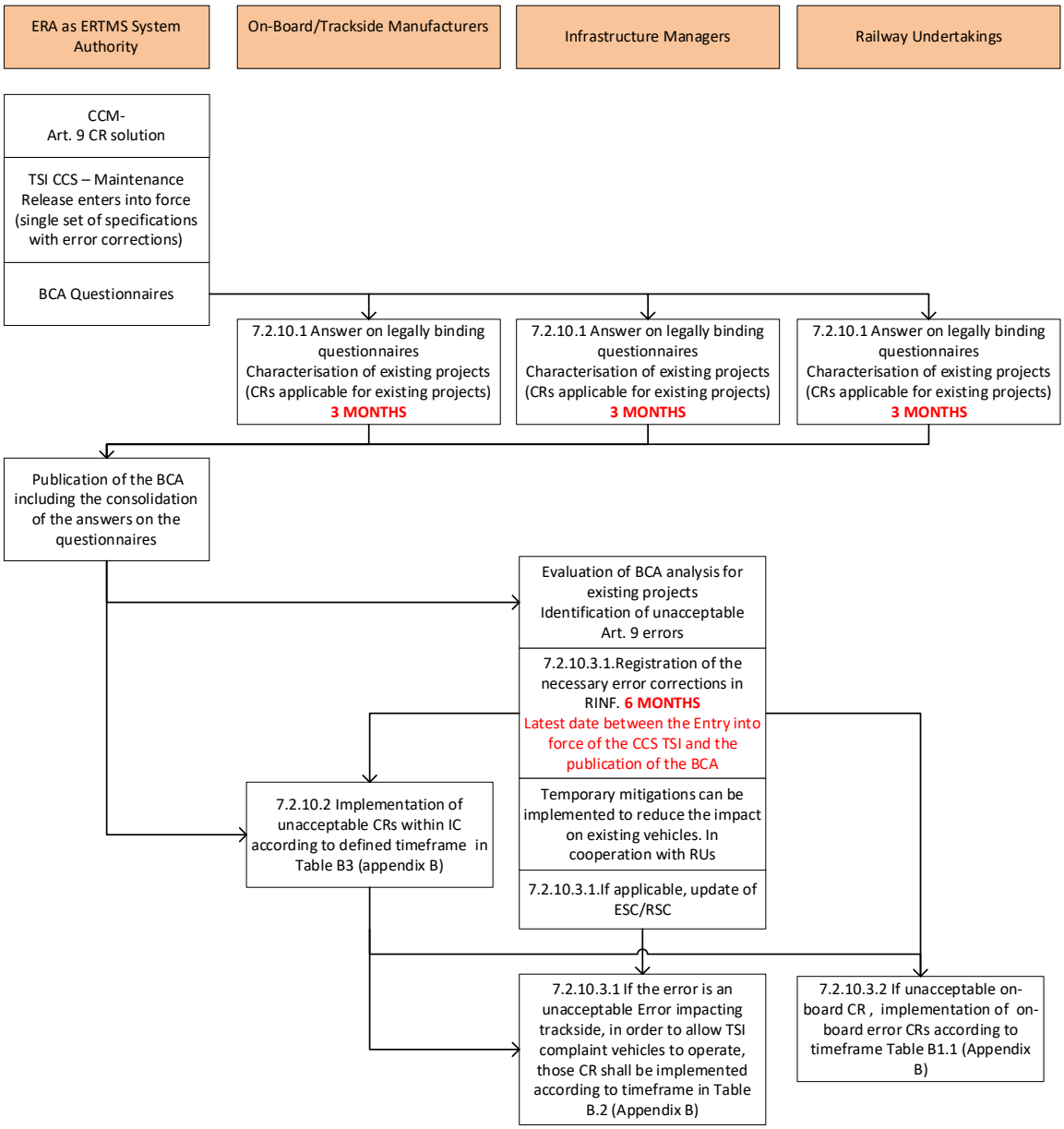

Figure 7. Error correction flowchart

Infrastructure Managers shall notify in RINF or Networks Statement the error corrections that apply to lines which are under construction in the coming 5 years. In this case RUs shall consider that in order to run on those lines the correction to the errors listed by the IM shall be implemented. Implementation and deployment times apply according to Tables B1.1, B2 and B3 as reflected in Figure 7

The following examples are based on the answers to the ERA questionnaires on CRs replied by Infrastructure Managers and On-board suppliers. Infrastructure managers, depending on the trackside designs and engineering of their lines, and with the information provided by the On-board suppliers shall classify the different errors as preventing or not preventing normal service.

Example 1. Error classified by an infrastructure manager as not preventing normal service. This error is not part of the previous workflow. No immediate action from the trackside or the on-board is required.

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Example	Error preventing normal service?	Action(s) from Trackside and/or On-board	
1. CR1021 (Brake command revocation/acknowledgement issues)	No	Trackside	No action is required unless trackside is upgraded or renewed.
		On-board	No action is required for legal releases (with maintenance of specifications) published before 1st January 2026. To be implemented after 1st January 2026 when any legal release containing the error correction is published if one or more registered errors are identified for the area of use

Example 2. Error classified by an infrastructure manager as preventing normal service. This error should follow the process described in Figure 7. Actions from trackside and/or on-board are required.

Examples	Error preventing normal service?	Action(s) from Trackside and/or On-board and/or manufacturers	
2. CR1252 (Ambiguities about release speed and application of A.3.4 in case a train accepts a CES)	Yes	Trackside	- Notify in RINF the applicability of the on-board error correction. - Optional: implement temporary mitigation measures to facilitate the operation of vehicles. - If the error impacts the trackside subsystem, error correction shall be applied according to row 1 in table B2. - If applicable, update of ESC/RSC
		IC	Implementation of corrections of unacceptable errors according to table B3
		On-board	To identify if the error correction shall be applied. If yes, it shall be implemented according to row 1 in table B1.1. See another example in section 2.8.2.2. *Note: The other error CR are not required for legal releases (with maintenance of specifications) published before 1st January 2026.*

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2.7.3. CCS TSI 7.3. RMR specific implementation rules

No additional clarification is necessary.

2.7.4. CCS TSI 7.4. ETCS specific implementation rules

No additional clarification is necessary.

2.7.4.1. CCS TSI 7.4.1. Trackside installations

2.7.4.1.1. CCS TSI 7.4.1.1 High-speed network

No additional clarification is necessary.

2.7.4.1.2. CCS TSI 7.4.1.2 Set of specifications from previous versions of the CCS TSI.

Minor modifications in the already deployed trackside subsystem which are not classified as renewal or upgrade and so do not need a reauthorisation fall into the scope of this point and the set of specifications that was used for the initial deployment can be used. When required and as per CCS TSI point 7.4.1.2 (2) & (3), adding 1 packet/message from a higher Baseline does not change the initial reference of the Baseline (e.g. implementation of CR 1462 on Baseline 2 trackside remains a Baseline 2 even if CR 1462 solution implements a package/message from Baseline 3.

The following flowchart in Figure 8 shows the possibilities of using former set of specifications when deploying ERTMS in a trackside: (HTML interactive version can be downloaded from here: https://www.era.europa.eu/sites/default/files/2026-01/transition%20regime%20app%20guide%203.0.zip)

