

ETCS System Compatibility (ESC) checks

(to be performed temporarily on Adif network as a measure to increase the confidence on the technical compatibility between CCS subsystems)



Document modification history			
Issue number Date	Section Number	Author	Modification / Description
1 16.01.2020		Adif	First release version

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1. Background

The technical specification for interoperability (TSI) relating to the control-command and signalling (CCS) subsystems of the rail system in the European Union, adopted by the Commission Regulation (EU) 2016/919 amended by the Commission Implementing Regulation (EU) 2019/776 lays down essential requirements which are necessary to achieve interoperability between Class A train protection subsystems and their interfaces with other subsystems.

The essential requirements are:

- (1) Safety.
- (2) Reliability and availability.
- (3) Health.
- (4) Environmental protection.
- (5) Technical compatibility.

The requirements of technical compatibility are subdivided in the following three categories:

- (1) The first category sets out the general engineering requirements for interoperability (environmental conditions, EMC).
- (2) The second category describes how the CCS Subsystems have to be applied technically and what functions they have to perform to ensure interoperability.
- (3) The third category describes how the CCS Subsystems have to be operated in order that interoperability is achieved.

This second category is known as characterisation of the subsystems that includes, among others, the following basic parameters:

- CCS safety characteristics relevant to interoperability.
- On-board and Trackside ETCS functionality.
- Mobile communication functions for railways – GSM-R.
- ETCS and GSM-R air gap interfaces.
- On-board and Trackside interfaces Internal to Control-Command and Signalling.
- Key & ETCS-ID management.
- Train detection systems.
- Electromagnetic compatibility between rolling stock and Control-Command and Signalling trackside equipment.
- ETCS & GSM-R DMI (driver-machine interface).
- Interface to data recording for regulatory purposes.
- Visibility of trackside Control-Command and Signalling objects.
- Construction of equipment used in CCS subsystems.
- **ETCS and Radio System Compatibility.**

The ETCS System Compatibility (ESC) is a new interoperability basis parameter added in the latest revision of the TSI.

2. Reference documents

- [1]. – COMMISSION REGULATION (EU) 2016/919 of 27 May 2016 on the technical specification for interoperability relating to the 'control-command and signalling' subsystems of the rail system in the European Union, amended by COMMISSION IMPLEMENTING REGULATION (EU) 2019/776 of 16 May 2019.
- [2]. – 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.
- [3]. – Guide for the application of the CCS TSI. Version 5.6. 19/12/2019.
- [4]. – Listado de pruebas de integración. Ministerio de Fomento. Version 1. Date: 01/02/2012.
- [5]. – Baseline Compatibility Assessment. Final Report. UNISIG. ERTMS USERS GROUP. Ref.: EUG_UNISIG_BCA. Issue: 1.0.0. Date: 22-05-2014.
- [6]. – Baseline Compatibility Assessment. Baseline 3 Release 2. Final Report. ERA UNISIG EEIG ERTMS USERS GROUP. Ref.: ERA_BCA_B3R2. Issue: 1.1.0. Date: 13/05/2016.
- [7]. – Error CRs Compatibility Assessment Art 10 Report. ERA UNISIG EEIG ERTMS USERS GROUP. Ref.: ERA_BCA_Art10. Issue: 1.0.0. Date: 30/09/2017.
- [8]. – Opinion ERA/OPI/2017-2 of the European Union Agency for Railways for European Commission regarding CCS TSI Error Corrections.

3. Definitions

Essential requirements: all the conditions set out in Annex III of Directive 2016/797/EU which must be met by the Union rail system, the subsystems, and the interoperability constituents, including interfaces.

Technical compatibility: technical characteristics of the infrastructure and fixed installations must be compatible with each other and with those of the trains to be used on the rail system. This requirement includes the safe integration of the vehicle's subsystem with the infrastructure.

CCS Subsystems: Control-Command and Signalling (CCS) Subsystems (On-board and Trackside) include the following parts: train protection; voice radio communication; data radio communication; train detection.

ETCS System Compatibility (ESC): shall be the recording of technical compatibility between ETCS on-board and the trackside parts ETCS of the CCS subsystems within an area of use.

