

ETCS System Compatibility (ESC) checks

(to be performed temporarily on Adif and Adif-AV networks as a measure to increase the confidence on the technical compatibility between CCS subsystems)

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2 24.02.2021	Section 6 Section 8.1.4 Annex D Section 8.2 Annex F Annex A Annex E&F	Adif	Scope of the document. ESC checks proposed by trackside ETCS subsystem suppliers. Applicability of the checks. Contact point for laboratory testing and test not to be conducted on trackside for ESC demonstration. Contact point for trackside testing. Definition of checks and pass/fail criteria ESC types list update Specific location for the checks
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3.3 18/07/2025	Section 12 Annexes E & F	Adif	Eighth release version. ESC Type 321 extended applicability to both tracks of line 024. Replacement "Thales" with "Hitachi (ex Thales)". Notes added after tables (p.19 and p.25). Some modifications in annexes (detailed in change control sheet of the file "Adif_AdifAV_ESC_v3.3_annexes").

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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) 2023/1695 of 10 August 2023 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.
- (6) Accessibility.

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 reliability, availability and safety characteristics relevant to interoperability.
- On-board and trackside ETCS functionality.
- Mobile communication functions for railways RMR.
- RMR, ETCS and ATO air gap interfaces.
- On-board and trackside interfaces internal to Control-Command and Signalling.
- Key & ETCS-ID Management.
- Trackside train detection systems.
- Electromagnetic compatibility between rolling stock and Control-Command and Signalling trackside equipment.
- ETCS & RMR DMI (driver-machine interface).
- Interface to data recording for regulatory purposes.
- Trackside CCS objects.
- Construction of equipment used in CCS subsystems.
- **ETCS and Radio System Compatibility.**
- On-board and trackside ATO functionality.

- Technical documentation for Maintenance.

The ETCS System Compatibility (ESC) is a new interoperability basic parameter added in the previous revision of the TSI (COMMISSION REGULATION (EU) 2016/919).

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. (repealed)
- [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 7.0. 17/11/2020.
- [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.
- [9]. – RESOLUCION 4/2024, DE LA AGENCIA ESTATAL DE SEGURIDAD FERROVIARIA, POR LA QUE SE ACTUALIZA LA "ESPECIFICACIÓN TÉCNICA DE CIRCULACIÓN. FUNCIONALIDAD NACIONAL Y VALORES NACIONALES DEL SISTEMA ERTMS/ETCS [ETC ETCS (FN)]".
- [10]. – Error CRs Compatibility Assessment. Art10 Report. Ref: ERA_BCA_Art10. Issue: 1.2.0. Date: 04/05/2020
- [11]. – Opinion ERA/OPI/2020-2 of the European Union Agency for Railways for European Commission regarding CCS TSI Error Corrections.
- [12]. – 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.
- [13]. – ERTMS/ETCS TEST FORMAT FOR OPERATIONAL TESTING. Version 1.2. Date 24/05/2011.

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 list of ESC Types is published and maintained by the European Union Agency for Railways in the technical document "ESC/RSC technical document, TD/011REC1028".
- [4.1.2] Infrastructure Managers, with the support of the ETCS suppliers for their network, shall submit to the Agency the definition of the necessary checks for each ESC type on their network.
- [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.
- [4.1.4] The results of the ESC checks for an on-board unit on the Interoperability Constituent level or subsystem level, including findings and conditions arising, are recorded in the ESC Check Report.

4.2. ESC checks and laboratories.

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

4.3. Assessment requirements for an On-board Subsystem and ETCS compatibility checks.

[4.3.1] The task of the NoBo with regards to the ESC/RSC check report is to verify the correctness and completeness of the ESC/RSC check report for the subsystem, according to the requirements in the point 6.3.3.1 of [12].

4.4. ESC types.

[4.4.1] Infrastructure Managers shall classify the ETCS lines according to ESC Types and register the ESC Types in RINF.

[4.4.2] The ESC Types shall only be used when published with status 'Valid' in the Agency technical document referred above.

[4.4.3] Each ESC Type identifies the set of ESC checks (e.g. document check, lab or track test, ...) applicable for a section or group of sections within an area of use. It is possible to use the same ESC type for cross border infrastructure and for different national infrastructures.

4.5. Milestones.

[4.5.1] According to [1] Infrastructure Managers, with the support of the ETCS suppliers for their network, had to submit to the Agency the definition of the necessary ESC checks on their network by 16 January 2020 at the latest. This milestone was achieved by Adif, delivering on the date the first version of its ESC document.

[4.5.2] According to [12] by 28 March 2024, infrastructure managers shall submit to the Agency the definition of the checks for the compatibility of vehicles with the infrastructure regarding the ETCS system and the radio system for the existing lines equipped with ERTMS or GSM-R in operation. Member States shall repeal the related national rules by the same date.

[4.5.3] Existing vehicles, and their corresponding vehicle type, equipped with ETCS and RMR shall be deemed compatible with the ETCS and radio system compatibility types of the networks on which they are operating with ETCS and RMR by 16 January 2020 without any further checks, maintaining the existing restrictions or conditions for use.

Any subsequent modification of the vehicle, their corresponding vehicle type or the infrastructure regarding the technical or route compatibility shall be managed according to the requirements specified for ETCS and Radio system compatibility in this TSI.

[4.5.4] By 1 June 2024, the Agency shall provide the Commission with its analysis on how to phase out the checks to prove the technical compatibility of on-board units with different ERTMS trackside implementations and to achieve harmonisation of engineering and operational rules for the Single European Rail Area.

5. Objective.

The objective of this report is the application of the 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, related to the ESC checks to be performed in the Adif and Adif AV network.

6. Scope.

The scope of this document includes according to Regulation (EU) 2023/1695 of 10 August 2023:

- 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 and Adif-AV networks and on the information reported by the specific ETCS suppliers, considering the lines managed by ADIF and Adif AV.
- It also includes information reported by the specific ETCS suppliers of each line related to the existing BCA reports and article 10 (error corrections) of the above-mentioned regulation. For this version of the ESC checks and regarding article 10 issues only those included in [5], [6], [7], [8], [10] and [11] have been covered. In this version, issues with potential impact but with no actual impact from a preliminary point of view have also been included.

The present document is a non-legally binding interpretation of ADIF in order to respond to the request made to Infrastructure Managers in last CCS TSI regarding the definition of ESC checks to be performed as a temporary measure to increase the confidence on the technical compatibility between the subsystems. It is based only on current practices in Spanish railway network, article 10 error correction related CRs checks, and the information provided by trackside suppliers. Therefore, it should not be interpreted neither as an endorsement by ADIF about the completeness of ETCS Compatibility (actually, the performance of these ESC checks does not constitute an exhaustive verification of the compatibility, and compatibility issues may appear even if the checks have been passed) nor as a safety or interoperability assurance.

When releasing this version, answers from some suppliers were missing, incomplete or unclear. As soon as the pending information is received, will be incorporated in future versions. For instance, 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.

Some of the issues not covered by this document are (non-exhaustive list):

- Possible deviations that an ERTMS onboard equipment entering Adif and Adif-AV networks 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 by Adif 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.
- Review by Adif of the CRs that have not been identified to have a potential compatibility issue in [5], [6], [7] [8], [10] and [11].

- Review by Adif of the correctness of the assessment included in [5], [6], [7] [8], [10] and [11].