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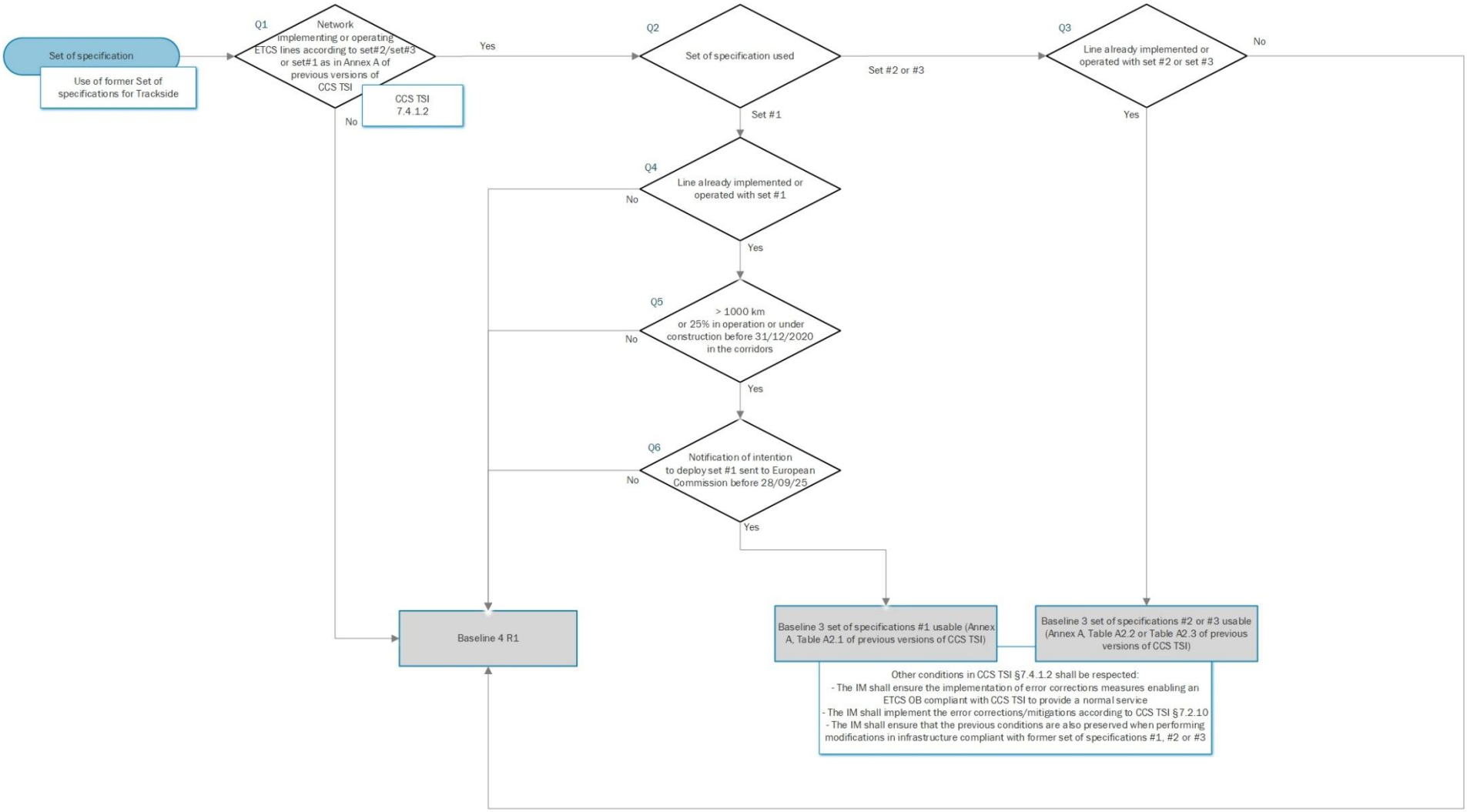

Figure 8. Flowchart for the use of previous set of specifications for trackside

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2.7.4.1.3. CCS TSI 7.4.1.3 ETCS System Version implementation rules

The CCS Trackside subsystem and the Interoperability Constituent which are integrated in it, can select the ETCS functions to be implemented as defined in CCS TSI point 7.4.1.3 *"*The trackside implementation can select which ETCS-functions shall be implemented from the set of specifications in Appendix A*. The specifications in Appendix A contain functions from the following system versions: 1.0, 1.1, 2.0, 2.1, 2.2, 2.3 and 3.0."*
It shall be noted that the IM shall notify by means of RINF which lines use which system version.

In case an IM develops operational and engineering rules for Supervised Manoeuvres as part of ETCS trackside SV2.3 implementation, it is recommended that the IM is liaising with ERA/ERJU (ERJU System Pillar Domain or ERA TWG Eng. rules) in order to align these with the harmonised operational and engineering rules being developed at European level. This will avoid proprietary national solutions for supervised manoeuvres.

2.7.5. CCS TSI 7.5. ETCS and radio system compatibility checks implementation rules

No additional clarification is necessary.

2.7.6. CCS TSI 7.6. Train detection systems specific implementation rules

No additional clarification is necessary.

2.7.7. CCS TSI 7.7. Specific cases

No additional clarification is necessary.

2.8. Appendices of the CCS TSI

2.8.1. CCS TSI, Appendix A References, List of mandatory specifications, Standards

No additional clarification is necessary.

2.8.2. CCS TSI, Appendix B – Transition Regime

Introduction

The Appendix B provides a transition regime for the TSI changes made in the CCS TSI 2023/1695 compared to the previous CCS TSI. The CCS TSI 2023/1695 includes mainly TSI changes linked to the introduction of ETCS Baseline 4 Release 1, ATO Baseline 1 Release 1 and RMR (being composed of GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0). The transition regime indicates when these new specifications become mandatory.

In all cases where a transition regime allows for the use of a set of specifications from a previous TSI version, it is allowed to use the TSI CCS version corresponding to the used subsets, as modified by Appendix B of the current TSI CCS, as assessment framework. I.e. certificates are issued for the current

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TSI CCS version while the assessment is done according to the TSI CCS text corresponding to the used requirements + appendix B from the current TSI version.

A similar transition regime is used both within the CCS TSI and the LOC&PAS TSI with the aim to facilitate and coordinate the transition phases at vehicle level. Explanation of the different phases for an on-board is given in this application guide – see section 2.7.2.4.1.

In the following, different situations presented as different examples, illustrate how to deal with the transition regime.

2.8.2.1. Transition regimes flowcharts

The following flowcharts depict the following processes: HTML interactive version can be downloaded from here:

https://www.era.europa.eu/sites/default/files/2026-01/transition%20regime%20app%20guide%203.0.zip

- Figure 9: Necessity of installing ETCS on-board
- Figure 10. Necessity of installing ETCS on-board for special vehicles
- Figure 11. Set of specifications and system version for vehicles
- Figure 12. CMD installation
- Figure 13. On-board modularity
- Figure 14. ATO On-board

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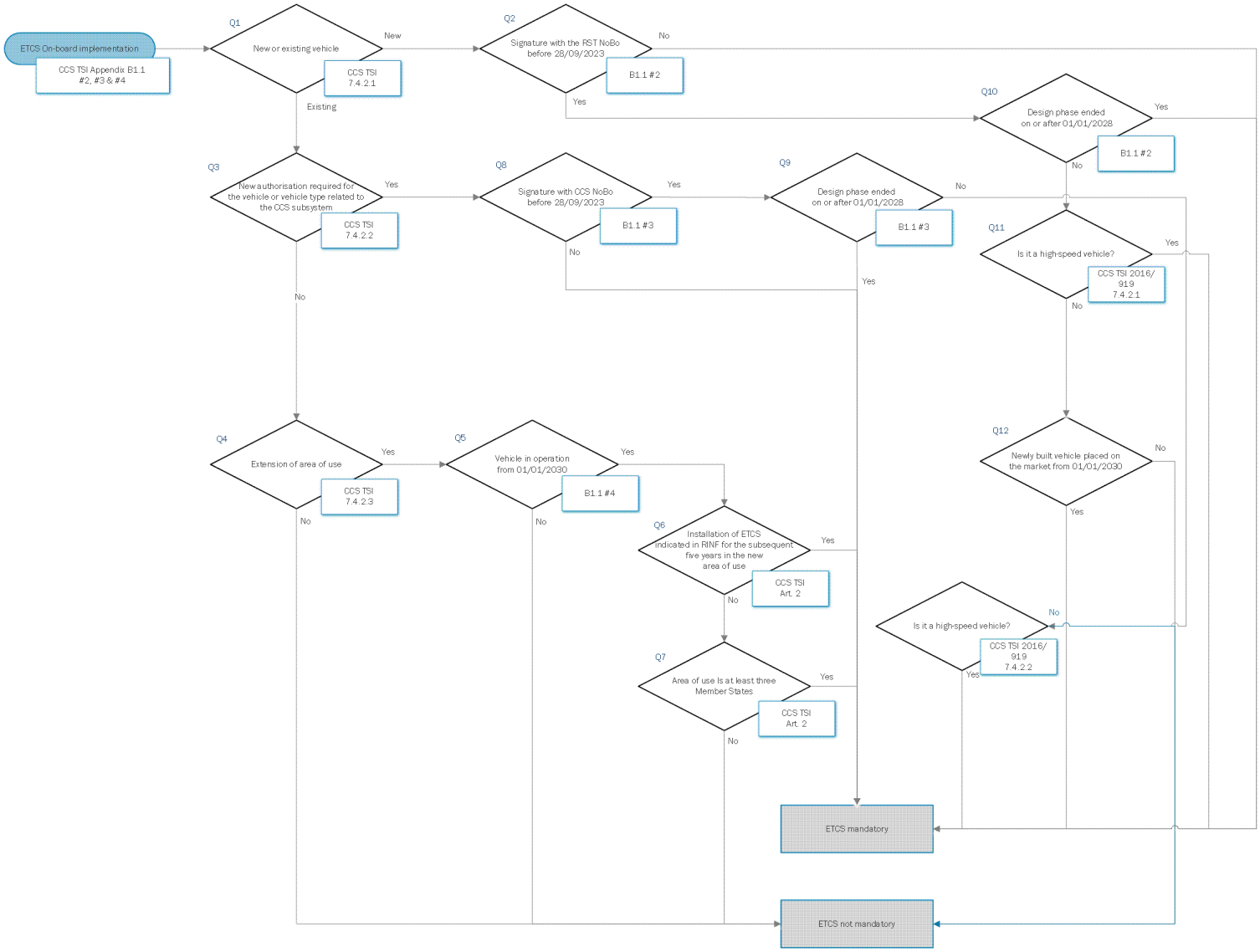