ESC checks: checks which shall be performed in order to demonstrate the technical compatibility between the on-board and trackside CCS subsystems due to the different possible implementations and the status of the migration to fully compliant CCS Subsystems.

The necessity of these checks shall be considered as a measure to increase the confidence on the technical compatibility between the CCS subsystems.

ESC type: shall be the value assigned to record the technical compatibility between an ETCS on-board and a section within the area of use. All sections of the Union network which require the same set of checks for the demonstration of ESC shall have the same ESC type.

4. Requirements

Requirements related ETCS System Compatibility (ESC) included in the documentation referred to in the previous paragraph 2 are (non-exhaustive list):

4.1. ESC checks management

- [4.1.1] The Agency shall set up and manage in a technical document the set of checks to demonstrate the technical compatibility of an on-board subsystem with the trackside subsystem.
- [4.1.2] Infrastructure Managers shall submit to the Agency any changes on the ESC checks for their network. The Agency shall update the technical document within 5 working days.
- [4.1.3] It is expected that ESC checks will be reduced until the next principle is achieved:
A CCS On-board Subsystem covered by an 'EC' Declaration of verification should be able to run on every CCS Trackside Subsystem covered by an 'EC' Declaration of verification, under the conditions specified in the CCS TSI, with no additional verifications.

4.2. ESC checks and laboratories

- [4.2.1] The possibility of executing those checks in a laboratory representing the trackside configuration to be made available by the Infrastructure Manager should be prioritized.

4.3. ESC checks and on-board subsystem EC verification

- [4.3.1] Particular attention shall be given to assessing the conformity of the on-board CCS subsystem regarding the basic parameter ETCS and radio system compatibility.
- [4.3.2] Regardless of the module selected for the previous EC verification procedure for the on-board subsystem, the Notified Body shall check:
- a) the availability of the result of the technical compatibility checks for the selected area of use of the vehicle.
 - b) that the technical compatibility checks have been performed in accordance with the technical document published by the Agency.
 - c) based on the report of the checks, that the technical compatibility checks results indicate all the incompatibilities and errors encountered during the technical compatibility checks.

4.4. ESC types

- [4.4.1] Infrastructure Managers shall classify the ETCS lines according to ESC types in RINF.

4.5. Milestones

- [4.5.1] Infrastructure Managers, with the support of the ETCS suppliers for their network, shall submit to the Agency the definition of the necessary ESC checks on their network by 16 January 2020 at the latest.
- [4.5.2] Existing vehicles shall be deemed compatible with the ETCS and radio system compatibility types of the networks on which they are operating by 16 January 2020

without any further checks, maintaining the existing restrictions or conditions for use.

Any subsequent modification of the vehicle or the infrastructure regarding the technical or route compatibility shall be managed according to the requirements specified for ETCS and Radio system compatibility.

- [4.5.3] By 1 June 2020, the Agency shall send a report to the Commission on the implementation of ETCS system compatibility (ESC) and radio system compatibility (RSC). The report shall include an assessment of the differing types of ESC and RSC, and the potential for reducing the underlying technical divergences of ESC and RSC types. Member States shall provide the Agency with the necessary information to complete the analysis.
- [4.5.4] By 1 December 2021, the Commission shall, based on input from the Agency, define the necessary steps to eliminate the tests or checks to prove technical compatibility of on-board units with different ERTMS trackside implementations, in particular to achieve harmonization of engineering and operational rules at Member State level and between Member States. Member States shall provide the Commission and the Agency with the necessary information to complete the analysis.

5. Objective

The objective of this report is the application of the COMMISSION REGULATION (EU) 2016/919 of 27 May 2016 on the TSI relating to the CCS subsystems of the rail system in the EU, amended by COMMISSION IMPLEMENTING REGULATION (EU) 2019/776 of 16 May 2019, related to the ESC checks to be performed in the Adif network.

