

# Guide for the application of the CCS TSI 2023/1695

*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*

<i>Version date</i>	<i>Section number</i>	<i>Modification description</i>
0.4	All	New edition after CCS TSI recast
Version 1.0 17/06/2024	All	New edition after CCS TSI recast. 1 st publication covering CCS TSI sections 7.2.10 error correction and specification maintenance, Appendix B Transition Regimes and Appendix G exceptional deviations. The rest of the content is under development.

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

1.1.1. 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].

1.1.2. 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.

1.1.3. Guidance is of voluntary application. It does not mandate any requirement in addition to those set out in the “Control-Command and Signalling” TSI.

1.1.4. 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 section of the TSI.

1.1.5. Guidance is not provided where the “Control-Command and Signalling” TSI does not requires further explanations.

1.1.6. 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**. Sections 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*

<i>DOCUMENT REFERENCE</i>	<i>TITLE</i>	<i>LAST ISSUE</i>
[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
[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

*Table 1: Document reference/s*

<i>DOCUMENT REFERENCE</i>	<i>TITLE</i>	<i>LAST ISSUE</i>
[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 ( <a href="#">link</a> )	v1.0 20/12/2023
[10]		
[11]		

### 1.3. Definitions and abbreviations

*Table 1: Definitions*

<i>TERM</i>	<i>DEFINITION/ SOURCE</i>
Acts issued by the Agency	Are those listed in Article 4 of Regulation (EU) 2016/796 of the European Parliament and of the Council (Agency Regulation)
AD-mode	Automatic Driving mode, as described in 4.4.16 of SS026 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)

Table 1: Definitions

TERM	DEFINITION/ SOURCE
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)
Existing rail system	Infrastructure composed of lines and fixed installations of the existing, rail network as well as the vehicles of all categories and origin travelling on that infrastructure (Article 2(16) 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 run	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: <i>"The expression 'train running a normal service' shall be understood as 'train which is not penalised because of a reduction of performance or safety'.</i>
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)
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)

*Table 1: Definitions*

<i>TERM</i>	<i>DEFINITION/ SOURCE</i>
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 2: Abbreviations*

<i>ABBREVIATION</i>	<i>FULL TEXT</i>
AC	Alternating Current
AERRL	Association of European Rail Rolling stock Lessors
BCA	Baseline Compatibility Assessment
CCM	Change Control Management
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardisation
CCS	Command Control and Signalling
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardisation
CEPT	European Conference of Postal and Telecommunications Administrations (Conférence européenne des administrations des postes et des télécommunications)



<i>ABBREVIATION</i>	<i>FULL TEXT</i>
CER	The Community of European Railway and infrastructure companies
CES	Conditional Emergency Stop
COST	(European Cooperation in the field of Scientific and Technical Research) (Cooperation européenne dans le domaine de la recherche Scientifique et Technique)
CR	Change Request
DC	Direct Current
DeBo	Designated Body
DMI	Driver-Machine Interface
EEA	European Economic Area
EEC	European Economic Community
EEIG	European Economic Interest Group
EIM	European Rail Infrastructure Managers
EIRENE	European Integrated Radio Enhanced Network
EMC	Electro Magnetic Compatibility
EN	European standard
ERA	European Union Agency for Railways also called “the Agency”
ERADIS	Interoperability and Safety database managed by the European Union Agency for railways
ERATV	European Register of Authorised Types of Vehicles
ERTMS	European Rail Traffic Management System
ESO	European Standardisation Organisation
ETCS	European Train Control System
ETS	European Telecommunications Standard
ETSI	European Telecommunications Standards Institute
EU	European Union
FFFIS	Form fit functional interface specification
FFFS	Form fit functional specification
FIS	Functional interface specification
FRMCS	Future Railway Mobile Communication System
GSM-R	Global System for Mobile communications - Railway
HD	Harmonisation Document
IC	Interoperability Constituent
IEC	International Electrotechnical Commission