Figure 9: Necessity of installing ETCS on-board

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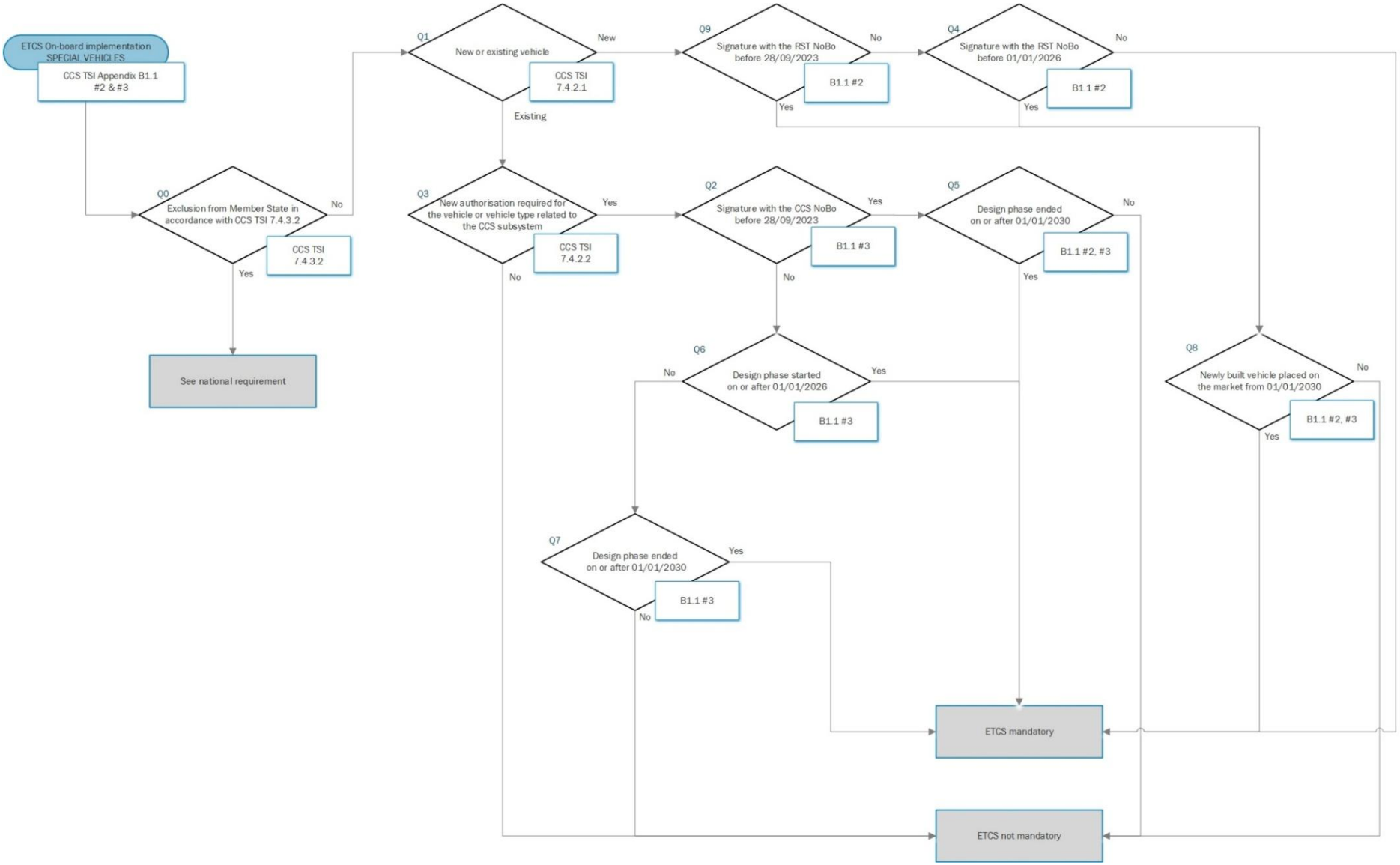

Figure 10. Necessity of installing ETCS on-board for special vehicles

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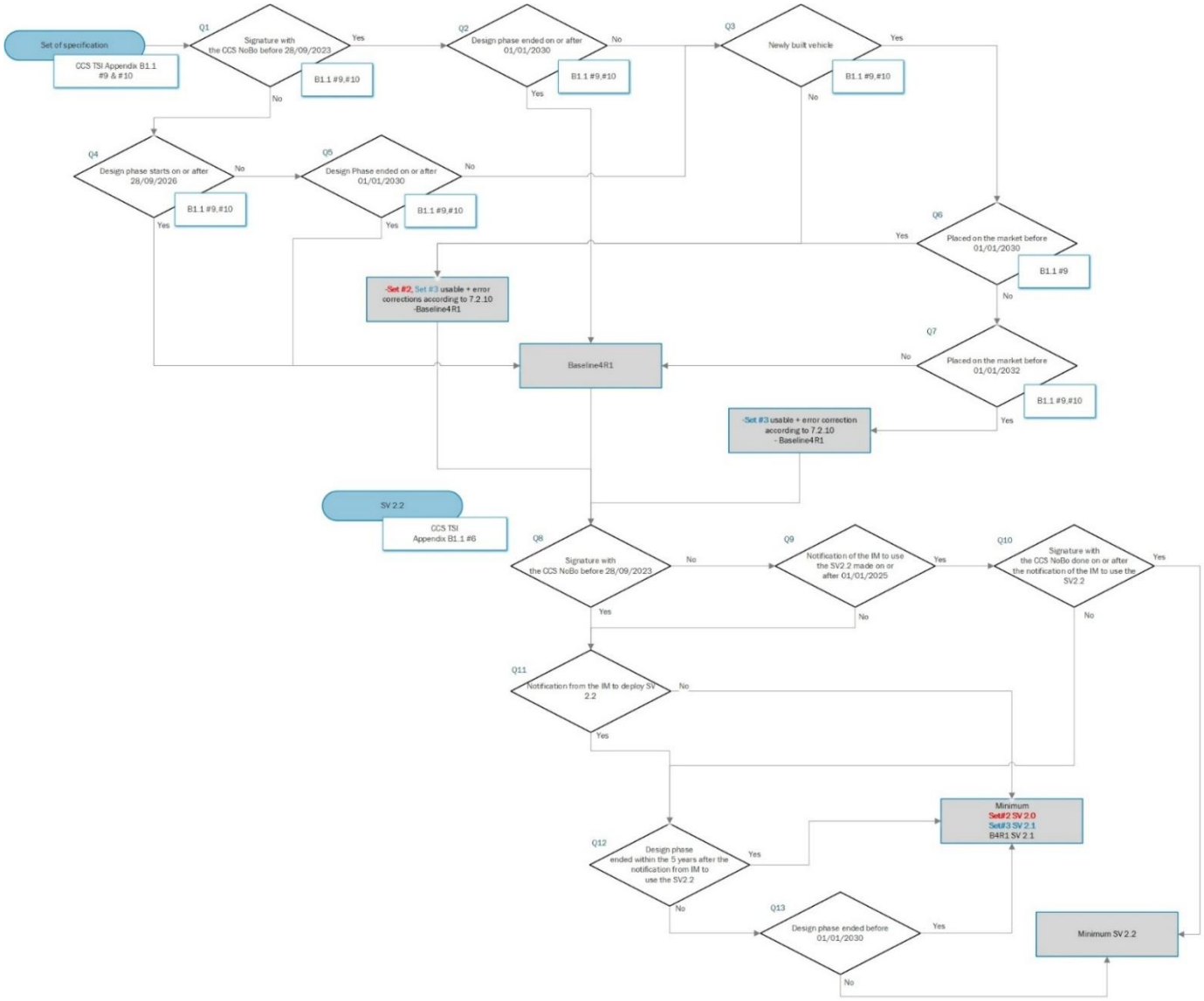