The checks that may apply for:

- Open points in CCS TSI (e.g.: braking curves in Baseline 2).
- Deficiencies in the TSI.

Are those agreed at European level in the frame of Article 10 error correction process and subsequently included in the pertinent documents included in chapter 2.

Regarding the potential compatibility issues identified in [5], [6], [7] [8], [10] and [11] for certain CRs the applicants performing ESC checks shall analyse if the identified issue is relevant with regard to the real behaviour of their OBUs and if the risk is not tolerable they must try to find an interoperable solution for the issue at project level. This document will be updated regularly and the applicable information at each time will be the one published in the Agency Technical document as "Valid". ADIF has considered ERA Tos (Technical Opinions) as inputs for the ESC, although no additional specific analysis on the content and results has been performed.

Adif understands that checks corresponding to new CRs to be included in the CCS TSI 2023 BCA (expected to be published in 2025) should not be introduced in Adif ESC document at this moment.

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.
- Submission complete ESC checks to the Agency.

8. ESC checks.

8.1. ESC checks development approach.

The following sections indicate the groups of compatibility controls that have been defined for the Adif and Adif-AV networks, as well as the criteria considered for each of them in their definition.

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 an area of use, 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 Train-track integration ESC tests, including Level 1 – Level STM LZB / Level 0 + LZB transition Train-track integration ESC tests.
- Level 2 Train-track integration ESC tests, including Level 2 – Level STM LZB / Level 0 + LZB transition Train-track integration ESC tests.

8.1.2. Analysis of the BCA reports compatibility with Adif and Adif AV networks.

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 networks it seems that the possible impact is limited to 7 CRs.

Anyway, regarding these CRs, applicants performing ESC checks must execute specific analysis based on the real behaviour of their relevant OBUs.

8.1.3. Analysis of the Error CRs Compatibility Assessment Art10 Report (2017) with Adif and Adif AV networks.

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 describes 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 networks it seems that the possible impact is limited to 12 CRs.

Anyway, regarding these CRs, applicants performing ESC checks must execute specific analysis based on the real behaviour of their relevant OBUs.

8.1.4. Analysis of the Error CRs Compatibility Assessment Art10 Report (2020) with Adif and Adif AV networks.

In May 2020, ERA delivered the Opinion ERA/OPI/2020-2 regarding CCS TSI Error Corrections [11] that includes the document "Error CRs Compatibility Assessment. Art 10 Report" [10]. This document identifies and describes 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 23 CRs as theoretical compatibility risk (new or change from previous reports).

Once the 23 CRs have been analysed in the Spanish networks it seems that the possible impact for 8 CRs is related to operational issues.

Anyway, regarding these CRs, applicants performing ESC checks must execute specific analysis based on the real behaviour of their relevant OBUs.

8.1.5. Additional ESC checks proposed by Adif trackside ETCS subsystem suppliers.

Considering that the ETCS suppliers for Adif and Adif AV networks have to support Infrastructure Managers on the definition of the necessary ESC checks, they have been asked regarding this issue in two aspects:

- The review of the classification and categorization of the checks defined by Adif and applied to the corresponding ESC types defined for each supplier.
- The need to define additional controls to those defined by Adif.

8.1.5.1 ETCS supplier Hitachi.

The documentation related to ESC type Code 112 and 122 provided by Hitachi has not been included due to the following considerations:

- On the provided document by Hitachi as supplier tests provided are the ones for the functional validation of the trackside. Even we recognise that there are some overlap between the Operation Test Scenarios (OTS) and the ESC, reusing the complete list of OTS for the ESC is not acceptable.
- On the documents provided there are also the Hazard Log for the trackside. This is also not acceptable since the scope of the ESC is the essential requirement "technical compatibility" and not to verify the "safety" of the system.
- The documents as presented are not well structured for ESC Applicants and NoBos to define and validate the necessary checks for the ESC type.

Hitachi has not submitted yet ESC related information for ESC type Code 111 and ESC type Code 132. Hitachi has not reviewed the checks proposed by Adif for their lines and their classification either.

8.1.5.2 ETCS supplier Hitachi (ex Thales).

Supplier information regarding the checks to be performed in order to demonstrate the technical compatibility between the on-board and trackside CCS subsystems on Adif ESC type Code 2xx lines/sections has been received from Hitachi (ex Thales) including both; review and

classification of Adif train-track integration ESC checks (Annex A1.2 and A3.2) and definition of additional controls (Annex D1.2 y D3.2).

8.1.5.3 ETCS supplier Siemens.

Supplier information regarding the checks to be performed in order to demonstrate the technical compatibility between the on-board and trackside CCS subsystems on Adif ESC type Code 3xx lines/sections has been received from Siemens including the review and classification of Adif train-track integration ESC checks (Annex A1.3 and A3.3). No additional controls have been defined by Siemens.

8.1.5.4 ETCS supplier Alstom.

Supplier information regarding the checks to be performed in order to demonstrate the technical compatibility between the on-board and trackside CCS subsystems on Adif ESC type Code 4xx lines/sections has been received from Alstom including both; review and classification of Adif train-track integration ESC checks (Annex A1.4 and A3.4) and definition of additional controls (Annex D3.4).

8.1.5.5 ETCS supplier CAF.

Supplier information regarding the checks to be performed in order to demonstrate the technical compatibility between the on-board and trackside CCS subsystems on Adif ESC type Code 5xx lines/sections has been received from CAF including the review and classification of Adif train-track integration ESC checks (Annex A1.5). No additional controls have been defined by CAF.

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.

In some tests, it will be necessary to check the overlapping areas on the borders between different areas of use and different ESC types (maximum speed in the complete line, track conditions, level transitions, handovers).

ESC tests related to train-track integration are extensively listed and attached in Annex A1 and A3. These checks:

- Are applicable to all vehicles at subsystem level if no specific comments are listed. Depending on the equipment of the train (independent ASFA equipment or STM ASFA) the applicant for the ESC check must select the tests that are applicable.
- Specific check data sheets have been defined for B2 (2.3.0d version) and B3 (3.6.0 version) on-board units. For OBUs equipped with other versions some JRU variables may vary from indicated in ESC checks data sheets.
- These checks include transitions from level 1 and 2 to STM ASFA and level 0 (+ASFA).
- These checks have been defined in a specific way for each ESC type. Anyway, Adif will provide any information related to the technical characteristics of the section if necessary.
- ESC Tests related to train-track integration defined by Adif have been classified into different categories:
 - "S0" class means Specific test of each ESC type in the entire section (for example: test of maximum speed and track conditions along the section) or in specific points of the ESC type defined by Adif (for example: static speed supervision due to a track crossover). These test cases must be repeated on all ESC types.

- “E” class means Specific test to be carried out in all points of the ESC type where applicable (for example: all transition points, all technological borders and all H0). These test cases must be repeated on all ESC types.
- “GO” class means Generic test that would be valid to do at any point of the same ESC type.
- “GF” class means Generic test that would be valid to do at any ESC type of the same supplier and of the same ETCS level (F: 1= Hitachi, 2= Hitachi (ex Thales), 3=Siemens, 4=Alstom, 5=CAF).
- “GT” class means Generic test that would be valid for any ESC type of the same ETCS level to which it applies.
- “GXXX, GYYY” class means Generic test that would be valid to do in ESC types XXX, YYY and in the same ESC type.
- “N/A” class means that the test does not apply to this ESC type.