<i>ABBREVIATION</i>	<i>FULL TEXT</i>
IM	Infrastructure Manager
INF	Infrastructure
ISO	International Organisation for Standardisation
ISV	Intermediate Statement Verification
JPC	Joint Programming Committee of CEN/CENELEC/ETSI
JPCR	Joint Programming Committee Rail
JWG	Joint Working Group
MS	EU or EEA Member State
NoBo	Notified Body
NB-Rail	Coordination group of notified bodies for railway products and systems
NNTR	Notified National Technical Rule
NSA	National Safety Authority
NSR	National Safety Rule
NTR	National Technical Rule
OJ	Official Journal of the European Union
PRM	Person with Disabilities or Person with Reduced Mobility
QMS	Quality Management System
RAMS	Reliability, Availability, Maintainability and Safety
RFU	Recommendation for Use
RINF	Register of Infrastructure
RISC	Railway Interoperability and Safety Committee
RMR	Railway Mobile Radio
RR	Revision Request
RRA	Revision Request Author
RS	Rolling Stock
RU	Railway Undertaking
SC	Standard Committee
SRT	Safety in Railway Tunnels
SS	Subsystem
STM	Specific Transmission Module
TC	Technical Committee
TR	Technical Report
TS	Technical Specification

<i>ABBREVIATION</i>	<i>FULL TEXT</i>
TSI	Technical Specification for Interoperability
UIC	International Union of Railways (Union Internationale des Chemins de Fer)
UIP	International Union of Private Wagons Owners (Union Internationale d'associations de Propriétaires de wagons de particuliers)
UIRR	International Union of Combined Road–Rail Transport Companies (Union Internationale des opérateurs de transport combiné Rail-Route)
UITP	International Association of Public Transport (Union Internationale des Transports Publics)
UNIFE	Union of the European Railway Industries (Union des Industries Ferroviaires Européennes)
UNISIG	Union Industry of Signalling (working party within UNIFE): steering committee involved in the development and implementation of ERTMS
WG	Working Group
WP	Working Party

## 2. GUIDANCE ON THE APPLICATION OF THE CCS TSI

### 2.1. Introduction

XXX TSI, section xxx - Title

To be completed.

### 2.2. Scope and definition of the subsystem

XXX TSI, section - Title

To be completed.

### 2.3. Essential requirements

XXX TSI, section - Title

To be completed.

### 2.4. Characterisation of the subsystem

2.4.1. XXX TSI, section - Title

To be completed.

### 2.5. Interoperability constituent(s)

XXX TSI, section - Title

To be completed.

## 2.6. Conformity assessment and EC verification

To be completed.

- 2.6.1. CCS TSI 6.1. Introduction
- 2.6.2. CCS TSI 6.2. Interoperability Constituents
- 2.6.3. CCS TSI 6.3. Control-Command and Signalling Subsystems
- 2.6.4. CCS TSI 6.4. Provisions in case of the partial fulfilment of TSI requirements
- 2.6.5. CCS TSI 6.5. Management of errors

## 2.7. Implementation

- 2.7.1. CCS TSI 7.1. Introduction
- 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
- 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.

- 2.7.2.3. CCS TSI 7.2.3. Upgrade or renewal of existing trackside subsystem
- 2.7.2.4. CCS TSI 7.2.4. EC type or design examination certificates

- 2.7.2.4.1. 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 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' in the National Vehicle Register or in the European Vehicle Register.

Explanation on 'Design phase started before TSI enters into force'. The applicant must 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 must 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.

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 2.8.1

According to the previous definitions, Figure 1 depicts the relation among the different phases:

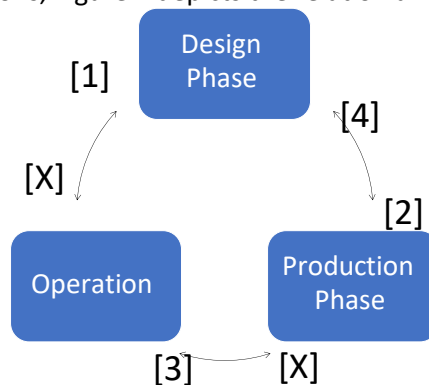


Figure 1. Transition states for CCS on-board subsystem.