Figure 11. Set of specifications and system version for vehicles

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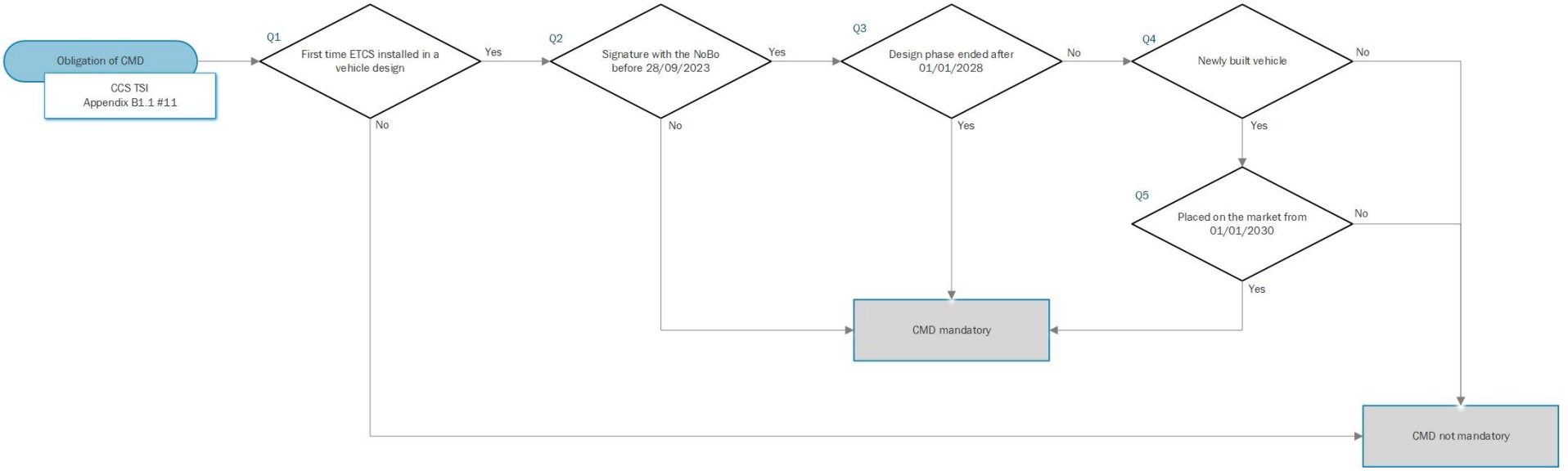

Figure 12. CMD installation

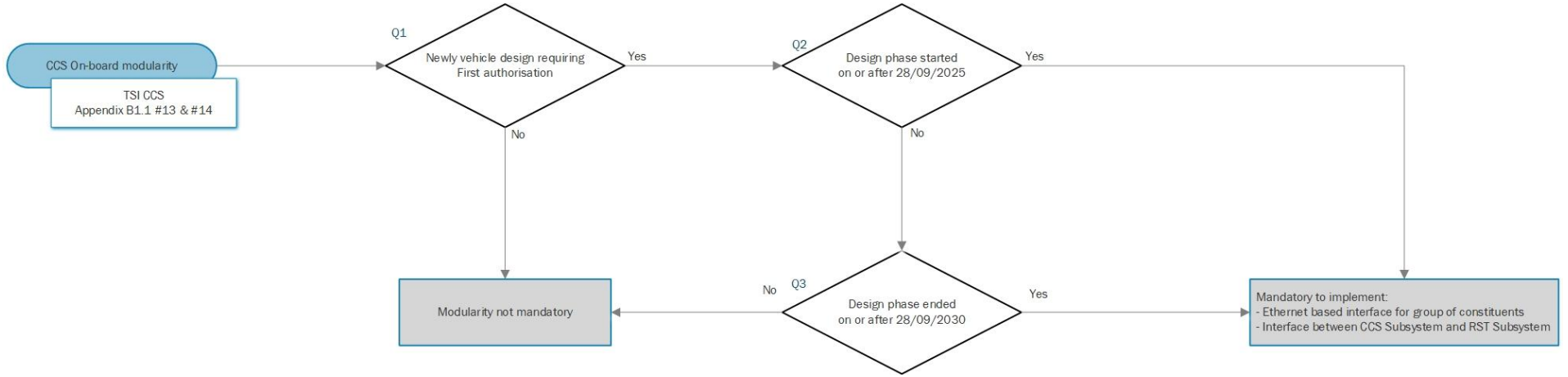

Figure 13. On-board modularity

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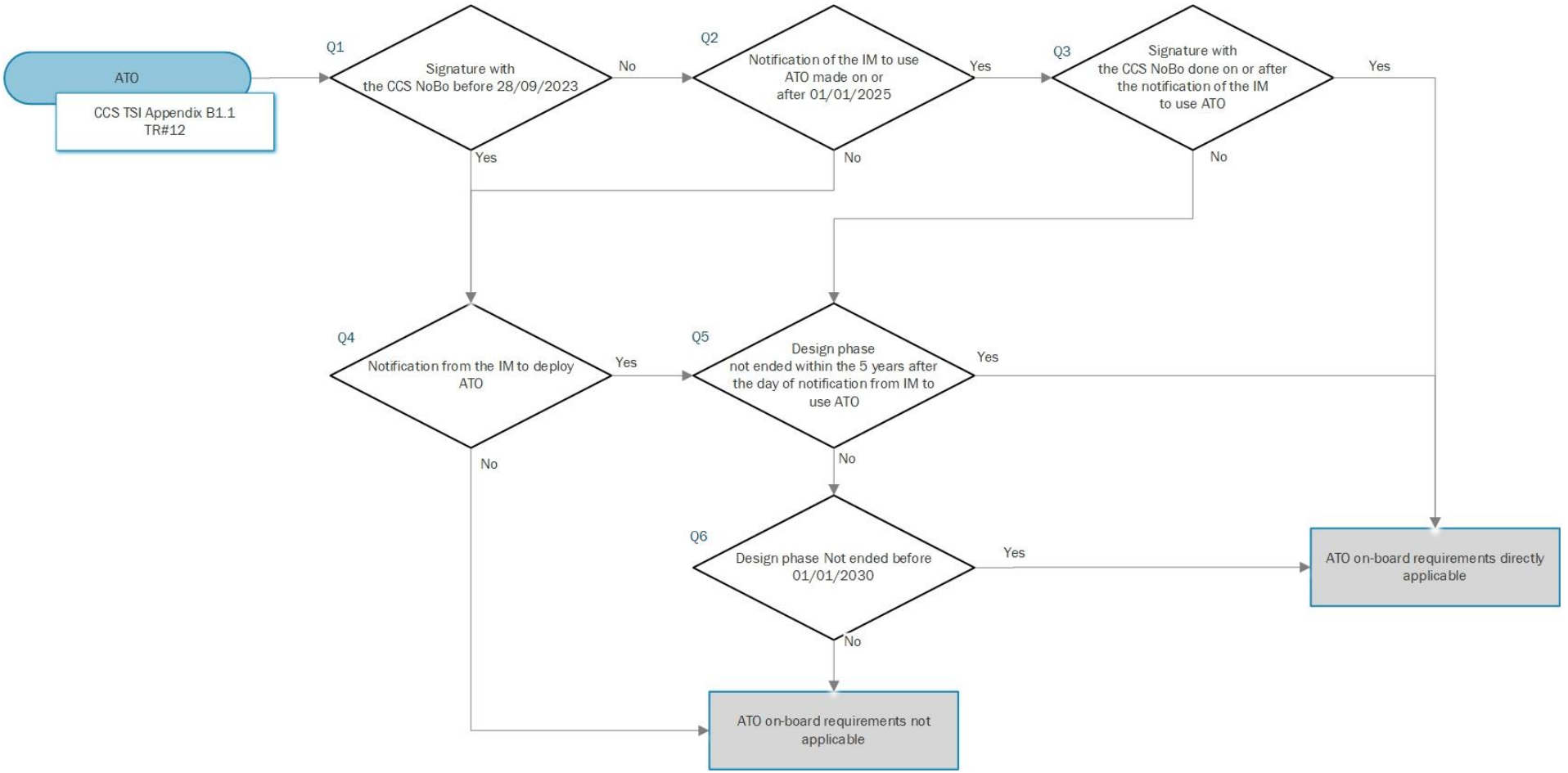

Figure 14. ATO On-board

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2.8.2.2. Examples for ETCS On-Board implementation requirements

2.8.2.2.1. In example 1, the starting conditions are:

- an ETCS On-Board is not necessary (yet) to operate on the network due to the availability of Class B systems (Member State did not add additional national requirements according to point 7.4.3)

- and the applicant intends not to install ETCS On-Board (yet) on a newly built vehicle (assumption: no special vehicle).

This means according to the row 2 of Table B1.1, following implementation rules apply for vehicles being authorised according to Table B1.1:

Example	**Design phase started on or after TSI enters into force (28 September 2023)**	**Design phase started before TSI enters into force (28 September 2023)**	**Production phase**	**Vehicle in operation**
1	It is mandatory to implement ETCS On-Board on newly built vehicles.	It is not mandatory to implement ETCS On-Board on newly built vehicle if design phase has ended before 01st January 2028. It is mandatory to implement ETCS On-Board on newly built vehicle if design phase has not ended before 01st January 2028.	It is mandatory to implement ETCS on newly built vehicles placed on the market from 01st January 2030 (also if these vehicles are part of a (large) series and the first vehicles are already authorised without ETCS On-Board implementation).	No implementation of ETCS on-board is mandated by the CCS TSI 2023/1695.