ESC checks related to analysis of the BCA reports compatibility with Adif and Adif-AV networks are listed in Annex B.

ESC checks related to the analysis of the Error CRs Compatibility Assessment Art 10 Report (2017) with Adif and Adif-AV networks are listed in Annex C1.

ESC checks related to the analysis of the Error CRs Compatibility Assessment Art 10 Report (2020) with Adif and Adif-AV networks are listed in Annex C2.

Additional ESC checks proposed by trackside ETCS subsystem suppliers in Adif and Adif-AV networks are listed in Annex D.

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

This is the contact detail for ESC checks applicants to request for trackside testing:

- High Speed Lines (ADIF-Alta Velocidad): follow instructions indicated in ADIF-Alta Velocidad web page (<https://www.adifaltavelocidad.es/solicitud-de-pruebas-en-la-infraestructura>).
- Conventional Lines (ADIF): follow instructions indicated in ADIF web page (<https://www.adif.es/en/solicitud-de-pruebas-en-la-infraestructura>).

8.3. ESC checks data sheets.

Data sheets for each ESC check for baseline 2 trains (2.3.0.d) and for baseline 3 trains (3.6.0) have been included in Annex A.

Format for drafting ESC Test Cases has been obtained from the ERA document [13].

9. Intentionally left blank.

10. ESC types.

The criteria used by Adif to define the ESC types are the following:

- Different ESC types 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.
 - As indicated above, the lines considered are those managed by Adif and Adif AV.
 - Overlapping areas have been considered for sections in which there are level transitions or technological transitions between ESC types.
 - The codification of the ESC type Code XYZ has been defined as follows:
 - X: corresponds to a supplier (1= Hitachi, 2= Hitachi (ex Thales), 3=Siemens, 4=Alstom, 5=CAF).
 - Y: correspond to a specific project (section of a line, a line, a set of lines)
 - Z: corresponds to ETCS/ERTMS level (1 or 2)
- For example, the ESC type 332 corresponds to:
- 3= Siemens ETCS trackside technology
 - 3= line 036 (section BIF. BOBADILLA a GRANADA)
 - 2= ETCS/ERTMS level 2

ESC types are extensively listed in Annex E.

11. Matrix of application.

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

12. Annex A: Train-track integration test list.

Annex A.1. Level 1 & Level 1 <> Level STM LZB transition & Level 1 <> Level 0 + LZB transition train-track integration ESC tests list.

Test Case Category Code / Test Case Code	Test Case Category / Test Case Title
Level 1 Train-track integration ESC tests list	
1.1	Static Speed Profile & TSR supervision
1.1.1	Static Speed Profile supervision. SSP due to a track crossover
1.1.2	Speed supervision. Overlapping TSR supervision
1.1.4	TSR supervision. FS mode
1.2	Release speed supervision and override without authorization
1.2.1	Release speed supervision. The release speed is a fixed value given by trackside. Normal conditions (without isolated bogies)
1.2.2	Release speed supervision. The release speed is a fixed value given by trackside. Train performs a SPAD (Signal Passed At Danger) in normal conditions.
1.3	Braking supervision
1.3.1	Braking supervision. Normal conditions (without isolated bogies) and the worst gradient conditions
1.3.2	Braking supervision. Isolated bogies and the worst gradient conditions.
1.3.3	Braking supervision. Trains with Lambda percentage introduced. Worst percentage, max train length and the worst gradient conditions.
1.4	Level transitions
1.4.1	Level transition from L1 to L0 + ASFA. Signal at proceed aspect. (*)
1.4.3	Level transition from L1 to L0 + ASFA when the first signal after the transition border is closed. (*)
1.4.4	Level transition from L1 to L0 + ASFA. The level transition announcement is not received, and the first signal of the ASFA area is closed. (*)
1.4.5	Level transition from L0 + ASFA to L1. Signal at proceed aspect. (*)
1.4.6	Level transition from L0 + ASFA to L1. Signal at stop aspect. (*)
1.4.7	Level transition from L1 to L0 + ASFA. Signal at stop aspect. (*)
1.4.8	Level transition from LSTM ASFA to L1. Signal at proceed aspect.
1.4.9	Level transition from L1 to LSTM ASFA. Signal at proceed aspect.
1.4.10	Level transition from L1 to LSTM ASFA when the first signal beyond the transition border is in stop aspect.
1.4.11	Level transition from L1 to LSTM ASFA. Signal at stop aspect.
1.4.12	Level transition from L1 to LSTM ASFA. The level transition announcement is not received, and the first signal of the level STM area is closed.
1.4.13	Level transition from L1 to L0 + ASFA. TSR in ASFA area. (*)
1.4.14	Level transition from LSTM ASFA to L1. Signal in OS aspect.
1.4.15	Level transition from L1 to LSTM ASFA. TSR in LSTM area.
1.4.16	Level transition from L1 to L0 + ASFA. The level transition order is not received. (*)
1.4.17	Level transition from L1 to LSTM ASFA. The level transition order is not received.

Test Case Category Code / Test Case Code	Test Case Category / Test Case Title
Level 1 Train-track integration ESC tests list	
1.4.18	Level transition from LSTM ASFA to L1. Signal at stop aspect.
1.5	Mode transitions
1.5.1	Mode transition from FS to OS at a further location. The driver acknowledges the request before reaching the OS area.
1.5.2	Mode transition from FS to OS at a further location. The driver does not acknowledge the request before reaching the OS area
1.5.3	Transition from OS mode to FS mode. Exit from an occupied track section
1.5.4	Mode transition from FS to SH at a further location. The driver acknowledges the request before reaching the SH area.
1.5.5	Mode transition from SH to TR. SPAD at a closed light signal
1.5.6	Authorised Override EoA. FS mode
1.5.7	Mode transition from SR to FS at a main light signal.
1.5.8	Mode transition from FS to OS at a current location.
1.5.9	Mode transition from FS to SH at a current location. The driver acknowledges the request after reaching the SH area.
1.6	TSR revocation
1.6.1	TSR revocation.
1.7	MA update
1.7.1	MA update after a passengers stop
1.9	Verification of track conditions
1.9.1	Verification of track conditions all along the line
1.9.2	Train interface: lowering and raising pantograph
1.9.3	Verification of track conditions: opening and closing the main power switch.
1.9.4	Verification of track conditions: opening and closing of the air conditioning intakes.
1.9.5	Verification of track conditions: passengers emergency brake inhibition.
1.9.6	Verification of track conditions: Change of voltage supply zone. FS mode.
1.9.7	Verification of track conditions: Change of voltage supply zone. OS mode.
1.10	Text messages
1.10.1	Text message reaching a track gauge changeover installation.
1.11	Miscellaneous
1.11.1	Management of the default balise information (packet 254).
1.11.4	Maximum speed supervision in the complete line.
1.11.5	Supervision of the national values transmitted from the trackside.
Level 1 <> Level STM LZB transition Train-track integration ESC tests list	
2.1	Level transition from LSTM LZB to L1
2.1.1	Level transition from LSTM LZB to L1. Standard operating conditions.
2.1.2	Level transition from LSTM LZB to L1. TSR in L1 area.
2.1.3	Level transition from LSTM LZB to L1. Degraded braking conditions.