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 2.8.1.

[X] Not possible

Regarding the CCS TSI Interoperability Constituents certified according the previous CCS TSI 2016/919, as indicated in CCS TSI section 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.

- 2.7.2.4.2. CCS Trackside Subsystem
- 2.7.2.4.3. Interoperability Constituents

- 2.7.2.5. CCS TSI 7.2.5. Legacy systems
- 2.7.2.6. CCS TSI 7.2.6. Availability of Specific Transmission Modules and interfaces to Class B on-board
- 2.7.2.7. CCS TSI 7.2.7. Additional Class B equipment on a line equipped with Class A
- 2.7.2.8. CCS TSI 7.2.8. Vehicle with Class A and Class B equipment
- 2.7.2.9. CCS TSI 7.2.9. Conditions for mandatory and optional functions

- 2.7.2.9.1. ETCS
- 2.7.2.9.2. ATO

The CCS TSI 2023/1695 introduces the Grades of Automation 1 and 2. ATO is considered as a new 3rd part of CCS as described in Table 4.1 of the CCS TSI. The high-level description of the different grades of automation are 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.

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). The ATO on-board specifications include both ATO GoA1 and GoA2-functionalities, so 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 2.8.1.13 and 2.8.1.14).

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 to 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 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, 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 7.9.5 of SUBSET-125 (V1.1.0).

## 2.7.2.9.3. 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 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 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 OApp 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:

**1. 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.



**2. 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.

**3. 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. 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.

**4. 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.

**5. 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);

#### 2.7.2.10. CCS TSI, 7.2.10 Specification maintenance (error correction)

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

This process shall be applied by any set of specifications used in a project.

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.

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 onboards 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, OBU behaviour compliant to the CR.

NOTE 2: If the Infrastructure Manager decides to implement mitigation measures, 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 (see section 2.8.1). For the errors affecting onboard subsystems, railway undertakings shall implement the error corrections in accordance with table B1.1 of the appendix B (see examples in section 2.8.1).

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 section 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 2 depicts the workflow for the management of error corrections.