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2.8.2.2.2. Context of example 2, the starting conditions are:

- an ETCS On-Board system version 2.0 (based on set #2 of CCS TSI 2016/919) remains sufficient to operate without any need for implementation of error corrections that could prevent normal service (see point 7.2.10)
- this ETCS on-board has no need to implement specific requirements (additional functions, national rules, …) not specified in set #2 of CCS TSI 2016/919.
- The applicant intends to produce newly built vehicles in series based on an EC declaration of verification referring to a valid EC type or design examination certificate referring to set #2 of CCS TSI 2016/919.

In example 2, an applicant intends to produce newly built vehicles in series based on an EC declaration of verification referring to a valid EC type or design examination certificate referring to set #2 of CCS TSI 2016/919. According to the column 'production phase' and row 9 of Table B1.1, this is possible until 01st January 2030 on newly built vehicles.

Example	**Design phase started on or after TSI enters into force (28 September 2023)**	**Design phase started before TSI enters into force (28 September 2023)**	**Production phase**	**Vehicle in operation**
2	N/A (not relevant in example)	N/A (not relevant in example)	Applicable on newly built vehicles from 1st January 2030	N/A (not relevant in example)

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2.8.2.2.3. In example 3, it concerns previously requested national rules by a Member State which are classified as an enhancement.

The following examples are used:

Example	If previously requested NR are related to functions introduced by CR:	Explanation with TSI 2023/Classification of CR:	Transition Regime:
3	Requested national rules: CR1346 'Radio Remote control shunting under ETCS' CR1379 'Technical range check during data entry' CR1374 'Non Leading'	These new functions are enhancements integrated into ETCS up to system version 3.0, so imposing these functionalities not according to the transition regime of the TSI 2023/1695 is considered as not being compliant to the CCS TSI 2023/1695. NR classified as enhancement are de-facto negatively assessed by the Agency.	Negatively assessed National Rules shall be repealed (or modified) by the Member States. The items considered within the 3 examples should not be mandatory solved by the ETCS On-Board upgrade, however it could be temporally handled also by other means ('Other means' should be found between RUs, IM and NSA with the support of the suppliers and assessed by the AsBo) until the transition regime of the ETCS system version 3.0 becomes applicable (see row 7 of Table B1.1).

2.8.2.2.4. In example 4, it concerns examples where Member State could request national rules which are errors being classified as preventing normal service.

Note: This change request CR1389 shall be considered as a potential case to illustrate the example.

Error CRs:	Explanation with TSI 2023/Classification of CR:	Transition Regime:
Example: Requested national rule related to the implementation of CR1389 integrated in B4R1 CR1389 'Reaction when CI of the odometry is exceeding the accuracy requirement of 5m+5% (SS-41)'	This CR is considered as an error preventing normal service with safety impact, and the CR is part of the B4R1 (ETCS On-Board reduced envelope up to SV2.1). Therefore, a questionnaire related to CR1389 to evaluate the applicability and the need to register this error on a network was distributed and analysed.	It is expected that IMs notify this CR as part of the "error correction procedure" if the error is evaluated as impacting the normal service (TSI - §7.2.10). The transition regime of registered error corrections shall apply (see example 4 below) for ETCS On-Board

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Error CRs:	Explanation with TSI 2023/Classification of CR:	Transition Regime:
		being compliant to set #1, #2 or #3 of CCS TSI 2016/919.

The starting conditions are:

- an ETCS system version 2.1 (based on set #3 of CCS TSI 2016/919) remains sufficient to operate on a network.
- there is a need to implement CR 1389 as without it, the IM has stated normal service would not be possible.
- This CR is registered in RINF by the Infrastructure Manager on 01st January 2025.
- The applicant intends to use the set #3 of the specifications for the ETCS On-Board as long as possible with a minimum set of error corrections implemented.

This means that in order to demonstrate the transition regime of the CCS OB, according to rows 1 and 10 in Table B1.1 and row 1 of Table B3, following implementation rules apply for vehicles being authorised according to Table B1.1 which prevents the further use of set#3 of CCS TSI 2016/919:

Example	Design phase started on or after TSI enters into force (28 September 2023)	Design phase started before TSI enters into force (28 September 2023)	Production phase	Vehicle in operation
4	It is allowed to continue to use set #3 of CCS TSI 2016/919 if design phase starts before 28 September 2026 and if the design phase has ended before 01st January 2030. The additional registered error corrections (e.g. CR 1389) shall be implemented by 01st January 2027 (18 months for the update of the ETCS IC + 6 months in case of a new authorisation). Use of ETCS B4R1 of CCS TSI 2023/1695 (including all error corrections) if design phase starts after 28 September 2026 or	It is allowed to continue to use set #3 of CCS TSI 2016/919 if the design phase has ended before 01st January 2030. The additional registered error corrections (e.g. CR 1389) shall be implemented by 01st January 2027 (18 months for the update of the ETCS IC + 6 months for the new authorisation). Use of ETCS B4R1 of CCS TSI 2023/1695 (including all error	It is allowed to continue to use set #3 of CCS TSI 2016/919 depending on the associated vehicle type. The additional registered error corrections (e.g. CR 1389) shall be implemented by 01st July 2027 in case no new authorisation is required or by 01st January 2028 in case a new authorisation is required	It is allowed to continue to use set #3 of CCS TSI 2016/919 depending on the associated vehicle type. The additional registered error corrections (e.g. CR 1389) shall be implemented on the affected vehicles in operation by 01st July 2027 in case no new authorisation is required or by 01st January 2028 in case a new

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Example	Design phase started on or after TSI enters into force (28 September 2023)	Design phase started before TSI enters into force (28 September 2023)	Production phase	Vehicle in operation
	if design phase ends after 01sr January 2030.	corrections) if design phase ends after 01st January 2030.	for the associated vehicle type. Use of ETCS B4R1 of CCS TSI 2023/1695 (including all error corrections) from 01st January 2032 on newly built vehicles.	authorisation is required for the associated vehicle type.

2.8.2.2.5. Example 5: ETCS System version 2.2

ETCS On-Board System version 2.2 is only introduced for ATO functionality. Therefore, the transition regime of ETCS system version 2.2 is integrated with the example of ATO On-Board implementation requirements described in points 2.8.2.3.2 and 2.8.2.3.3.

2.8.2.2.6. Example 6

Starting conditions:

- On the concerned network, ETCS system version 2.3 (based on ETCS B4R1 of CCS TSI 2023/1695) will be in operation on some lines by 2032 and has been notified by the IM in RINF/Network statement in the year 2025 (notification period more than 5 years). The early notification is done to announce the implementation of the functions such as FRMCS or Supervised Manoeuvres as referred to in footnote 57 of the CCS TSI 2023/1695.

According to the row 7 in Table B1.1, ETCS On-Board system version 3.0 cannot yet be mandated through the CCS TSI 2023/1695 and as such remains currently a voluntary choice of the applicant. *Note: the same is valid for the transition regime related to FRMCS On-Board implementation in row 15 of Table B1.1.*

2.8.2.2.7. Example 7

Starting conditions:

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- an applicant intends to extend the area of use of a vehicle type having already ETCS On-Board (based on set #2 of CCS TSI 2016/919).
- In order to operate in this extended area of use, a Class B-system needs to be added without any modification of the ETCS-part (no new interface to ETCS and no new configuration file inside ETCS).
- The notified body is contracted for this upgrade of the CCS On-Board Subsystem in the year 2024 (after entry into force of the CCS TSI 2023/1695).

This means that according to row 8 of Table B1.1 the ETCS system version 2.1 is not required according to point 7.4.2.4.2. Point 7.4.2.3 (7)) refers to 7.4.2.4.1 and 7.4.2.4.2, which only mandates ETCS up to system version 2.1 in case the ETCS part of the subsystem is upgraded. In this project the adding of the Class B is not impacting the ETCS part, so the vehicle may remain in set #2.

Example	**Design phase started on or after TSI enters into force (28 September 2023)**	**Design phase started before TSI enters into force (28 September 2023)**	**Production phase**	**Vehicle in operation**
7	ETCS-part does not require any upgrade due to point 7.4.2.3 (7)	N/A (not relevant in example)	N/A (not relevant in example)	N/A (not relevant in example)

2.8.2.2.8. Example 8

Starting conditions:

- For the concerned on-board, the design phase starts in the year 2024.
- the design phase ends in the year 2025.
- a series of vehicles is intended to be produced until the year 2034.
- The applicant intends to use set of specifications #3 of CCS TSI 2016/919.