Test Case Category Code / Test Case Code	Test Case Category / Test Case Title
Level 1 Train-track integration ESC tests list	
2.1.4	Level transition from LSTM LZB to L1. The light signal at the transition border is in stop aspect.
2.2	Level transition from L1 to LSTM LZB
2.2.1	Level transition from L1 to LSTM LZB. Standard operating conditions.
2.2.2	Level transition from L1 to LSTM LZB. TSR management. TSR in LZB area.
2.2.3	Level transition from L1 to LSTM LZB. Degraded braking conditions + maximum train length.
2.2.5	Level transition from L1 to LSTM LZB. The level transition announcement is not received, and the first signal of the level STM area is closed.
2.2.6	Level transition from L1 to LSTM LZB. The level transition order is not received.
Level 1 <> Level 0 + LZB transition Train-track integration ESC tests list	
4.1	Level transition from L0 + LZB to L1
4.1.3	Level transition from L0+LZB to L1. Standard operating conditions
4.1.4	Level transition from L0+LZB to L1. The first signal after the level transition border is in stop aspect. Degraded braking conditions
4.1.5	Level transition from L0+LZB to L1. TSR in L1 area
4.1.8	Level transition from L0+LZB to L1. The light signal at the transition border is in stop aspect.
4.2	Level transition from L1 to L0 + LZB
4.2.3	Level transition from L1 to L0+LZB. Degraded braking conditions + maximum train length.
4.2.4	Level transition from L1 to L0+LZB. Standard operating conditions
4.2.5	TSR management at Level transition from L1 to L0+LZB. TSR in LZB area.

(*) These tests check both pure ETCS behavior and also national ETCS function FN-27.

Suppliers information regarding review and classification of Adif Level 1 train-track integration ESC checks is included in "Adif_AdifAV_ESC_v3.3_annexes" file; sheets A1.2, A1.3, A1.4, A1.5.

The checks/locations indicated in "Adif_AdifAV_ESC_v3.3_annexes" file may be temporarily modified due to potential works on track. If it is not possible to carry out a check at the specified location, Adif must be contacted to confirm the applicable checks/locations for the area.

Data sheets for Level 1 train-track integration ESC checks for baseline 2 trains (2.3.0.d) and for baseline 3 trains (3.6.0) are included in "L1_DS_V2.3" file.

Annex A.3. Level 2 & Level 2 <> Level 0 + LZB transition Train-track integration ESC tests list.

Test Case Category Code / Test Case Code	Test Case Category / Test Case Title
Level 2 Train-track integration ESC tests list	
3.1	Static Speed Profile supervision
3.1.1	Static Speed Profile supervision. SSP due to a track crossover
3.2	Braking supervision
3.2.1	Braking supervision with different train sets. Normal conditions (without isolated bogies) and the worst gradient conditions
3.2.2	Braking supervision with different train sets. Isolated bogies and the worst gradient conditions
3.2.3	Braking supervision. Trains with Lambda percentage introduced. Worst percentage, max train length and the worst gradient conditions.
3.3	Movement authority management (MA)
3.3.1	MA update in FS mode. New EoA at a light signal
3.3.2	MA update in FS mode. New EoA at a ETCS marker board
3.3.3	MA update in OS mode
3.3.4	MA shortening in RBC-RBC handover area
3.5	Track conditions
3.5.1	Verification of track conditions all along the line
3.5.2	Train interface: opening and closing of the main power switch.
3.5.3	Train interface: opening and closing of air conditioning intakes
3.5.4	Train interface: passengers emergency brake inhibition
3.5.5	Verification of track conditions: Lowering and raising pantograph
3.5.6	Verification of track conditions: Change of voltage supply zone. FS mode.
3.5.7	Verification of track conditions: Change of voltage supply zone. OS mode.
3.6	Management of TSR information: supervision
3.6.1	Management of TSR information sent by balise in level 2. FS mode
3.6.2	Management of TSR information sent by the RBC. FS mode
3.6.3	Management of TSR information sent by balise in level 2. SR mode
3.6.4	Management of TSR information sent by the RBC. SR mode
3.6.5	Management of TSR information sent by balise in level 2. OS mode
3.6.6	Management of TSR information sent by the RBC. OS mode
3.6.7	SoM in a TSR area
3.6.8	Management of the overlapping TSR information sent by balise and RBC in level 2
3.6.9	Management of the overlapping TSR information sent by the RBC
3.7	Management of TSR information: revocation
3.7.3	TSR revocation
3.8	Start of mission (SoM)
3.8.1	SoM without valid train location information. Mode transition to FS
3.8.2	SoM in SB mode after exit of SL mode

Test Case Category Code / Test Case Code	Test Case Category / Test Case Title
Level 2 Train-track integration ESC tests list	
3.8.3	SoM in SB mode. Train in a stabling area with valid train location information and with previous group of balises
3.8.4	SoM in SB mode. Train in stabling area without valid location information and with previous group of balises
3.8.5	SoM in SB mode. Train in front of a light signal and the location information is valid
3.8.6	SoM in SB mode. Train in front of a light signal and without valid train location information
3.8.7	SoM in SB mode after exit of SL mode. Train in stabling area and the train location information is valid
3.8.8	SoM in SB mode after exit of SL mode. Train in front of a light signal and the location information is valid
3.8.9	SoM in SB mode. Train in front of a light signal and with valid train location information. RBC/RBC Handover area
3.8.10	SoM in SB mode. Train in front of a light signal without valid location information. RBC/RBC Handover area
3.9 Mode transitions: Entry in FS mode	
3.9.1	Mode transition from SR to FS at a main light signal
3.9.2	Mode transition from SR to FS at an ETCS marker board
3.9.3	Mode transition from SB to FS
3.10 Mode transitions: Exit from PT mode	
3.10.1	Mode transition from PT to FS
3.10.2	Mode transition from PT to SR
3.11 Mode transitions: SB mode	
3.11.1	Mode transition from FS to SB
3.12 Mode transitions: Entry in OS mode	
3.12.2	Mode transition from FS to OS at a further location. The driver acknowledges the request before reaching OS area.
3.12.3	Mode transition from FS to OS at a further location. The driver does not acknowledge the request before reaching the OS area
3.12.4	Mode transition from SR to OS at the current location sent by trackside. The driver acknowledges the request of OS mode
3.12.5	Mode transition from FS to OS at a current location ordered by trackside. The driver acknowledges the request of OS mode
3.13 Mode transitions: Exit from OS mode	
3.13.1	Mode transition from OS to FS at a main light signal
3.13.2	Exit from OS mode with the following signal opened for OS
3.14 Mode transitions: Entry in SH mode	
3.14.1	Mode transition from SB to SH selected by driver
3.14.2	Mode transition from FS to SH selected by driver
3.14.3	Mode transition from OS to SH selected by driver
3.14.4	Mode transition from SR to SH selected by the driver