6. Scope

The scope of this document includes according to Regulation (EU) 2019/776 of 16 May 2019:

- Checks to be performed temporarily as a measure to increase the confidence on the technical compatibility between a CCS on-board subsystem covered by an EC Declaration of verification that interacts with a CCS trackside subsystem covered by an EC Declaration of verification in the area of use of a vehicle.
- These checks are based both on the current practice already in place in Adif network and on the information reported by the specific ETCS suppliers, considering the existing lines on December 2019. At this moment, and regarding the information included in annexes B and C there is still pending information on some of the lines in service (e.g Línea Figueras-Perpignan, C4 Madrid Commuter line).
- It also includes compatibility checks based on the existing BCA reports and article 10 (error corrections) of the above-mentioned regulation. For this first version of the ESC checks and regarding article 10 issues, only analyzed in an ERA technical opinion have been included. The rest of the available information corresponding to on-going processes will be added when the new ERA technical opinion 2020 is released. In this version, issues with potential impact but with no actual impact from a preliminary point of view has also been included.

This document cannot be regarded as complete as many suppliers answers were missing, incomplete or unclear.

The scope of this document does not include checks to cover:

- The demonstration of the technical compatibility between the on-board and trackside CCS subsystems.
- Open points in CCS TSI (e.g.: braking curves in Baseline 2).
- Deficiencies in the TSI.
- Possible deviations that ERTMS onboard equipment entering Adif network may have, e.g. ERTMS onboard subsystems implementing additional / partial CR different that those applicable to a 2.3.0.d train, a 3.4.0 train or a 3.6.0 train.
- Eventual application conditions or compatibility checks that may be included in the technical file (e.g. Safety Case) of the applicant's ETCS On-Board subsystem.
- Confirmation that the answers given by the suppliers are indeed the specific detailed design implemented in the trackside or the project documentation.
- Checks for a certain ETCS On-Board Unit for running on non ETCS equipped lines.

Regarding the potential compatibility issues identified in BCA report [5], BCA B3 R2 report [6] and Error CRs CA Art10 Report [7], for some CRs the applicants performing ESC checks must analyze if the identified issue is relevant for them and if the risk is not tolerable they must try to find an interoperable solution for the issue at project level.

Adif has not performed any safety or interoperability detailed analysis on the proposal of the ESC checks to be performed in order to increase the confidence on the technical compatibility between an on-board and trackside CCS subsystem.

In light of these considerations, and regarding this ESC checks definition, no liability can be accepted for completeness as evidence for ETCS System Compatibility.

7. Action plan

In order to fulfil the Agency requirements related to the definition of the necessary ESC checks, Adif has set the following activities:

- Legal framework and technical data collection.
- ETCS suppliers request.
- Proposal ESC checks development, considering the previous inputs.
- ESC Check plan definition.
- Establishment of a panel for ESC checks final approval.
- Stakeholders information delivery.
- Submission complete ESC checks to the Agency.

8. ESC checks

8.1. ESC checks development approach

8.1.1. Train-track integration tests

The objective of the ESC in a first stage is to capture the current practice already in place in the different networks. Currently, in order to get the authorization to run in a line or set of lines,

vehicles are often requested to perform some tests or checks, sometimes referred to as train track integration.

Thus, ESC checks list has been developed based on the wide experience gained by the Spanish Ministry of Public Works and Transport over the last years. This Ministry has been managing together with Adif and Renfe integration tests throughout the Spanish high-speed network and the train fleet.

Classification of Train-track integration ESC checks has been carried out considering the above-mentioned points:

- Level 1 and Level 0 ESC tests.
- Level 1 > STM LZB transition ESC tests.
- Level 2 ESC tests.

No specific template has been provided for the definition of the ESC, to allow the Infrastructure Managers to submit the list of checks currently in use.

8.1.2. Analysis of the BCA reports compatibility with Adif's existing lines.

In June 2016, Commission Regulation (EU) 2016/919 *on the TSI relating to the CCS subsystems of the rail system in the EU* was published including the ETCS Baseline 3 Release 2 (B3R2), Baseline 3 Maintenance Release 1 (B3MR1) and Baseline 2 (B2) specifications.

Previously, in May 2014, UNISIG and EUG had produced the BCA report [5], which identifies 54 CRs with a potential compatibility issue for tracksides with system version X=1.

After that, in July 2016, ERA published the BCA B3 R2 report [6] which identifies 5 CRs included in B3R2 also with a potential compatibility issue.