This means that:

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Example	Design phase started on or after TSI enters into force (28 September 2023)	Design phase started before TSI enters into force (28 September 2023)	Production phase	Vehicle in operation
8	It is allowed to use set of specifications #3 of CCS TSI 2016/919 as the design phase starts before 28th September 2026 and the design phase ends before 01st January 2030.	N/A (not relevant in example)	Newly built vehicles in production phase can only use this vehicle type until 31st December 2031 and as from the year 2032 onwards, newly built vehicles shall be produced based on ETCS B4R1 of the CCS TSI 2023/1695 which will trigger a new authorisation for the concerned vehicle type	N/A (not relevant in example)

2.8.2.2.9. Example 9 – Cold Movement Detector

9.a Starting conditions:

- A project includes the upgrade of an existing vehicle design and the serial retrofitting of existing vehicles in order to be equipped with ETCS for the first time;
- The design phase started in June 2023 and ends in the year 2027;
- A series of existing vehicles is intended to be retrofitted from 2028 until the year 2034.
- The applicant intends to use set #3 of CCS TSI 2016/919 (without the need of implementation of error corrections introduced in B4R1).

The transition regime is explained in the table below.

9.b Starting conditions:

- A project includes a new vehicle design and the production of a set of newly built vehicles;
- The design phase started in June 2023 and ends in the year 2027;
- A series of newly built vehicles is intended to be produced from 2028 until the year 2034.
- The applicant intends to use set #3 of CCS TSI 2016/919 (without the need of implementation of error corrections introduced in B4R1) and without CMD.

The transition regime is explained in the table below.

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9.c Starting conditions:

- A project includes the upgrade of an existing vehicle design already being equipped with ETCS based on set of specification #3 of CCS TSI 2016/919 for which the applicant only wants to include CMD and does not want to change the ETCS system version
- The design phase started in June 2023 and ends in the year 2027;
- A series of existing vehicles is intended to be retrofitted from 2028 until the year 2034.

The transition regime is explained in the table below.

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9.d Transition regimes for example 9a, 9b and 9c

According to row 10 and 11 of Table B1.1, following transition regime applies.

Example	Design phase started on or after TSI enters into force (28 September 2023)	Design phase started before TSI enters into force (28 September 2023)	Production phase	Vehicle in operation
9a	N/A (not relevant in example)	Use of set #3 is allowed (as the design phase ended before 01st January 2030) and CMD remains optional (as the design phase ended before 01st January 2028).	All existing vehicles within the project can be upgraded based on the vehicle design using set #3 and without CMD.	N/A (not relevant in example)
9b	N/A (not relevant in example)	Use of set #3 is allowed (as the design phase ended before 01st January 2030) and CMD remains optional (as the design phase ended before 01st January 2028).	Newly built vehicles being produced before 01st January 2030 can use set #3 without CMD; Newly built vehicles being produced between 01st January 2030 and 01st January 2032 can use set #3, however CMD is mandatory; Newly built vehicles being produced from 01st January 2032 onwards shall use ETCS B4R1 with CMD;[2]	N/A (not relevant in example)

[2] For the placing on the market of newly built vehicles, it is mandatory to use a vehicle design with CMD from 01st January 2030 onwards and ETCS B4R1 from 01st January 2032 onwards, so the applicant has the choice to immediately integrate CMD and ETCS B4R1 into its vehicle design or consider 1 or 2 consecutive upgrades of its vehicle design to fulfil the implementation requirement.

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Example	Design phase started on or after TSI enters into force (28 September 2023)	Design phase started before TSI enters into force (28 September 2023)	Production phase	Vehicle in operation
9c	N/A (not relevant in example)	If adding CMD-device does not require an ETCS upgrade, the continued use of set #3 is allowed without time limitation. If adding CMD-device does require an ETCS upgrade, the use of ETCS B4R1 is mandatory if design phase ends on or after 01st January 2030, therefore in example 9c, it is allowed to use set #3.	All existing vehicles within the project can be upgraded based on the vehicle design using set #3 and with CMD implemented.	N/A (not relevant in example)

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2.8.2.3. Examples for ATO GoA1/2 On-Board (incl. ETCS on-board unit B4R1 up to SV2.2) implementation requirements

2.8.2.3.1. Context: according to point 7.4.4, the Member States shall develop a national plan for the implementation of the TSI, including the implementation plans for ATO GoA1/2. ATO GoA1/2 trackside implementation can lead to new mandatory on-board requirements (i.e. ATO on-board unit and ETCS B4R1 up to SV2.2) triggered by the notification within the RINF or Network statement.

2.8.2.3.2. ATO example 1

Starting condition:

- On the concerned network, ATO GoA2 will be in operation on some lines in the year 2031;
- the IM has notified this within RINF/network statement of the year 2026 (notification period of 5 years, starting from 01st January 2026);

2.8.2.3.3. ATO example 2

Starting condition:

- On the concerned network, ATO GoA2 will be in operation on some lines in the year 2027;
- The IM has notified this within RINF/network statement of the year 2025 (notification period shorter than 5 years, starting from 01st January 2025).

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2.8.2.3.4. This means that row 6 (ETCS B41 up to SV2.2) and row 12 (ATO On-Board Implementation) of Table B1.1 lead to the following implementation rules for vehicle designs/vehicles being authorised:

<table>
<tr><th>Example</th><th>Design phase started on or after TSI enters into force (28 September 2023)</th><th>Design phase started before TSI enters into force (28 September 2023)</th><th>Production phase</th><th>Vehicle in operation</th></tr>
<tr><td rowspan="2">ATO 1</td><td>If design phase started after 01st January 2026:
ATO on-board and ETCS on-board unit SV2.2 requirements are directly applicable.</td><td rowspan="2">ATO on-board and ETCS B4R1 up to SV2.2 requirements are applicable if the design phase is not ended by 01st January 2031;</td><td colspan="2" rowspan="2">No implementation requirements
Note: As there are no mandatory ATO on-board or ETCS B4R1 up to SV2.2 implementation requirements, agreements can be made between IM and RUs (who operate or intend to operate on ERTMS/ATO equipped lines) for installation of ATO OB and ETCS up to SV2.2 into the concerned vehicles.</td></tr>
<tr><td>If design phase started between 28 September 2023 and 01st January 2026:
ATO on-board and ETCS B4R1 up to SV2.2 requirements are applicable if the design phase is not ended before 01st January 2031;</td></tr>
<tr><td rowspan="2">ATO 2</td><td>If design phase started after 01st January 2025:
ATO on-board and ETCS B4R1 up to SV2.2 on-board requirements are directly applicable.</td><td rowspan="2">ATO on-board and ETCS B4R1 up to SV2.2 requirements are applicable if the design phase is not ended by 01st January 2030;</td><td colspan="2" rowspan="2">No implementation requirements
Note: As there are no mandatory ATO on-board or ETCS B4R1 up to SV2.2 implementation requirements, agreements can be made between IM and RUs (who operate or intend to operate on ERTMS/ATO equipped lines) for installation of ATO OB and ETCS up to SV2.2 into the concerned vehicles.</td></tr>
<tr><td>If design phase started between 28 September 2023 and 01st January 2025:
ATO on-board and ETCS B4R1 up to SV2.2 requirements are applicable if the design phase is not ended before 01st January 2030;</td></tr>
</table>

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2.8.2.3.5. Vehicle project: assume following starting conditions for a vehicle project:

A vehicle design is upgraded where ETCS is installed for the first time and a series of existing vehicles is retrofitted with ETCS for the first time

The design phase starts in June 2025 and the design phase ends in 2028

Example	**Design phase started on or after TSI enters into force (28 September 2023)**	**Design phase started before TSI enters into force (28 September 2023)**	**Production phase**	**Vehicle in operation**
ATO 1	ATO on-board and ETCS B4R1 up to SV2.2 requirements are not mandatory as the design phase is ended before 01st January 2030;	N/A (not relevant in this example)	ATO on-board and ETCS B4R1 up to SV2.2 requirements are not mandatory for the serial retrofitting as ATO and ETCS B4R1 is not mandatory for the vehicle design phase	N/A (not relevant in this example)
ATO 2	ATO on-board and ETCS B4R1 up to SV2.2 on-board requirements are mandatory as the design phase starts after 01st January 2025.	N/A (not relevant in this example)	The serial retrofitting will include ATO and ETCS B41 up to 2.2 As the vehicle design includes ATO and ETCS B4R1 up to 2.2, the serial retrofitting will include ATO and ETCS B4 up to 2.2.	N/A (not relevant in this example)

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2.8.2.4. Clarifications for table B2 (CCS Trackside Subsystem)

Partial fulfilment: in row 6 of table B2, the deletion of the partial fulfilment is added for consistency reasons as the previous CCS TSI did not exclude the CCS trackside subsystem. As indicated in point 7.4.1.3, the trackside can select which functions to implement. When a function is implemented, it shall fully comply with the CCS TSI 2023/1695.

Note: In Table B.2 row 1 the term "IM Decision" refers to the list of applicable CR to be registered in RINF by the IM as defined in point 7.2.10.3.1.