Test Case Category Code / Test Case Code	Test Case Category / Test Case Title
Level 2 Train-track integration ESC tests list	
3.14.5	Mode transition from FS to SH at the current location ordered by trackside. The driver acknowledges the request of SH mode
3.14.6	Mode transition from FS to SH at further location ordered by trackside. The driver acknowledges the request of SH mode
3.14.7	Mode transition from FS to SH at a further location ordered by trackside. The driver does not acknowledge the request of SH mode
3.14.8	Mode transition from SR to SH at current location ordered by trackside. The driver acknowledges the request of SH mode
3.14.9	Mode transition from SR to SH at further location ordered by trackside. The driver acknowledges the request of SH mode
3.14.10	Mode transition from OS to SH at further location ordered by trackside. The driver acknowledges the request of SH mode
3.15 Mode transitions: transitions to TR mode	
3.15.2	Perform a SPAD at a closed light signal. Mode transition from OS to TR
3.15.3	Movement protection in SR mode
3.15.4	Mode transition from SH to TR. SPAD at a closed light signal
3.16 Override with authorization	
3.16.1	Override with authorization. FS mode. The radio communication session is established with the RBC
3.16.2	Override with authorization. OS mode. The radio communication session is established with the RBC
3.16.3	Override with authorization. PT mode. The radio communication session is established with the RBC
3.17 Level transitions	
3.17.1	Level transition from L2 to L1. Signal at proceed aspect.
3.17.2	Level transition from L1 to L2. Signal at proceed aspect.
3.17.3	Level transition from L1 to L2. Signal at stop aspect.
3.17.4	Level transition from L2 to L0 + ASFA. Signal at proceed aspect. (*)
3.17.5	Level transition from L2 to L0 + ASFA when the first signal beyond the transition border is in stop aspect. (*)
3.17.6	Level transition from L0 + ASFA to L2. Signal at proceed aspect. (*)
3.17.7	Level transition from L0 + ASFA to L2. Signal at stop aspect. (*)
3.17.8	Level transition from L2 to LSTM LZB. Signal at proceed aspect.
3.17.9	Level transition from L2 to LSTM LZB. Degraded braking conditions + maximum train length.
3.17.10	Level transition from LSTM LZB to L2. Signal at proceed aspect.
3.17.11	Level transition from LSTM LZB to L2. Signal at stop aspect.
3.17.12	Level transition from L2 to LSTM ASFA. Signal at proceed aspect.
3.17.13	Level transition from L2 to LSTM ASFA when the first signal beyond the transition border is in stop aspect
3.17.14	Level transition from LSTM ASFA to L2. Signal at proceed aspect.
3.17.15	Level transition from LSTM ASFA to L2. Signal at stop aspect.

Test Case Category Code / Test Case Code	Test Case Category / Test Case Title
Level 2 Train-track integration ESC tests list	
3.17.25	Level transition from L2 to L0 + ASFA. The level transition announcement is not received, and the first signal of the ASFA area is closed. (*)
3.17.26	Level transition from L2 to L0 + ASFA when level transition order is not received. (*)
3.17.30	TSR Management at level transition from L2 to LSTM LZB. TSR in LZB area
3.17.33	TSR Management at level transition from LSTM LZB to L2. TSR in L2 area
3.17.34	Level transition from L2 to L1. Signal at stop aspect.
3.17.39	Level transition from L2 to L0 + ASFA. TSR in ASFA area. (*)
3.17.43	Level transition from LSTM LZB to L2. Degraded braking conditions.
3.17.44	Level transition from L2 to LSTM ASFA. The level transition announcement is not received, and the first signal of the level STM area is closed.
3.17.45	Level transition from L2 to LSTM ASFA when level transition order is not received
3.17.46	Level transition from L2 to LSTM LZB. The level transition announcement is not received, and the first signal of the level STM area is closed.
3.17.47	Level transition from LSTM ASFA to L2. Signal in OS aspect
3.17.48	Level transition from L2 to LSTM ASFA. TSR in LSTM area
3.17.49	Level transition from L2 to LSTM LZB. The level transition order is not received.
3.18	Exit of Post Trip (PT) mode
3.18.1	Exit from PT mode with valid train location information.
3.18.2	Exit from PT mode without valid train data information.
3.19	Handover management
3.19.1	RBC/RBC Handover management. FS mode
3.19.2	RBC/RBC Handover management. SL mode
3.19.3	Management of the overlapping TSRs information in RBC/RBC handover area
3.19.4	Track conditions management in RBC/RBC handover area
3.19.5	TSR revocation in RBC/RBC handover area
3.20	Unconditional emergency stop (UES)
3.20.1	Unconditional emergency stop (UES), movement authority is revoked and further update
3.21	Co-operative shortening of MA
3.21.1	Co-operative shortening of MA. The train accepts the new MA
3.21.2	Co-operative shortening of MA. The train rejects the new MA
3.22	Change of train number
3.22.2	Change of train number in a station. Driver introduces a new number
3.23	Release speed and override without authorization
3.23.2	Perform a SPAD at a closed signal. The release speed is a fixed value sent by trackside. Normal conditions.
3.25	Geographical position
3.25.1	Geographical position indicated on DMI and requested by the driver. FS mode

Test Case Category Code / Test Case Code	Test Case Category / Test Case Title
Level 2 Train-track integration ESC tests list	
3.26	Supervision of the national values transmitted from the trackside
3.26.1	Supervision of the national values transmitted from the trackside
3.27	Management of the default balise information
3.27.1	Management of the default balise information (packet 254).
3.28	Coordinate system
3.28.1	Assignment of Coordinate system
3.29	MA request
3.29.1	MA request parameters
3.30	Train position report
3.30.1	Train position reporting according to "position report parameters"
3.31	Degraded conditions
3.31.1	One balise from a balise group included in the linking information is missed. Linking error. FS mode
3.31.3	RBC/RBC handover when only one modem is available.
3.31.4	Expiration of T_NVCONTACT with successful attempts to set-up safe connection
3.32	Key management
3.32.1	Key generation and installation
3.32.2	Key EVC deletion
3.32.3	Key modification
3.32.4	Key validity period
3.33	Maximum speed supervision
3.33.1	Maximum speed supervision in the complete line
3.34	Miscellaneous
3.34.1	Shifted MA
3.34.3	Conditional emergency stop
3.34.4	Stabling areas without release speed and maximum train length
Level 2 <> Level 0 + LZB transition Train-track integration ESC tests list	
4.1	Level transition from L0 + LZB to L2
4.1.1	Level transition from L0+LZB to L2. Signal at proceed aspect
4.1.2	Level transition from L0+LZB to L2. The light signal at the transition border is in stop aspect
4.1.6	TSR management at level transition from L0+LZB to L2. TSR in L2 area.
4.1.7	Level transition from L0+LZB to L2. Degraded braking conditions
4.2	Level transition from L2 to L0 + LZB
4.2.1	Level transition from L2 to L0+LZB. Signal at proceed aspect
4.2.2	Level transition from L2 to L0+LZB. Degraded braking conditions + maximum train length.
4.2.7	TSR management at level transition from L2 to L0+LZB. TSR in LZB area

(*) These tests check both pure ETCS behavior and also national ETCS function FN-27.



Suppliers information regarding review and classification of Adif Level 2 train-track integration ESC checks is included in "Adif_AdifAV_ESC_v3.3_annexes" file; sheets A3.2, A3.3, A3.4.

The checks/locations indicated in "Adif_AdifAV_ESC_v3.3_annexes" file may be temporarily modified due to potential works on track. If it is not possible to carry out a check at the specified location, Adif must be contacted to confirm the applicable checks/locations for the area.

Data sheets for Level 2 train-track integration ESC checks for baseline 2 trains (2.3.0.d) and for baseline 3 trains (3.6.0) are included in "L2_DS_V2.3" file.

13. Annex B: Analysis of the BCA reports compatibility with Adif and Adif-AV networks.

For further details of each item, CR description included in [5] and [6] may be used.