Once the 59 CRs have been analysed in the Spanish network it might be concluded that the possible impact for 7 CRs is related to operational issues and it should be included in the ESC checks list.

8.1.3. Analysis of the Error CRs Compatibility Assessment. Art10 Report with Adif's existing lines.

In October 2017, ERA delivered the Opinion ERA/OPI/2017-2 regarding CCS TSI Error Corrections [8] that includes the document "Error CRs Compatibility Assessment. Art 10 Report" [7]. This document identifies and describe the potential safety hazards and/or the operational shortcomings that would prevent the normal service and recommends mitigation measures to cope with them.

Therefore, it could be considered as the BCA Art.10 report, identifying 22 CRs as theoretical compatibility risk out of the 40 CR classified as errors in the ERA database that are assessed in the document [7].

Once the 22 CRs have been analysed in the Spanish network it might be concluded that the possible impact for 12 CRs is related to operational issues and it should be included in the ESC checks list.

8.1.4. ESC Checks proposed by trackside ETCS subsystem suppliers.

To be defined.

8.2. ESC checks list

ESC checks will cover the following points (non exhaustive list):

- Static speed profile supervision.
- Braking supervision.
- Movement authority management (MA).
- Train interfaces: main power switch, air condition intakes and passenger emergency brake.
- Management of TSR information: supervision.

- Management of TSR information: revocation.
- Start of mission.
- Mode transitions.
- Override with authorization.
- Level transitions.

- Exit of Post Trip (PT) mode.
- Hand over management.
- Unconditional emergency stop (UES).
- Co-operative shortening of MA.
- Change of train number.

- Release speed and override without authorization.
- Text message driver acknowledgement.
- Geographical position.
- Supervision of the national values transmitted from the trackside.
- Management of the default balise information.

- Coordinate system.
- MA request.
- Train position report.
- Degraded conditions.
- Key management.

- Maximum speed in the complete line.
- Verification of track conditions in the complete line.
- CRs.

ESC checks related to Train-track integration are extensively listed in Annex A.

ESC checks related to analysis of the BCA reports compatibility with Adif network are extensively listed in Annex B.

ESC checks related to the analysis of the Error CRs Compatibility Assessment Art 10 Report (2017) with Adif network are extensively listed in Annex C.

ESC checks proposed by trackside ETCS subsystem suppliers in Adif network are extensively listed in Annex D.

From the Adif point of view, ESC tests can only be executed at subsystem level and on track.

In order to prioritize the execution of the ESC test in a laboratory environment, ERA could provide the list of approved laboratories and identify the test not to be conducted on trackside for ESC demonstration without any liability to Adif.

8.3. ESC types

Different ESC type values shall be assigned to different areas of use from various suppliers or projects implemented.

Each ESC type corresponds to a specific engineering or to the use of a specific functionality in one line or set of lines.

ESC types are extensively listed in Annex E.

ESC checks vs ESC types matrix is included in Annex F.

Annex A: Train-track integration ESC checks list

A1. Level 1 & Level 0 Train-track integration ESC tests list		
Test Case Category Code	Test Case Category	Test Case Title
1.1	Static Speed Profile & TSR supervision	Static Speed Profile supervision. SSP due to a track crossover
		Speed supervision. Overlapping TSR supervision
		Speed supervision. TSR supervision when entering a LO area
1.2	Release speed supervision	TSR supervision. FS mode
		Release speed supervision. The release speed is a fixed value given by trackside. Normal conditions (without isolated bogies)
		Release speed supervision. The release speed is a fixed value given by trackside. Train performs a SPAD
1.3	Braking supervision	Release speed supervision. EoA override
		Braking supervision. Normal conditions (without isolated bogies) and the worst gradient conditions
2.1	Level transitions	Level transition from L1 to LO + ASFA
		Level transition from LO + ASFA to L1 in L1 area
3	Mode transitions	Mode transition from SR to OS at a further location. The driver does not acknowledges the request before reaching the OS area
		SPAD. FS mode
6	MA update	MA update after a passengers stop
8	Verification of track conditions	Verification of track conditions. Train passes a track on concrete slab area

