

AERRL – ERFA – CER - EIM Position Paper on

ETCS System Compatibility Checks (ESC)

Actions needed for simplification

Thursday 23 July 2026,

1. Introduction

ESC tests are still required in many countries, despite the sector-wide objective to simplify and phase them out in the long term. Moreover, the scope and acceptance of these tests vary widely.

While ESC tests provide value in identifying integration issues at an early stage, the current implementation can lead to additional costs and extended timelines for entry into service.

ESC tests were first introduced as a provisional measure to ensure technical compatibility between ETCS onboard equipment and trackside systems. The diversity of *engineering approaches* on the infrastructure, the lack of fully standardised *trackside implementations*, and the design freedom granted to (trackside and on-board) manufacturers are the main reasons why ESC and integration tests between track and vehicle remain necessary. Compatibility issues can also arise on the vehicle side, for example, due to differing interpretations of onboard systems or their adaptation to new track configurations. As long as ESCs are applied, their scope, governance, reuse, and cost allocation must be clearly regulated across the EU.

2. The Issues

The implementation of ESC approaches across Europe shows a high level of diversity, ranging from minimal checks to extensive test catalogues, which are sometimes repeated per vehicle and project. The early termination of the relevant ERA Technical Working Group, whose termination was not supported by the sector organisations, does not change the fact that the operational and financial impacts on the market persist.

The EC has given the ERA a mandate to address the excessive complexity and fragmentation of ESC requirements, intending to reduce costs and improve interoperability across the EU. Although this mandate provides a structured approach, the current measures may not

sufficiently address the needs of cross-border fleets, operators, and IMs who require predictable and harmonised procedures.

The current ESC testing regime carries significant consequences across four dimensions:

- a. Time & Capacity: Additional test and coordination cycles delay entry into service while placing excessive demand on already scarce test track capacity and specialist personnel.
- b. Cost: Direct testing fees compound with indirect costs stemming from vehicle standstill, project extensions, and repeated checks - creating a substantial financial burden for both operators and IMs.
- c. Investment Uncertainty: New ESC requirements triggered by changes to trackside configuration impact the business case for interoperable rolling stock, as additional ESC checks may be required.
- d. Network Access & Single Market: Diverging or supplementary test requirements function as de facto market entry barriers, directly undermining the objective of interoperability, both at the national level and across the SERA framework.

3. Sector position

In light of these challenges, the sector puts forward a coordinated set of proposals organised around five complementary pillars: EU-wide transparency on tests already performed, EU-wide reuse of existing evidence, stricter limits on the creation of new ESC types, an efficient test strategy that favours laboratory and simulation methods over on-track testing, and a fair allocation of costs. Taken together, these measures are intended to make ESC processes proportionate, predictable and harmonised across the EU.

3.1 EU-wide transparency

Without a shared, EU-wide overview of which ESC tests have already been performed, stakeholders have no reliable way to identify duplication or to assess whether a given test is still warranted. The sector therefore calls for:

- a. The EC verification process to demonstrate an accurate definition for compliance with the essential requirement ‘technical compatibility’ – including what is relevant for the ‘Route Compatibility Check’.
- b. Establishing an ESC-Check to monitor finished tests, outlining their purposes and objectives, the baseline or version implemented, and the results achieved. E.g. launching a pilot ESC registry voluntary reporting by IMs/keepers/RUs; subsequently

introduce mandatory reporting requirements through the relevant European regulatory framework.

- c. As ERA is the designated authority to set up and manage ESC, each ESC type and classified line should be identified and listed in the EU Registers, such as RINF, which, however, still needs enhancement to publish all relevant information.

3.2 EU-wide reuse

Once test results and evidence are visible across the sector, the next step is to ensure that they can actually be reused rather than repeated. The following principles should govern the reuse of ESC evidence:

- a. Require the reuse of evidence in case of equivalence (e.g. based on subsystem/interoperability statements) where technical comparability is demonstrated, and ensure such reuse across vehicle projects with the same ETCS constituents can be easily accepted in their vehicle assessments, with documented reuse criteria.
- b. All tests performed for EC verification purposes should not be repeated once positively assessed for this purpose. The principle of equivalence mentioned above should be applied to avoid any duplication of tests and assessments, notably, in the case of a multi-country project or of extension of the area of use.
- c. Only the tests performed in the framework of the EC verification should be subject to an assessment by a conformity assessment body. The ESC tests should not be subject to such an assessment.