2.8.2.4.1. Example 1 on ERTMS trackside implementation: An IM has started ERTMS trackside installation before TSI CCS 2023/1695 enters into force.

Starting conditions:

- This trackside project is a project in advanced stage of development with the intention to be placed in service in the year 2025.
- The design is done according to set of specifications #1, #2 or #3 based on the CCS TSI 2016/919 amended by Regulations (EU) 2019/77 and (EU) 2020/387
- The train detection systems are not impacted by the implementation requirements of point 7.6 of the CCS TSI 2023/1695

The IM has no intention to change its design and analyses which implementation requirements from Table B2 in CCS TSI 2023/1695 should be considered. According to Table B2, only row 1 might impact the ERTMS trackside design. This will depend on the answers from the questionnaires which might exceptionally lead to trackside error corrections within the trackside design. The IM shall also analyse the possible impact of other errors preventing normal service for the on-board listed in the BCA report and shall follow the error correction process. In this case there is no need to request for non-application according to Article 7 of the Directive (EU) **2016/797**

2.8.2.4.2. Example 2 on ERTMS trackside implementation: An IM has started ERTMS trackside installation on several lines of its network. The trackside roll-out will be based on a generic design from 2022 until at least 2035.

Starting conditions:

- The trackside design is done according to set of specifications #1, #2 or #3 of the CCS TSI 2016/919 amended by Regulations (EU) 2019/77 and (EU) 2020/387.
- The trackside roll-out uses currently non-harmonised marker boards different from the ones specified in the CCS TSI 2023/1695;
- The trackside roll-out uses currently non-compliant interfaces between the different RBCs;

The IM has no intention to change its design and analyses which implementation requirements from Table B2 in CCS TSI 2023/1695 should be considered.

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According to Table B2,

- Row 1 (Potential error corrections impacting Trackside CCS Subsystem) might impact the trackside design. This will depend on the answers from the questionnaires which might exceptionally lead to trackside error corrections within the trackside design.
- Row 3 (Marker-Board) will impact the non-harmonised marker boards for those trackside projects which are not in advanced stage of development.
- Row 6 (Partial fulfilment) will impact the non-compliant RBC-RBC interface designs and will require compliant RBC-RBC interfaces for trackside projects (modification or implementation) being placed in service after 28th September 2030. Until that date, the implementation of non-compliant interfaces will be considered as using the "partial fulfilment" clause.

2.8.2.4.3. Example 3 on ERTMS trackside implementation: An IM has started ERTMS trackside installation on several lines of its network which are not in advanced stage of development (this needs to be decided and justified by the IM by means of the progress of the project at the time the TSI 2023/1695 entered into force according to the definition set in Directive EU (2016/797)).

- Option 1: The IM can use the B4R1 directly which includes error corrections for all system versions. In this case the IM is directly applying the TSI in force with no changes. No need to perform further actions.
- Option 2: The IM decides to use 7.4.1.2 to use previous set of specifications. In this case the example is the same as the one depicted in 2.8.2.4.2. According to Table B2 rows 1, 3 and 6 need to be revised.

2.8.2.5. Clarifications for table B3 (CCS Interoperability Constituents)

Note: In Table B.3 rows 1 and 3, the term "IM Decision" refers to the list of applicable CR registered in RINF by the IM as defined in point 7.2.10.3.1.

The transition regime established for Appendix A, Table A 2, Indexes 31, 37 b.37 c and 37 d is determined by the latest date between the 1st July 2026 and the publication of a Technical Opinion by the Agency establishing a new version of those indexes as Acceptable Means of Compliance (AMOC). In the meantime, all the tests and assessments that could have been done on a product, remain valid and do not need to be repeated.

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2.8.3. CCS TSI, Appendix C – ESC/RSC templates

Note: Further information may be included depending on the outcomes of the ESC/RSC TWG

2.8.4. CCS TSI, Appendix D - Description of conditions, restrictions and added functions template

The document describing the template and its use is in the Agency Web page in the ERTMS section under Certification issues. Can be directly access through this link:

Restrictions_and_added_functions_en.xlsx
(https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.era.europa.eu%2Fsystem%2Ffiles%2F2024-06%2FRestrictions_and_added_functions_en.xlsx&wdOrigin=BROWSELINK)

This document shall be part of the technical file issued by the NoBo assessing the CCS interoperability constituents.

This document shall be part of the technical file issued by the NoBo assessing the CCS subsystem.

It is essential to use the latest version of the template available on the website.

These filled templates can demonstrate how the conditions for use and other restrictions related to the interoperability constituents have been taken into account at the level of the subsystem. In other words, how applicable conditions for use, restrictions, options and added functions have been considered and properly transferred or closed from the IC level to CCS subsystem level). The use of a harmonised template makes the vehicle authorisation process much simpler.

2.8.5. CCS TSI Appendix E - List of harmonised text indications and messages displayed on the ETCS Driver Machine Interface

No additional clarification is necessary.

2.8.6. CCS TSI, Appendix F – Open points

The open points related to Control-Command and Signalling are listed in Annex F of the TSI Control-Command and Signalling.

According to art 13 and 14 of [2] the Member States should notify national rules for the management of open points, until they are completely solved with an update of the TSI.

However, a Control-Command and Signalling Trackside or On-board subsystem where a National Rule is applied:

1. usually does not allow interoperability, and
2. might also be incompatible with future Control-Command and Signalling subsystems where the harmonised solution for the open point is applied

It is therefore advisable to limit as much as possible the negative effects of applying national rules in the implementation of Control-Command and Signalling subsystems. For this reason the Members States are invited, before deciding the rules to be notified, to check the “Notes” in Annex G and, if necessary, contact the Agency, to gather information about the scope of the open point and the state of the work for its solution.

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Moreover, art 8 of [3] requires Member States to submit draft safety rules to the Agency and the European Commission for examination; the Agency and the European Commission will assess strictly the introduction of any new rule in order to prevent further barriers from being created, according with Art 25(1) of [1].

2.8.7. CCS TSI, Appendix G – Partial fulfilment

As indicated in the Appendix G, only the deviations defined in the table at the end of the Appendix are allowed by the TSI. Each of the three rows of the table correspond to each of the categories defined in the Appendix. The cases defined are only applicable to the CCS on-board subsystems. As indicated in 2.7.4.1.3 and 0, the CCS trackside can select what are the functions to implement.

2.8.8. CCS TSI, Appendix H - National Implementation Plan template

No additional clarification is necessary.

2.9. CCS TSI Annex II – Legacy systems

No additional clarification is necessary.

3. APPLICABLE SPECIFICATIONS AND STANDARDS

3.1. Foreword

The requirement for compliance with TSI Control-Command and Signalling is supported by a set of specifications and standards, to promote an open market and to facilitate the management of equipment during the whole lifetime (including maintenance and upgrade).

3.2. Use of the specifications and standards

The specifications and standards in the tables of this chapter have been listed by the Agency, after a check of their scope and content with the cooperation of experts from the working parties (reference to Agency regulation) and with the opinion of Notified Bodies and National Safety Authorities.

The application of the specifications and standards listed in this Application Guide remains voluntary, as they refer to aspects of the Subsystems where the adoption of solutions that are not harmonised does not prejudice interoperability (provided the solution respects functional and performance requirements specified in the relevant basic parameters).

These specifications and standards should not be confused with the specifications listed in the Appendix A of the TSI Control-Command and Signalling, which are essential part of the definition of the basic parameters and are therefore mandatory.

When the version of the referred document is no explicitly mentioned, latest update of the standard applies.

3.3. References

No additional clarification is necessary.

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3.4. Informative specifications

The following Table lists the informative specifications that are relevant for Table A 2 of the Control-Command and Signalling TSI.