		Verification of track conditions: opening and closing of the main power switch. Degraded conditions
		Verification of track conditions in the complete line
10	Text messages	
		Text message reaching a track gauge changeover installation
11	Miscellaneous	
		Management of the default balise information (packet 254). New MA information is received while the brake reaction is applied
		ERTMS management of ASFA separate equipment
		Inhibition of levels in on-board equipment
		Maximum speed supervision in the complete line

A2. Transition from L1 to STM LZB Train-track integration ESC tests list

Test Case Category Code	Test Case Category	Test Case Title
	Mode transition from LSTM LZB to L1	
		standard operating conditions
		LTV in L1 area
		Degraded braking conditions
	Mode transition from L1 to LSTM LZB	
		standard operating conditions
		TSR management. LTV in LZB area
		Degraded braking conditions

A3. Level 2 Train-track integration ESC tests list		
Test Case Category Code	Test Case Category	Test Case Title
1	Static Speed Profile supervision	Static Speed Profile supervision. SSP due to a track crossover
2	Braking supervision	Braking supervision with different train sets. Normal conditions (without isolated bogies) and the worst gradient conditions
		Braking supervision with different train sets. Isolated bogies and the worst gradient conditions
3	Movement authority management (MA)	MA update in FS mode. New EoA at a ETCS markerboard
		MA shortening in RBC-RBC handover area
5	Train interfaces: main power switch, air condition intakes and passenger emergency brake	Train interface: opening and closing of the main power switch
		Train interface: opening and closing of air conditioning intakes
		Train interface: passengers emergency brake inhibition
6	Management of TSR information: supervision	Management of TSR information sent by the RBC. SR mode
		Management of TSR information sent by the RBC. OS mode
		SoM in a TSR area
		Management of the overlapping TSR information sent by the RBC

7	Management of TSR information: revocation	
		TSR revocation by change of route
		Multiple TSRs revocation
8	Start of mision (SoM)	
		SoM without valid train location information. Mode transition to FS without TAF
		SoM in SB mode after exit of SL mode
		SoM in SB mode. Train in a stabling area with valid train location information and with previous group of balises
		SoM in SB mode. Train in stabling area without valid location information and with previous group of balises
		SoM in SB mode. Train in front of a light signal and the location information is valid
		SoM in SB mode. Train in front of a light signal and without valid train location information
		SoM in SB mode after exit of SL mode. Train in stabling area and the train location information is valid
		SoM in SB mode after exit of SL mode. Train in front of a light signal and the location information is valid
		SoM in SB mode. Train in front of a light signal and with valid train location information. RBC/RBC Handover area
		SoM in SB mode. Train in front of a light signal without valid location information. Handover area
		SoM in SB mode. Train in front of a light signal and without valid train location information. RBC/RBC Handover area. Communication session establishment with the RBC(2) in RBC(1) area
		SoM in SB mode. Train in front of a light signal and without valid train location information. Outside of RBC/RBC handover area. Communication session establishment with the RBC(2) in RBC(1) area

		Mode transition from SR to FS at a main light signal
		Mode transition from OS to FS at a main light signal
		Mode transition from PT to FS
		Mode transition from PT to SR
9, 10, 12	Mode transitions	
		Mode transition from FS to SB
		Mode transition from OS to SB
		Mode transition from SB to FS
		Mode transition from PT to FS
		Mode transition from SR to OS at a further location. The driver acknowledges the request before reaching the OS area
		Mode transition from FS to OS at a further location. The driver does not acknowledges the request before reaching the OS area
		Mode transition from SR to OS at the current location sent by trackside. The driver acknowledges the request of OS mode
		Mode transition from FS to OS at a current location ordered by trackside. The driver acknowledges the request of OS mode
		Mode transition from SR to SH selected by the driver
		SH permission is refused by the RBC. FS mode
		Mode transition from FS to SH at the current location ordered by trackside. The driver acknowledges the request of SH mode
		Mode transition from FS to SH at a further location ordered by trackside. The driver does not acknowledge the request of SH mode
		Mode transition from OS to SH at the current location ordered by trackside. The driver acknowledges the request of SH mode
14	Override with authorization	
		Override with authorization. FS mode. The radio communication session is established with the RBC