BCA ESC tests list			
Test Case Code	Test Case Title	Test Case Description	Comments
B1	CR 166. Use of NID_OPERATIONAL	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
B2	CR 484. Clarification required: Mode profile and Infill MA	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
B3	CR 595. Braking curve calculation	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
B4	CR 843. Message with several non-revocable TSRs is discarded	Check whether a B2 on-board may not accept a message containing several non-revocable TSRs	Only for B2 trains
B5	CR 899. Replacement of track description and linking information	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
B6	CR 933. Storing of RBC contact information	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
B7	CR 958. Ambiguous exception	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

14. Annex C1: Analysis of the Error CRs Compatibility Assessment Art10 Report (2017) with Adif and Adif-AV networks.

For further details of each item, CR description included in [7] and [8] may be used.

Error CRs Compatibility Assessment Art10 Report (2017) tests list (I)			
TC Code	Test Case Title	Test Case Description	Comments
C1.1	CR 1252: Ambiguities about release speed and application of A.3.4 in case a train accepts a CES	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
C1.2	CR 1288: Shortcomings due to specific locations temporarily considered as the EOA/SvL	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
C1.3	CR 1300: Follow-up to CR977	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
C1.4	CR 1267: Acquiring the list of available networks whilst communication session is established.	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
C1.5	CR 1306: Undefined sequence of actions following the filtering of trackside information as per SRS 4.8.	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.	

Error CRs Compatibility Assessment Art10 Report (2017) tests list (II)

TC Code	Test Case Title	Test Case Description	Comments
C1.6	CR 1309: Enhancement of HDLC to handle retransmission of SABME message	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
C1.7	CR 994: Text message start conditions	<p>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).</p> <p>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.</p>	
C1.8	CR 1120: Uncertain handling of some infill information	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
C1.9	CR 1166: Ambiguities in driver acknowledgement requirements	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.	
C1.10	CR 1251: Use of inconsistent or incomplete terms for the cooperative MA shortening function	<p>When the request to Shorten MA is rejected by the on-board, the RBC sends an Unconditional Emergency Stop.</p> <p>Check if on-board equipment keeps an obsolete mode profile after granting a request to shorten MA without mode profile.</p>	Only for B2 trains running in level 2

Error CRs Compatibility Assessment Art10 Report (2017) tests list (III)

TC Code	Test Case Title	Test Case Description	Comments
C1.11	CR 1259: Accuracy of distances measured on-board not considered when determining Release Speed from MRSP	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.	
C1.12	CR 1264: Exhaustiveness of the list of actions not to be reverted or executed twice	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.	Trains running in level 1

15. Annex C2: Analysis of the Error CRs Compatibility Assessment Art10 Report (2020) with Adif and Adif-AV networks.

For further details of each item, CR description included in [10] and [11] may be used.

Error CRs Compatibility Assessment Art10 Report (2020) tests list (I)			
Test Case Code	Test Case Title	Test Case Description	Comments
C2.1	CR 1313: Unclear management of train position status on passing unlinked BG(s)	In the case the on-board position is unknown, the directional information sent by unlinked balise may be rejected, although the balise is read in the direction for which the information is valid.	
C2.2	CR 1318: Ambiguity in determination of location accuracy	An on-board operating in FS with release speed, when reading the last balise group linked may use the default value of location accuracy of 12 metres. If the release speed provided by trackside has not taken this possibility into account, the release speed may not be safe.	Trains running in level 2
C2.3	CR 1319: Support of different transmission speeds (ETCS data)	The on-board unilaterally chooses the transmission speed to be used during the communication with the RBC. In case the on-board chooses a speed which is not implemented by the RBCs, the communication between the on-board and the RBC will not be possible.	Trains running in level 2
C2.4	CR 1325: Rejection of safety relevant information due to pending acknowledgement of validated train data	An on-board that during a mission changes some train data may reject more restrictive information sent by the RBC if the new train data has not been acknowledged by the RBC. This can have a safety impact by rejecting more restrictive information.	Trains running in level 2
C2.5	CR 1327: Reset of confidence interval	An on-board that is not functioning properly can have an odometry error greater than the SS-41 performance requirements that set it in 5 metres plus the 5% of the distance travelled. In addition, the reading of a balise group does not ensure that the odometry error will collapse to a bounded error, so that even after reading a balise group the odometry error is not bounded in case of odometry system failure. An on-board with release speed given by trackside may not apply the expected reaction due to the min safe front end does pass the EoA in case of a high odometry error.	Trains running in level 2

Error CRs Compatibility Assessment Art10 Report (2020) tests list (II)

Test Case Code	Test Case Title	Test Case Description	Comments
C2.6	CR 1333: Subset-026 clause 3.12.4.4 does not cover the case of reception of a new MA without mode profile.	Due to a possible interpretation of the specifications, an on-board may not delete the list of balises for SH after existing SH. If subsequently the on-board receives a SH order without a new list of balises, the on-board may use the old list of balises. This may cause an operation problem in which an on-board is stopped when passing a balise not included in the list of balises for SH that it received previously and still stored.	
C2.7	CR 1334: Ambiguity regarding the mode and level end events for the display of a text message	In case the infrastructure uses a combination of events to display or stop displaying a text message, the expected behaviour by the on-board and the infrastructure may be different. This can lead to some messages being displayed in different situations than the ones expected by the infrastructure or not being displayed at all.	
C2.8	CR 1348: No change of speed and distance monitoring supervision status	Because of failure of braking curves, the on-board may not correctly monitor the trackside maximum speed when it has entered a braking curve and a relocation occurs due to the reading of balise group.	
C2.9	CR 1312: Undefined sequence of actions following the filtering of trackside information as per SRS 4.8 (part 2)	Possibly a text message operational or safety relevant could not be displayed to the driver. Additionally, the normal service could be impacted if the brake is applied due to the driver having not acknowledged the information first displayed by the on-board soon enough, so that either the 5s of the level ack are elapsed or the end condition of the text information not immediately displayed is reached before the driver could acknowledge it.	
C2.10	CR 1332: Release speed calculated on-board while a LTO in rear of the EOA is stored on-board	If the release speed calculation is always based on the current level, an announced level transition from L2/3 to L1 during RSM can provoke an EB application to standstill at the moment the level transition is executed because the L1 release speed will be lower than the L2/3 release speed.	

16. Annex D: Additional ESC checks list proposed by Adif trackside ETCS subsystem suppliers.

a) ETCS supplier Hitachi (ex Thales)

Hitachi (ex Thales) information regarding the definition of additional ESC checks to those defined by Adif is included in "Adif_AdifAV_ESC_v3.3_annexes" file; sheets D1.2, D3.2.

Data sheets for additional ESC checks proposed by Hitachi (ex Thales) are included in "Thales_DS_V2.2" file.

b) ETCS supplier Alstom

Alstom information regarding the definition of additional ESC checks to those defined by Adif is included in "Adif_AdifAV_ESC_v3.3_annexes" file; sheets D3.4.

Data sheets for additional ESC checks proposed by Alstom are included in "Alstom_DS_V2.2" file.