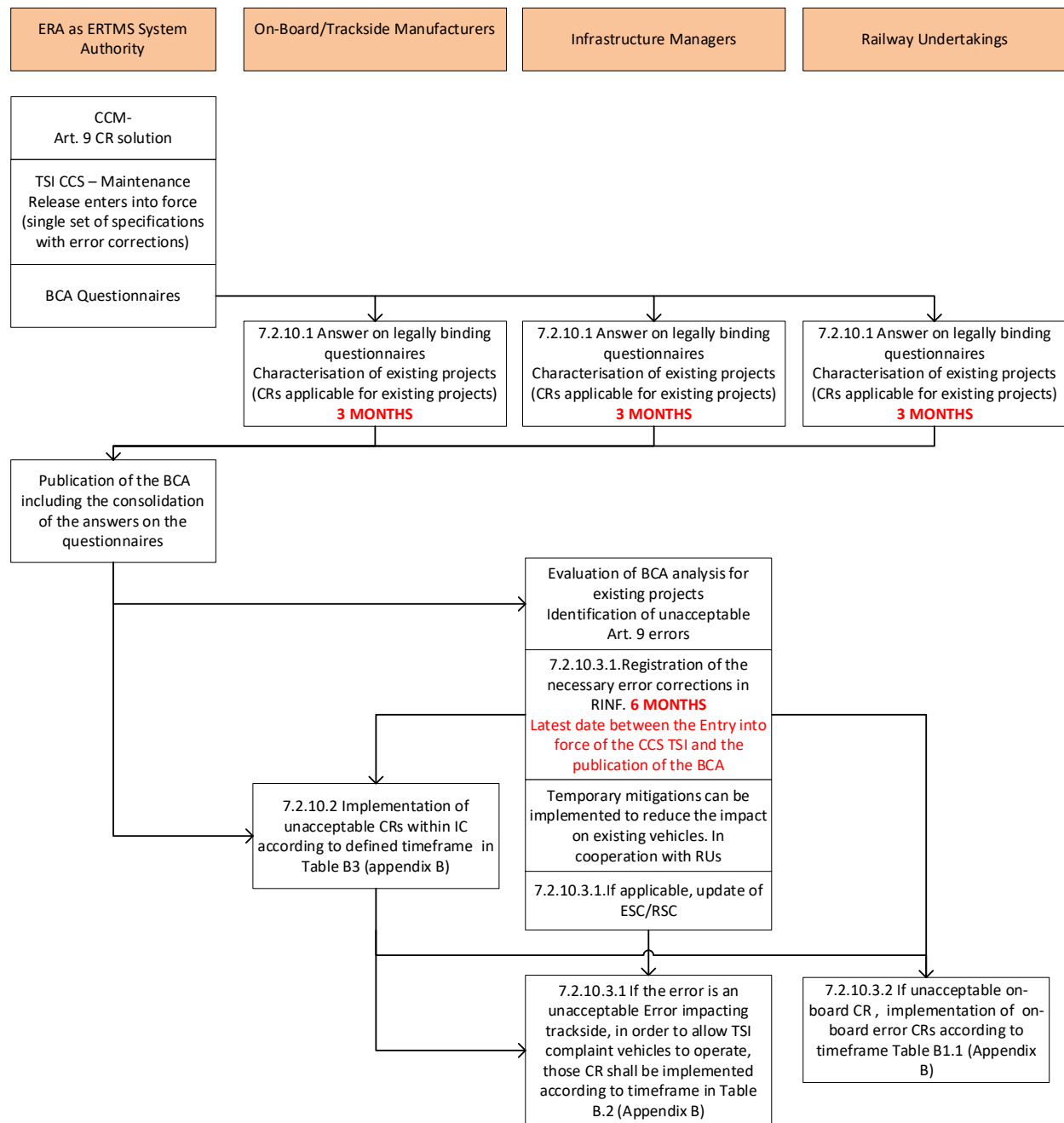


Figure 2. Error correction flowchart

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 onboard is required.

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 1 <sup>st</sup> 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 2. 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	<ul style="list-style-type: none"> <li>- Notify in RINF the applicability of the on-board error correction.</li> <li>- Optional: implement temporary mitigation measures to facilitate the operation of vehicles.</li> <li>- If the error impacts the trackside subsystem, error correction shall be applied according to row 1 in table B2.</li> <li>- If applicable, update of ESC/RSC</li> </ul>
		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 2.8.1 0. Note: The other error CR are not required for legal releases (with maintenance of specifications) published before 1 <sup>st</sup> January 2026.

### 2.7.3. CCS TSI 7.3. RMR specific implementation rules

### 2.7.4. CCS TSI 7.4. ETCS specific implementation rules

#### 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

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

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 on 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”* and also in the SRS chapter 1 clause 1.7.1.3 *“according to the characteristics of the specific lines and the related operational needs. In any case, the requirements of this SRS, which are allocated to the trackside and related to the implemented functions, shall be respected.”*

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

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

2.7.7. CCS TSI 7.7. Specific cases

## 2.8. Appendices of the CCS TSI

### 2.8.1. CCS TSI, Appendix B – Transition Regime

#### Introduction

2.8.1.1. 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.

2.8.1.2. 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.

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

**Examples for ETCS On-Board implementation requirements**

2.8.1.4. 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 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.

2.8.1.5. 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 section 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 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 1 <sup>st</sup> January 2030	N/A (not relevant in example)



2.8.1.6. 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).