		Override with authorization. OS mode. The radio communication session is established with the RBC
15	Level transitions	
		Level transition from L2 to L1
		Level transition from L1 to L2
		Level transition from L1 to L2. Announce and command in variable information balises at a signal
		Level transition from L2 to L0
		Level transition from L2 to L0. The light signal at the transition border is displaying a stop aspect
		Level transition from L0 to L2
		Level transition from L0 to L2. The light signal at the transition border is displaying a stop aspect
		Level transition from L2 to LSTM LZB
		Level transition from L2 to LSTM LZB. The first light signal after the transition border in LZB area is displaying a stop aspect
		Level transition from LSTM LZB to L2
		Level transition from LSTM LZB to L2. The light signal at the transition border is displaying a stop aspect
		Level transition from L2 to LSTM ASFA
		Level transition from L2 to LSTM ASFA. The light signal at the transition border is displaying a stop aspect
		Level transition from LSTM ASFA to L2
		Level transition from LSTM ASFA to L2. The light signal at the transition border is displaying a stop aspect
		TSR Management at level transition from L1 to L2. TSR in L2 area
		TSR Management al level transition from L2 to L1. TSR in L1 area
		TSR Management at level transition from L2 to LSTM LZB. TSR in LZB area
		TSR Management al level transition from L2 to LSTM LZB. TSR in L2 area

		TSR Management at level transition from L2 to LSTM LZB. TSR on both sides of the transition border
		TSR Management at level transition from LSTM LZB to L2
16	Exit of Post Trip (PT) mode	Exit from Post Trip (PT) mode with valid train location information
		Exit from Post Trip (PT) mode without valid train location information
17	Handover management	RBC/RBC Handover management. FS mode
		RBC/RBC Handover management. SL mode
		Management of the overlapping TSRs information in handover area
		Track conditions management in RBC/RBC handover area
		TSR revocation in handover area
		Recovery transition from L1 to L2 in handover area
18	MA update	MA update. SR mode
19	Unconditional emergency stop (UES)	Unconditional emergency stop (UES), movement authority is revoked and further update
20	Co-operative shortening of MA	Co-operative shortening of MA. The train accepts the new MA
		Co-operative shortening of MA. The train rejects the new MA
21	Change of train number	Change of train number in a station. The RBC sends the new number
		Change of train number in a station. Driver introduces a new number

22	Release speed and override without authorization	Supervision of the release speed in FS mode. Fixed value given by trackside. Normal conditions
		Supervision of the release speed in FS mode. The release speed is calculated by the on-board equipment. Normal conditions
		Perform a SPAD at stop light signal. The release speed is the national value
24	Text message driver acknowledgement	Reactions according to messages that require driver acknowledgement. Plain text messages
25	Geographical position	Geographical position indicated on DMI and requested by the driver. FS mode
26	Supervision of the national values transmitted from the trackside	Supervision of the national values transmitted from the trackside
27	Management of the default balise information	Management of the default balise information (packet 254). New MA information is received while the brake reaction is applied
28	Coordinate system	Assignment of Coordinate system
29	MA request	MA request parameters
30	Train position report	Train position reporting according to "position report parameters"
32	Degraded conditions	One balise from a balise group included in the linking information is missed. Linking error. FS mode

		RBC/RBC handover. Transition with the Accepting RBC out of service
		RBC/RBC handover when only one on-board modem is available
		Expiration of T_NVCONTACT with successful attempts to set-up safe connection
		SoM and movement within the area of another RBC
33	Key management	Key generation and installation
		Key RBC deletion
		Key RBC modification
		Key validity period
35	Maximum speed supervision	Maximum speed supervision in the complete line
36	Track conditions	Verification of track conditions in the complete line

Annex B: BCA reports compatibility with Adif network ESC checks list.