17. Annex E: ESC types list.

ESC types list		
ESC Type Code	ETCS Supplier / Level	Line Code (Section)
1xx	Hitachi	
111	L1	050 (LES BORGES BLANQUES a MADRID PUERTA DE ATOCHA) 052 (CAMB. PLASENCIA DE JALON a BIF. CAMB. PLASENCIA DE JALON) 054 (BIF.CANAL IMPERIAL a BIF. MONCASI) 056 (BIF. ARTESA DE LLEIDA a BIF. LES TORRES DE SANUI) 060 (BIF. CAMB. ZARAGOZA DELICIAS a CAMB. ZARAGOZA DELICIAS) 068 (VALLECAS AV-AG. KM.12,3 a LOS GAVILANES – AG. KM.13,4)
112	L2	050 (LES BORGES BLANQUES a MADRID PUERTA DE ATOCHA) 052 (CAMB. PLASENCIA DE JALON a BIF. CAMB. PLASENCIA DE JALON) 054 (BIF.CANAL IMPERIAL a BIF. MONCASI) 056 (BIF. ARTESA DE LLEIDA a BIF. LES TORRES DE SANUI) 060 (BIF. CAMB. ZARAGOZA DELICIAS a CAMB. ZARAGOZA DELICIAS) 068 (VALLECAS AV-AG. KM.12,3 a LOS GAVILANES – AG. KM.13,4)
122	L2	046 (BIF.VINALOPO a EL REGUERON AG KM 522,1) 354 (EL REGUERON AG KM 522,1 a MURCIA DEL CARMEN)
132	L2	984 (POLA DE LENA a BIF. PAJARES) 896 (CAMPOMANES AV AG. KM 411.6 a CAMBIADOR DE CAMPOMANES) 130 (UJO a CAMPOMANES RC) 130 (LA ROBLA RC a SANTIBÁÑEZ)
2xx	Hitachi (ex Thales)	
211	L1	050 (BARCELONA SANTS a BIF. CAMBIADOR PUIGVERD) 066 (BIF. CAN TUNIS-A.V. a CAN TUNIS-A.V.) 640 (CAMBIADOR DE LA BOELLA a CAMP DE TARRAGONA)
221	L1	050 (LIMITE ADIF LFPSA a BARCELONA SANTS)
231	L1	080 (BIF. CANAL DEL DUERO a MADRID-CHAMARTÍN-AG. KM. 1,5) 072 (CTT FUENCARRAL AV a CAMBIADOR M. CHAMARTÍN) 076 (CAMBIADOR VALDESTILLAS a BIF. CAMB. VALDESTILLAS) 982 (MEDINA DEL CAMPO AV a BIF. MEDINA)
232	L2	080 (BIF. MEDINA a MADRID-CHAMARTÍN-AG. KM. 1,5) 072 (CTT FUENCARRAL AV a CAMBIADOR M. CHAMARTÍN)
241	L1	082 (BIF. A GRANDEIRA AG. KM 85.0 a BIF. COTO DA TORRE)
251	L1	920 (VILLAVERDE ALTO a PARLA) 500 (BIF. PLANETARIO a VILLAVERDE ALTO) 300 (MADRID-CHAMARTIN a VILLAVERDE BAJO)
262	L2	822 (TABOADELA AG. KM. 234,0 a OURENSE) 890 (CAMBIADOR PEDRALBA a BIF. PEDRALBA) 892 (CAMBIADOR DE TABOADELA a TABOADELA AV AG. KM. 446,1) 982 (TABOADELA AG. KM. 234,0 a BIF. MEDINA) 190 (CAMB. DE MEDINA AV a MEDINA DEL CAMPO AV)
271	L1	040 (MADRID-CHAMARTÍN a BIF. TORREJON DE VELASCO) 040 (BIF. TORREJON DE VELASCO a BIF. BLANCALES) 010 (LOS GAVILANES a BIF. TORREJON DE VELASCO) 010 (BIF. TORREJON DE VELASCO a YELES)
281	L1	400 (UTRERA a CÁDIZ) 406 (LAS ALETAS a UNIVERSIDAD DE CÁDIZ)
292	L2	080 (VALLADOLID-CAMPO GRANDE a BIF. MEDINA) 076 (CAMB. DE VALDESTILLAS a BIF. CAMB. DE VALDESTILLAS)

ESC Type Code	ETCS Supplier / Level	Line Code (Section)
3xx	Siemens	
311	L1	030 (BIF. MÁLAGA-A.V. a MÁLAGA-MARÍA ZAMBRANO) 032 (ANTEQUERA-SANTA ANA a CAMBIADOR ANTEQUERA) 014 (BIF. GOBANTES a BIF. BOBADILLA) 036 (ANTEQUERA-SANTA ANA a BIF. BOBADILLA)
312	L2	030 (BIF. MÁLAGA-A.V. a MÁLAGA-MARÍA ZAMBRANO) 032 (ANTEQUERA-SANTA ANA a CAMBIADOR ANTEQUERA) 014 (BIF. GOBANTES a BIF. BOBADILLA) 036 (ANTEQUERA-SANTA ANA a BIF. BOBADILLA)
321	L1	024 (YELES-AGUJA KM. 34,397 a BIF. LOS BLANCALES) 040 (BIF. TORREJÓN DE VELASCO a VALENCIA-JOQUIN SOROLLA) 042 (BIF. ALBACETE a CHINCHILLA A.V.) 308 (ALBACETE-LOS LLANOS a CAMBIADOR ALBACETE) 338 (CAMBIADOR VALENCIA a VALENCIA-JOQUÍN SOROLLA)
332	L2	036 (BIF. BOBADILLA a GRANADA)
341	L1	082 (BIF A GRANDEIRA a O IRIXO-A.V.) 800 (A CORUÑA a BIF. SAN DIEGO) 818 (A ESCRAVITUDE a BIF. ANGUEIRA) 822 (A SUSANA a A CORUÑA) 824 (VILAGARCIA DE AROUSA a SANTIAGO DE COMPOSTELA) 826 (CERCEDA-MEIRAMA a CENTRAL TERMICA DE MEIRAMA) 830 (BIF. UXES a BIF. SAN CRISTOBAL) 842 (BIF. RÍO SAR a BIF. A GRANDEIRA AG KM 376,1)
351	L1	102 (COLMENAR VIEJO a MADRID-CHAMARTIN) 104 (ALCOBENDAS a UNIVERSIDAD CANTOBLANCO)
381	L1	400 (SEVILLA a LAS CABEZAS) 422 (BIF UTRERA a EL SORBITO) 444 (LA SALUD a LA NEGRILLA) 456 (LA SALUD-AGUJA KM. 6,2 a LA SALUD-AGUJA KM. 10,2)
4xx	Alstom	
412	L2	042 (ALBACETE-LOS LLANOS a ALACANT-TERMINAL) 046 (BIF MURCIA a ELX AV) 048 (BIF. VINALOPÓ a MONFORTE DEL CID AV)
422	L2	080 (RIO ARLANZON a VALLADOLID-CAMPO GRANDE) 084 (LEÓN a BIF. VENTA DE BAÑOS) 158 (CAMBIADOR VILLAMURIEL a BIF. CERRATO) 170 (BIF. SOTO a BIF. CERRATO) 180 (BIF. ESTADIO MUNICIPAL a CAMBIADOR CLASIFICACIÓN) 186 (CAMBIADOR VILECHA a BIF. CAMBIADOR VILECHA)
432	L2	080 (BURGOS-ROSA MANZANO a BIF. LA VEGA) 136 (CAMB. BURGOS a BURGOS-ROSA MANZANO)
441	L1	818 (VILLAGARCIA DE AROUSA a CATOIRA) 824 (BIF REDONDELA a DODRO) 828 (BIF. SAN AMARO a PORTAS) 850 (REDONDELA AV a BIF. ARCADE)
442	L2	200 (BELLVITGE-GORNAL a BARCELONA-ESTACIÓ DE FRANÇA) 220 (FABRA I PUIG a BIF. VILANOVA) 240 (CORNELLÁ a L'HOSPITALET DE LLOBREGAT) 250 (BELLVITGE AGUJA KM. 674,8 a L'HOSPITALET DE LLOBREGAT) 270 (SANT ANDREU a BIF. ARAGÓ) 276 (ARENYS DE MAR a L'HOSPITALET DE LLOBREGAT)