3.3 Limit the creation of new ESC types

Beyond managing the tests that already exist, the proliferation of new ESC types must itself be contained. The sector could therefore apply the following safeguards, under ERA's supervision, before any new ESC type is introduced or an existing one retired:

- a. New ESC types should only be used when they address residual risk not already covered by existing processes, such as certification, error correction or engineering rules.
- b. On-board supplier consultation should be considered, with no local, informal requirements.
- c. A sunset clause could be applied to new ESC types and conduct an automatic review no later than three years after implementation.
- d. Regarding existing ESC tests, clearly define the criteria for an ESC type becoming obsolete and therefore being removed. These criteria should consider the diversity of on-board configurations and real operational experience, rather than the mere number of cases ESC processed (statistical approach). Moreover, removing or

optimising ESC shall not trigger administrative work for Railway Undertakings and Vehicle Keepers (ERATV update).

3.4 Efficient test strategy: lab before on-track

Even where an ESC test remains necessary, it should be performed using the most efficient and least disruptive method available. The sector therefore proposes a clear hierarchy of methods:

- a. The methods for demonstrating the technical compatibility of the integrated technical solution within the intended area of use should be specified by the IM. Preferably, the applicant should be offered a choice of different suitable methods.
- b. Standardise on reproducible laboratory and simulation evidence. The laboratory should be responsible for ensuring that test results are representative of on-site testing. On-track tests should be carried out when technically unavoidable.
- c. Increased public funding should be made available for laboratories and digital twin environments, as these are key enablers for efficient, safe and scalable testing. Strengthening these capabilities at the European level would support harmonisation, reduce reliance on costly on-track testing, and accelerate deployment.
- d. The economic impact related to the development and maintenance of a laboratory digital twin should be carefully considered, as this may not be feasible in all cases.
- e. Representative laboratory and bench-testing environments should be maintained for relevant ETCS infrastructure configurations to enable efficient verification of ERTMS-equipped locomotives after onboard or trackside upgrades, minimising the need for repetitive on-track testing.

3.5 Fairness in cost allocation

Finally, regardless of how testing is organised, the resulting costs must be distributed fairly between the parties involved rather than falling automatically on one side:

- a. When new trackside configurations or infrastructure changes result in ESC checks, cost allocation should be addressed collaboratively and not automatically assigned to any single party. A balanced approach should be taken, considering both the interests of operators/keepers and IMs, to ensure fair sharing of the associated expenses.
- b. To prevent adverse incentives – such as situations where early adopters are effectively penalised by having to bear repeated ESC testing costs, while late users can benefit from already validated configurations without comparable effort – an EU-consistent cost principle is required.



4. Conclusion

The complete and immediate phase-out of ESC is not a realistic objective. The sector is fully committed to working jointly with ERA to identify meaningful improvements to current ESC processes, such as reducing duplication, improving transparency, and enabling evidence reuse, while laying the groundwork for a structured, long-term phase-out.

This collaboration should result in a concrete, step-by-step roadmap with clear milestones, measurable outcomes, and regular progress reviews. Only through a shared and evidence-based approach can the European railway sector move toward a genuinely interoperable system in which ESC requirements become progressively obsolete.

Ultimately, greater emphasis should also be placed on addressing the root causes of the lack of interoperability, such as the completeness and stability of specifications and the availability of fully compliant products. Achieving progress in these areas would naturally improve efficiency and reduce the need for additional testing.

About the signatories:

AERRL – the Association of European Rail Rolling Stock Lessors – represents the rolling stock lessors at European level, promoting interoperable, sustainable, efficient and safe passenger and cargo rolling stock transport for the European railways.

CER —The Community of European Railway and Infrastructure Companies (CER) brings together railway undertakings, their national associations as well as infrastructure managers and vehicle leasing companies.

EIM — EIM, the association of European Rail Infrastructure Managers, was established in 2002 to promote the interests of the infrastructure managers in Europe. EIM's primary goal is promoting growth of rail traffic and the development of an open sustainable, efficient, customer-oriented rail network in Europe.

ERFA — the European Rail Freight Association — represents private and independent railway freight operators, advocating for a competitive and non-discriminatory Single European Railway Area.