In the "Notes" column of the following table some of the informative specifications are supporting a mandatory specification, identified through the Index in the tables of Appendix A of the TSI Control Command and Signalling

No.	ETCS Baseline 4 Release 1 RMR: GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0 ATO Baseline 1 Release 1			
	Reference	**Document name**	**Version**	**Notes**
1	Intentionally deleted ~~02S126~~	~~RAM requirements (chapter 2 only)~~	~~6~~	~~Index 28~~
2	Intentionally deleted ~~97S066~~	~~Environmental Conditions~~	~~5~~	
3	SUBSET-074-1	Methodology for testing FFFIS STM	4.0.0	Index 36
4	Intentionally deleted ~~97E267~~	~~Odometer FFFIS~~	~~5~~	
5	O_2475	ERTMS GSM-R QoS test specification	4.0.0	Index 33 and Note 4
6	Intentionally deleted			
7	SUBSET-074-3	FFFIS STM Test specification traceability of test cases with specific transmission module FFFIS	4.0.0	Index 36
8	SUBSET-074-4	FFFIS STM Test specification traceability of testing the packets specified in the FFFIS STM application layer	4.0.0	Index 36
9	ERA/ERTMS/040092	ERTMS/ETCS test plan and methodology	4.0.0	Index 37
10	Intentionally deleted			
11	Intentionally deleted			
12	Intentionally deleted			
13	Intentionally deleted			
14	Intentionally deleted			
15	Intentionally deleted			
16	ERA/ERTMS/040093	Test database	Reserved	Index 37
17	Intentionally deleted			
18	Intentionally deleted			
19	SUBSET-077	UNISIG Causal Analysis Process	4.0.0	Index 27

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No.	ETCS Baseline 4 Release 1 RMR: GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0 ATO Baseline 1 Release 1			
	Reference	**Document name**	**Version**	**Notes**
20	SUBSET-078	Failure Modes and Effects Analysis for the Interface to/from an Adjacent RBC – in Application Level 2	3.5.0	Index 27
21a	SUBSET-079-1	Failure Modes and Effects Analysis for DMI-Subsystem in Application Level 1	3.15.0	Index 27
21b	SUBSET-079-2	Failure Modes and Effects Analysis for DMI-Subsystem in Application Level 2	3.15.0	Index 27
22	SUBSET-080	Failure Modes and Effects Analysis for TIU in Application Level 1 and Level 2	3.3.0	Index 27
23a	SUBSET-081-1	Failure Modes and Effects Analysis for Transmission System in Application Level 1	3.6.0	Index 27
23b	SUBSET-081-2	Failure Modes and Effects Analysis for Transmission System in Application Level 2	3.6.0	Index 27
24	SUBSET-088	ETCS Application levels 1 & 2 — Safety Analysis	3.8.0	Index 27
25	TS50459-1	Railway applications — Communication, signalling and processing systems — European Rail Traffic Management System — driver machine interface - Part 1 — General principles for the presentation of ERTMS/ETCS/GSM-R information	2015	Note 6
26	Intentionally deleted			
27	TS50459-2	Railway applications — Communication, signalling and processing systems — European Rail Traffic Management System — Driver Machine Interface - Part 2 — Ergonomic arrangements of ERTMS/GSM-R information	2015	Note 6
28	TS50459-4	Railway applications — Communication, signalling and processing systems — European Rail Traffic Management System — driver machine interface - Part 4 — Data entry for the ERTMS/ETCS/GSM-R systems	2005	Note 6
29	TS50459-5	Railway applications — Communication, signalling and processing systems — European Rail Traffic Management System — driver machine interface - Part 5 — Symbols	2005	Note 6

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No.	ETCS Baseline 4 Release 1 RMR: GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0 ATO Baseline 1 Release 1			
	Reference	**Document name**	**Version**	**Notes**
30	TS50459-6	Railway applications — Communication, signalling and processing systems — European Rail Traffic Management System — driver machine interface - Part 6 — Audible information	2005	Note 6
31	Intentionally deleted			
32	Intentionally deleted			
33	Intentionally deleted			
34	Intentionally deleted			
35	Intentionally deleted			
36	Intentionally deleted			
37	SUBSET-093	GSM-R Interfaces — Class 1 requirements	4.0.0	Index 33 and Note 4
38	Intentionally deleted			
39	Intentionally deleted			
40	ERA/ERTMS/040063	Test sequences evaluation and validation	4.0.0	Index 37
41	Intentionally deleted			
42	Intentionally deleted			
43	04E083	Safety requirements and requirements to safety analysis for interoperability for the control-command and signalling subsystem	1.0	Index 27
44	04E084	Justification report for the safety requirements and requirements to safety analysis for interoperability for the control-command and signalling subsystem	1.0	Index 27
45	Intentionally deleted			
46	Intentionally deleted			
47	SUBSET-113	ETCS Hazard Log	ERA website	Index 27 Note 9
48	EN 50617-1	Railway Applications – Technical Parameters of train detection systems for the interoperability of the trans-European Railway system : Part 1 Track Circuits	2015	Index 77
49	EN 50617-2	Railway Applications – Technical Parameters of train detection systems for the interoperability of the trans-European Railway system : Part 2 Axle Counters	2015	Index 77

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No.	ETCS Baseline 4 Release 1 RMR: GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0 ATO Baseline 1 Release 1			
	Reference	**Document name**	**Version**	**Notes**
49A	EN 50592	Railway Applications – Testing of Rolling Stock for electromagnetic compatibility with axle counters	2016	Index 77
50	Intentionally deleted			
51	ERA/ERTMS/040055	ETCS DMI objects - START / STOP conditions	2.0.0	Index 4 and Index 6
52	Intentionally deleted			
53	SUBSET-118	Functional Safety Analysis of ETCS DMI for ETCS Auxiliary Hazard	1.7.0	Index 27
54	Intentionally deleted			
55	Intentionally deleted			
56	SUBSET-129	FIS for the RBC/RBC Handover involving a Baseline2 RBC	4.0.0	Index 12
57	SUBSET-116	Eurobalise On-board equipment susceptibility test specification	1.1.0	Index 9
58	O-2875	ERTMS/GSM-R Quality of Service test specification for EIRENE QoS requirements	2.0.0	Index 33
59	O-3001-1	GSM-R Cab radio testcases catalogue	2.0.0	Index 32 and Index 33 and
60	O-3001-2	GSM-R EDOR testcases catalogue	2.0.0	Index 32 and Index 33 and
61	O-3001-3	GSM-R SIM card testcases catalogue	2.0.0	Index 33 and Index 67 and
62	O-3001-4	GSM-R Network testcases catalogue	2.0.0	Index 32 and Index 33 and
63	EN 50125-1	Railway applications — Environmental conditions for equipment — Part 1: equipment on board rolling stock	2014	Note 8
64	12E108-2	ERTMS/ATO Operational Principles	2.0	Index 84
65	13E137-2	ERTMS/ATO Operational Requirements	2.0	Index 84

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No.	ETCS Baseline 4 Release 1 RMR: GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0 ATO Baseline 1 Release 1			
	Reference	**Document name**	**Version**	**Notes**
66	13E151-2	ERTMS/ATO Operational Scenarios	2.0	Index 84
67	SUBSET-144	ERTMS/ATO (GoA1+2) FMEA and functional analysis	1.0.0	Index 84 Note 10
68	SUBSET-140	ERTMS/ATO ATO OB / Recording-Monitoring devices FFFIS Application Layer	1.2.0	Index 8 Note 11
69	SUBSET-149	ERTMS/ETCS – ERTMS/ATO Online Monitoring System	1.2.0	Note 11
70	Intentionally deleted			
71	SUBSET-152	Eurobalise On-board equipment, Procedure for evaluation of ambiguous metal masses in the track	1.0.0	Index 9
72	O-3001-5	GSM-R Cross Reference Table	1.0.0	

Note 1, 2, 3, 5 and 7: Intentionally deleted.
Note 4: O-2475 version 4.0.0 and SS-093 version 4.0.0 including the KPIs for GSM-R CS and for GSM-R PS, have been published in this CCS TSI Application Guide.
Note 6: With regards to the GSM-R DMI, this Index provides additional information to implement the mandatory requirements of the EIRENE SRS.
Note 8: For the requirements about "Vibrations and Shocks" refer to version 1999. See CCS TSI Application Guide Section 2.8.1.
Note 9: The latest version of SS-113 will be available in the Agency webpage under the following link. *(Latest version of the document https://www.era.europa.eu/system/files/2022-11/subset_113_1.pdf)*.
Note 10: With regards to the ATO, this index provides additional information to support a common understanding for the safety analysis.
Note 11: With regards to the ETCS and ATO, these indexes provide additional voluntary (technical) standards to support the monitoring of the ERTMS system.

11.1 The current version of SUBSET-149 identifies monitoring data generated by ERTMS/ETCS and ERTMS/ATO on-boards. The SUBSET-149 does not cover all monitoring data, so future evolutions can include additional data (i.e. related to RST-functionality) as well as information generated by other devices. For the ETCS application, SUBSET-027 is used as the main set of monitoring data to be used within the OMS. For the ATO application, SUBSET-140 is used as the main set of recording and monitoring data to be used for the OMS.

11.2 As this SUBSET-149 supports trackside maintenance operations, Infrastructure Managers could envisage that this OMS is mandatory installed on all vehicles operating on ETCS and/or ATO equipped

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lines. As the diagnose of trackside functioning is strictly under the responsibility of the Infrastructure Manager, it is not considered as a function being mandatory for interoperability.

11.3 The infrastructure manager, entity managing the change, manufacturer or any other entity responsible for rail vehicle or infrastructure can consider contractual agreements with the owner of the vehicles to install such on-line monitoring system into their vehicles if this optimises the trackside maintenance operations and supports the fulfilment of the required level of availability (see CCS TSI - 4.2.1.2).

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