ESC Type Code	ETCS Supplier / Level	Line Code (Section)
5xx	CAF	
511	L1	640 (CAMBIADOR DE LA BOELLA a BIF. LA XACONA)
521	L1	600 (L'AMETLLA DE MAR a CAMBIADOR DE LA BOELLA) 632 (BIF. LA FEREDAT a BIF. VILA-SECA)
541	L1	824 (BIF. REDONDELA a BIF. ARCADE) (*) 848 (REDONDELA AV a BIF. REDONDELA) (**) 850 (VIGO URZAIZ a BIF. ARCADE) (***)

(*) Exit to Redondela de Galicia at signal 44, KP 15+013.

(**) Entry from Redondela de Galicia at signal E7, KP 12+057.

(***) Exit to Bif. Arcade at signals 140 and 138, KP 13+725 and 13+744 respectively.

(***) Entry from Bif. Arcade at signals 175 and 159, KP 17+564 and 15+760 respectively.

Note. – Overlapping areas have been considered for sections in which there are level transitions or technological transitions between ESC types.

Note. – When an ESC type includes more than one line (e.g. ESC types 111), it must be considered as one single line when planning and executing the checks.

18. Annex F: ESC checks vs ESC types matrix.

ESC Type Code		ESC Types																													
		1xx				2xx								3xx						4xx				5xx							
		111	112	122	132	211	221	231	232	241	251	-	262	271	281	292	311	312	321	332	341	351	381	412	422	432	441	442	511	521	541
Test Case Category / CR Code																															
A. Train-track integration test	A1. Level 1	?	N/A	N/A	N/A	A1.2	A1.2	A1.2	N/A	A1.2	A1.2		N/A	A1.2	A1.2	N/A	A1.3	N/A	A1.3	N/A	A1.3	A1.3	N/A	N/A	N/A	A1.4	N/A	A1.5	A1.5	A1.5	
	A3. Level 2	N/A	?	?	?	N/A	N/A	N/A	A3.2	N/A	N/A		A3.2	N/A	N/A	A3.2	N/A	A3.3	N/A	A3.3	N/A	N/A	N/A	N/A	A3.4	A3.4	A3.4	N/A	A3.4	N/A	N/A
B. BCA checks	B1: CR 166	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		?	?	N/A	N/A	N/A	X	N/A	X	N/A	N/A	N/A	N/A	X	X	X	N/A	X	N/A	N/A
	B2: CR 484	X	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A		?	?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	B3: CR 595	X	X	X	X	X	X	X	X	X	X		?	?	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	B4: CR 843	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		?	?	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	B5: CR 899	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		?	?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	B6: CR 933	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A		?	?	N/A	X	N/A	X	N/A	X	N/A	N/A	N/A	N/A	X	X	X	N/A	N/A	N/A	N/A
	B7: CR 958	N/A	X	X	X	N/A	N/A	N/A	X	N/A	N/A		?	?	N/A	X	N/A	X	N/A	X	N/A	N/A	N/A	N/A	X	X	X	N/A	X	N/A	N/A
	Other CR related to BCA reports	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		?	?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	?	N/A	N/A	N/A	N/A	N/A	N/A
C1. Art.10 (2017) checks	C1.1: CR 1252	N/A	X	X	X	N/A	N/A	N/A	X	N/A	?		?	?	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A	X	N/A	N/A	
	C1.2: CR 1288	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	N/A	?		?	?	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	C1.3: CR 1300	X	X	X	X	X	X	X	X	X	?		?	?	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	C1.4: CR 1267	N/A	X	X	X	N/A	N/A	N/A	X	N/A	?		?	?	N/A	X	N/A	X	N/A	X	N/A	N/A	N/A	N/A	X	X	X	N/A	X	N/A	N/A
	C1.5: CR 1306	X	X	X	X	X	X	X	X	X	?		?	?	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	C1.6: CR 1309	N/A	X	X	X	N/A	N/A	N/A	N/A	N/A	?		?	?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	C1.7: CR 994	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A	?		?	?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	C1.8: CR 1120	X	X	X	X	X	X	X	X	X	?		?	?	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X
	C1.9: CR 1166	N/A	N/A	N/A	N/A	X	X	X	X	X	?		?	?	N/A	X	N/A	N/A	N/A	N/A	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	C1.10: CR 1251	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	?		?	?	N/A	N/A	X	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	C1.11: CR 1259	N/A	N/A	N/A	N/A	X	X	X	X	X	?		?	?	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A
	C1.12: CR 1264	N/A	N/A	N/A	N/A	X	X	X	N/A	X	?		?	?	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A
	Other CR related to art.10 (2017) report	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		?	?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	?	N/A	N/A	N/A	N/A	N/A	N/A
C2. Art.10 (2020) checks	C2.1: CR 1313	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	C2.2: CR 1318	N/A	X	X	X	N/A	N/A	N/A	X	N/A	N/A		X	N/A	N/A	X	N/A	X	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	C2.3: CR 1319	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	C2.4: CR 1325	N/A	X	X	X	N/A	N/A	N/A	X	N/A	N/A		X	N/A	N/A	X	N/A	X	N/A	X	N/A	N/A	N/A	N/A	X	X	X	N/A	X	N/A	N/A
	C2.5: CR 1327	N/A	X	X	X	N/A	N/A	N/A	X	N/A	N/A		X	N/A	N/A	X	N/A	X	N/A	X	N/A	N/A	N/A	N/A	X	X	X	N/A	X	N/A	N/A
	C2.6: CR 1333	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	C2.7: CR 1334	N/A	N/A	X	N/A	X	N/A	X	X	N/A	N/A		N/A	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	N/A
	C2.8: CR 1348	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	C2.9: CR 1312	N/A	N/A	N/A	N/A	?	?	?	N/A	?	?		?	?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	C2.10: CR 1332	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other CR related to art.10 (2020) report	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	?	N/A	N/A	N/A	N/A	N/A	
D. Checks proposed by suppliers	?	?	?	?	D1.2	D1.2	D1.2	D3.2	D1.2	D1.2		D3.2	D1.2	D1.2	D3.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	D3.4	D3.4	D3.4	N/A	N/A	N/A	

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

Key	
Ax.y, Dx.y	Application matrix (*)
X	The CR applies to the ESC Type (**)
?	Missing information from supplier
N/A	Does not apply

(*) See Ax.y & Dx.y sheets in: "Adif_AdifAV_ESC_v3.3_annexes" file
(**) See B, C1, C2 sheets in: "Adif_AdifAV_ESC_v3.3_annexes" file