BCA ESC tests list				
Test Case Title	Test Case Code	Test Case Description	Comments	ESC Types application
CR 166. Use of NID_OPERATIONAL	B1	The NID_OPERATIONAL consists of up to 8 digits which are entered left adjusted into the datafield, the leftmost digit is the digit to be entered first. In case the NID_OPERATIONAL is shorter than 8 digits, the remaining space is to be filled with special character "F". Check Packet Number 5 "Train running number" transmitted to RBC	Only for B2 trains running in level 2	3x & 4x
CR 484. Clarification required: Mode profile and Infill MA	B2	If a mode profile start location is located in advance of an infill BG, when the train reads this BG in FS mode, the mode profile previously memorised On-board may be deleted (the infill MA cannot repeat this mode profile)	Only for B2 trains running in level 1	11 & 2x
CR 595. Braking curve calculation	B3	Evaluate the impact of the B3 braking curve model in B2 lines	B3 trains and B2 trains implementing B3 braking curve calculation in B2 lines	All types
CR 843. Message with several non-revocable TSRs is discarded	B4	Check whether a B2 on-board may not accept a message containing several non-revocable TSRs	Only for B2 trains	32 (Albacete station)

CR 899. Replacement of track description and linking information	B5	The last part of a condition (non stopping area–other reasons or powerless section) could be deleted if other track condition is defined in the same area	Only for B2 trains and/or B2 trackside running in level 1	11
CR 933. Storing of RBC contact information	B6	Train has to establish a communication session with Accepting RBC before leaving Handing RBC area	Only for B3MR1 (v 3.4.0) trains running in level 2 with only one session available	2x, 3x & 4x
CR 958. Ambiguous exception	B7	A different interpretation between RBC and on-board of the requirements for the LRBG use / acceptance might lead to a deadlock situation in start of mission	Only for B2 trains running in level 2	All types



Annex C: Error CRs Compatibility Assessment Art10 Report (2017) with Adif network ESC checks list.

Art10 2017 tests list				
Test Case Title	Test Case Code	Test Case Description	Comments	ESC Types application
CR 1252: Ambiguities about release speed and application of A.3.4 in case a train accepts a CES	C1	Related to the supervision of a Conditional Emergency Stop location with no release speed. Check if a on-board system delete the release speed information when updating the EoA/SvL as result of an accepted CES.	Trains running in level 2	1x, 2x & 4x
CR 1288: Shortcomings due to specific locations temporarily considered as the EoA/SvL	C2	When the supervision of a point is lost into the route, the RBC sends a CES just before the point. This location could be between the beginning of the OS mode profile and the EoA. Check that ETCS on-board equipment supervises the EoA linked to an accepted CES after acknowledging a mode profile.	Trains running in level 2	4x
CR 1300: Follow-up to CR977	C3	Check if the SvL can be guaranteed by B3MR1 and B3R2 on-boards when the EBI supervision limit is passed while the on-board equipment is processing a balise group message.	Trains B3 MR1 and R2	All types
CR 1267: Acquiring the list of available networks whilst communication session is established.	C4	In case the on-board is fitted with only one Mobile Terminal which is busy due to the automatic connection through the currently stored radio network, the on-board might not be able to change of the Radio Network ID during the SoM. Check if on board systems are fitted with more than one Mobile Terminal.	Only for B2 and B3MR1 (v3.4.0) trains running in level 2 with only one session available	All types

CR 1306: Undefined sequence of actions following the filtering of trackside information as per SRS 4.8.	C5	Possible operational impact when overriding a signal due to BGs transmitting both packet 12 (Level 1 Movement Authority) with V_MAIN = 0 and packet 137 (Stop if in Staff Responsible) with Q_SRSTOP = 0 are implemented in level 1 areas. Check if on-board system entries in TR mode when passing those BG although the override function is active.	All types
CR 1309: Enhancement of HDLC to handle retransmission of SABME message	C6	Possible operational impact only for those on-board equipments whose on-board initiated call fail due to their Euroradio configuration.	Trains running in level 2 1x
CR 994: Text message start conditions	C7	There are text messages with all the events composing the end condition for the display of text message as not relevant (i.e. the end of the display of this text message is not limited by the location, the time, the mode nor the level; all the end events have the special value). Check if a text message could not be displayed to the driver and in addition, if an unwanted safety reaction could be applied if the on-board considers a text message without end event as not consistent and rejects the packet.	21
CR 1120: Uncertain handling of some infill information	C8	In the transition from level STM/0 to level 1, MA infill information is sent together with a level 1 announcement (packet 41). In case of losing the main BG, the on-board could use a wrong reference for this information.	Transitions from level 2 or level 0/STM to level 1 All types
CR 1166: Ambiguities in driver acknowledgement requirements	C9	A level transition from STM to level 1 or 2 and an immediate OS mode profile could be sent to the on-board. In that situation, an on-board could be during more than 5 seconds in OS mode without driver acknowledgment and without brake intervention.	34 & 4x