2.8.1.7. 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 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 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	<p>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 01<sup>st</sup> January 2027 (18 months for the update of the ETCS IC + 6 months in case of a new authorisation).</p> <p>Use of ETCS B4R1 of CCS TSI 2023/1695 (including all error corrections) if design phase starts after 28 September 2026 or if design phase ends after 01<sup>st</sup> January 2030.</p>	<p>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 01<sup>st</sup> January 2027 (18 months for the update of the ETCS IC + 6 months for the new authorisation).</p> <p>Use of ETCS B4R1 of CCS TSI 2023/1695 (including all error corrections) if design phase ends after 01st January 2030.</p>	<p>It is allowed to continue to use set #3 of CCS TSI 2016/919 depending on the associated vehicle type.</p> <p>The additional registered error corrections (e.g. CR 1389) shall be implemented by 01<sup>st</sup> July 2027 in case no new authorisation is required or by 01<sup>st</sup> January 2028 in case a new authorisation is required for the associated vehicle type.</p> <p>Use of ETCS B4R1 of CCS TSI 2023/1695 (including all error corrections) from 01st January 2032 on newly built vehicles.</p>	<p>It is allowed to continue to use set #3 of CCS TSI 2016/919 depending on the associated vehicle type.</p> <p>The additional registered error corrections (e.g. CR 1389) shall be implemented on the affected vehicles in operation by 01<sup>st</sup> July 2027 in case no new authorisation is required or by 01<sup>st</sup> January 2028 in case a new authorisation is required for the associated vehicle type.</p>

#### 2.8.1.8. 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 2.8.1.13 and 2.8.1.14.

#### 2.8.1.9. 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.

#### 2.8.1.10. Example 7

Starting conditions:

- 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 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)

## 2.8.1.11. 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:

Example	Design phase started 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 28 <sup>th</sup> September 2026 and the design phase ends before 01 <sup>st</sup> 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)

## 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.

### 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.

## 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 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 01 <sup>st</sup> January 2030) and CMD remains optional (as the design phase ended before 01 <sup>st</sup> 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 01 <sup>st</sup> January 2030) and  CMD remains optional (as the design phase ended before 01 <sup>st</sup> January 2028).	Newly built vehicles being produced before 01 <sup>st</sup> January 2030 can use set #3 without CMD;  Newly built vehicles being produced between 01 <sup>st</sup> January 2030 and 01 <sup>st</sup> January 2032 can use set #3, however CMD is mandatory;  Newly built vehicles being produced from 01 <sup>st</sup> January 2032 onwards shall use ETCS B4R1 with CMD; <sup>1</sup>	N/A (not relevant in example)

<sup>1</sup> For the placing on the market of newly built vehicles, it is mandatory to use a vehicle design with CMD from 01<sup>st</sup> January 2030 onwards and ETCS B4R1 from 01<sup>st</sup> 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.

Example	Design phase started 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)	<p>If adding CMD-device does not require an ETCS upgrade, the continued use of set #3 is allowed without time limitation.</p> <p>If adding CMD-device does require an ETCS upgrade, the use of ETCS B4R1 is mandatory if design phase ends on or after 01<sup>st</sup> January 2030, therefore in example 9c, it is allowed to use set #3.</p>	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)

**Examples for ATO GoA1/2 On-Board (incl. ETCS OBU B4R1 up to SV2.2) implementation requirements**

2.8.1.12. Context: according to section 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 OBU and ETCS B4R1 up to SV2.2) triggered by the notification within the RINF or Network statement.

## 2.8.1.13. 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 01<sup>st</sup> January 2026);

## 2.8.1.14. 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 01<sup>st</sup> January 2025).



2.8.1.15. 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:

Example	Design phase started 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	If design phase started after 01st January 2026: ATO on-board and ETCS OBU SV2.2 requirements are directly applicable.	ATO on-board and ETCS B4R1 up to SV2.2 requirements are applicable if the design phase is not ended by 01st January 2031;	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.	
	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;			
ATO 2	If design phase started after 01 <sup>st</sup> January 2025: ATO on-board and ETCS B4R1 up to SV2.2 on-board requirements are directly applicable.	ATO on-board and ETCS B4R1 up to SV2.2 requirements are applicable if the design phase is not ended by 01 <sup>st</sup> January 2030;	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.	
	If design phase started between 28 September 2023 and 01 <sup>st</sup> January 2025: ATO on-board and ETCS B4R1 up to SV2.2 requirements are applicable if the design phase is not ended before 01 <sup>st</sup> January 2030;			

2.8.1.16. 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 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 01 <sup>st</sup> 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)

**Clarifications for table B2 (CCS Trackside Subsystem)**

2.8.1.17. 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 section 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.