<p>CR 1251: Use of inconsistent or incomplete terms for the cooperative MA shortening function</p>	<p>C10</p>	<p>When the request to Shorten MA is rejected by the on-board, the RBC sends an Unconditional Emergency Stop. Check if on-board equipment keeps an obsolete mode profile after granting a request to shorten MA without mode profile.</p>	<p>Only for B2 trains running in level 2</p>	<p>3x</p>
<p>CR 1259: Accuracy of distances measured on-board not considered when determining Release Speed from MRSP</p>	<p>C11</p>	<p>If an ERTMS/ETCS on-board does not consider the accuracy of distances when determining the release speed then, depending on the odometry error and on the SBI used for the calculation of the start location and on the speed restriction, it may lead to an ERTMS/ETCS on-board not supervising the end of the speed restriction as expected by trackside.</p>		<p>4x</p>
<p>CR 1264: Exhaustiveness of the list of actions not to be reverted or executed twice</p>	<p>C12</p>	<p>On-board systems could stop the section timer of the movement authorization, considered infinitely valid in certain circumstances. Check if a route may be revoked by the interlocking although the MA is locked from the on-board point of view.</p>	<p>Trains running in level 1</p>	<p>4x</p>



Annex D: ESC checks list proposed by trackside ETCS subsystem suppliers in Adif network.

To be defined.

Annex E: ESC types list

ESC types list		
ESC Type Code	ETCS Supplier	Line Code / Section
1x	CSEE (Ansaldo - Hitachi)	
11		050 / Madrid-Lleida
2x	Alcatel (Thales)	
21		050 / Lleida-Barcelona
22		050 / Barcelona-Límite Adif-TP Ferro
23		080 / Madrid-Valladolid
24		082 / Ourense-Santiago
3x	Dimetronic (Siemens)	
31		030 / Bif.Málaga-Málaga
32		040 / Bif.Torrejon de Velasco-Valencia 042 / Bif. Albacete-Albacete
33		036 / Antequera-Granada
4x	Alstom	
41		042 / Albacete-Alicante
42		080 / Valladolid-Venta de Baños 084 / Bif.Venta de Baños-León

Annex F: ESC checks vs ESC types matrix

		ESC Type Code	ESC Types												
			1x	2x				3x				4x			
			11	21	22	23	24	25	26	31	32	33	34	41	42
ESC Checks (1) (2)		Test Case Code													
		A. Train-track integration test	A1. Level 1	X	X	X	X	X	X	X	X	X	X	X	X
A2. Transition L1 to STM LZB	X									X	X				
A3. Level 2	X		X	X	X	X	X	X	X	X	X	X	X	X	X
B. BCA test	B1. CR 166									X	X	X	X	X	X
	B2. CR 484	X	X	X	X	X	X	X							
	B3. CR 595	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	B4. CR 843									X					
	B5. CR 899	X													
	B6. CR 933		X	X	X	X	X	X	X	X	X	X	X	X	X
	B7. CR 958	X	X	X	X	X	X	X	X	X	X	X	X	X	X
C. Art.10 2017 test	C1. CR 1252	X	X	X	X	X	X	X						X	X
	C2. CR 1288													X	X
	C3. CR 1300	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	C4. CR 1267	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	C5. CR 1306	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	C6. CR 1309	X													
	C7. CR 994		X												
	C8. CR 1120	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	C9. CR 1166												X	X	X
	C10. CR 1251									X	X	X	X		
	C11. CR 1259													X	X
	C12. CR 1264													X	X
D. Cheks proposed by suppliers		(3)													

(1).- ESC Tests can only be executed at subsystem level and on track.

(2).- In order to prioritize the execution of the ESC test in a laboratory environment, ERA could identify the test not to be conducted on trackside for ESC demonstration

(3).- To be defined