2.8.1.18. 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 section 7.2.10.3.1.

2.8.1.19. 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 2019/2020
- The train detection systems are not impacted by the implementation requirements of chapter 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.

2.8.1.20. 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 2019/2020.
- 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.

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.

### **Clarifications for table B3 (CCS Interoperability Constituents)**

2.8.1.21. 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 section 7.2.10.3.1.

## 2.8.2. 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 2.8.1.17, the CCS trackside can select what are the functions to implement.

## 2.9. Practical cases

Text

# 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 Annex A of the TSI Control-Command and Signalling, which are essential part of the definition of the basic parameters and are therefore mandatory.

## 3.3. References

*To be elaborated*

## 3.4. Harmonised Standards

*To be elaborated*

## 3.5. 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

<b>ETCS Baseline 4 Release 1 RMR: GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0 ATO Baseline 1 Release 1</b>				
No.	Reference	Document name	Version	Notes
1	Intentionally deleted <del>02S126</del>	<del>RAM requirements (chapter 2 only)</del>	<del>6</del>	<del>Index 28</del>
2	Intentionally deleted <del>97S066</del>	<del>Environmental Conditions</del>	<del>5</del>	
3	SUBSET-074-1	Methodology for testing FFFIS STM	4.0.0	Index 36
4	Intentionally deleted <del>97E267</del>	<del>Odometer FFFIS</del>	<del>5</del>	
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	Reserved	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
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

<b>ETCS Baseline 4 Release 1 RMR: GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0 ATO Baseline 1 Release 1</b>				
<b>No.</b>	<b>Reference</b>	<b>Document name</b>	<b>Version</b>	<b>Notes</b>
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	only for Index 33 and 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	only for Index 33 and 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	only for Index 33 and Note 6
29	TS50459-5	Railway applications — Communication, signalling and processing systems — European Rail Traffic Management System — driver machine interface - Part 5 — Symbols	2005	only for Index 33 and Note 6
30	TS50459-6	Railway applications — Communication, signalling and processing systems — European Rail Traffic Management System — driver machine interface - Part 6 — Audible information	2005	only for Index 33 and Note 6
31	Intentionally deleted			
32	Intentionally deleted			
33	Intentionally deleted			
34	Intentionally deleted			
35	Intentionally deleted			
36	Intentionally deleted			

<b>ETCS Baseline 4 Release 1 RMR: GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0 ATO Baseline 1 Release 1</b>				
<b>No.</b>	<b>Reference</b>	<b>Document name</b>	<b>Version</b>	<b>Notes</b>
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	Reserved	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	EN50617-2	Railway Applications – Technical Parameters of train detection systems for the interoperability of the trans-European Railway system : Part 2 Axle Counters	2015	Index 77
49A	EN50592	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	Reserved	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			



<b>ETCS Baseline 4 Release 1 RMR: GSM-R Baseline 1 Maintenance Release 1 + FRMCS Baseline 0 ATO Baseline 1 Release 1</b>				
<b>No.</b>	<b>Reference</b>	<b>Document name</b>	<b>Version</b>	<b>Notes</b>
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	1.0.0	Index 32 and Index 33 and Note 7
60	O-3001-2	GSM-R EDOR testcases catalogue	1.0.0	Index 32 and Index 33 and Note 7
61	O-3001-3	GSM-R SIM card testcases catalogue	1.0.0	Index 33 and Index 67 and Note 7
62	O-3001-4	GSM-R Network testcases catalogue	1.1.0	Index 32 and Index 33 and Note 7
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
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

**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 CSS 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.

**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 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).

#### 4. Annex 1 List of standards

*To be completed.*