



EEIG ERTMS Users Group
123-133 Rue Froissart, 1040 Brussels, Belgium
Tel: +32 (0)2 673.99.33 - TVA BE0455.935.830
Website: www.ertms.be E-mail: info@ertms.be

ENGINEERING SUPPORT GROUP (ESG)

ESC/RSC Type and Check

Ref: 21E272
Version: 1
Date: 16/02/2022

Modification history

Version	Date	Modification / Description	Editor
0a	17/12/2021	First release after ESG92 to ESG95 discussion	AJ, GR
0b	11/01/2022	Editorial changes	ATJ
1-	16/02/2021	Approved version	ATJ

Table of Contents

1	List of References and acronyms.....	4
2	Foreword	5
3	Scope of the document.....	5
4	ESC/RSC activities	5
4.2	Definition of borders of ESC/RSC Type	6
4.2.2	Examples of different kinds of ESC/RSC Type borders	6
4.2.3	ESC/RSC Type border definition at Member State border crossing projects.....	8
4.3	Definition of checks.....	8
5	Considerations.....	9

1 List of References and acronyms

References

[TSI CCS 2019]	Commission Regulation (EU) 2016/919 amended by Commission Regulation (EU) 2019/776 on technical specification for interoperability relating to the control command and signalling subsystem of the rail system in the European Union	-
[TSI CCS AG]	Guide for the application of the CCS TSI	7.0
[ERA 1209/063]	Clarification Note on Safe Integration	1.0
[BX Guidelines]	EUG Border crossing guidelines 17E087	3-

Acronyms

CCS	Control Command and Signalling
CER	Community of European Railways
CMD	Cold Movement Detector
CR	Change Request
EC	European Commission
EIM	European Rail Infrastructure Manager
ERTMS	European Rail Traffic Management System
ESC	ETCS System Compatibility
EUG	ERTMS Users Group
ERA	European Union Agency for Railways
IC	Interoperability Constituent
IM	Infrastructure Manager
MS	Member State
RSC	Radio System Compatibility
TSI	Technical Specification for Interoperability

2 Foreword

- 2.1.1.1 TSI CCS [TSI CCS 2019] has introduced the formal concept of ESC/RSC activity to prove the compatibility between an ERTMS on-board system against an ERTMS trackside system in operation.
- 2.1.1.2 TSI CCS Application guide [TSI CCS AG] provides further details about the meaning, actors involved, roles and the process aiming to achieve the ESC/RSC Statement at level of vehicle type or the ESC/RSC IC Statement if it refers to IC or to a group of ICs of the ERTMS on-board system.
- 2.1.1.3 ESC/RSC activities are not conceived to detect possible safety issues: for those the “safe integration” approach has to be followed according to Clarification Note on Safe Integration by ERA [ERA 1209/063] and taking into account all the peculiarities of the on-board system (all possible deviations and exported constraints).

3 Scope of the document

- 3.1.1.1 Since nor [TSI CCS 2019] neither [TSI CCS AG] provide rules or criteria to define a Type and the relevant checks¹, this document intends to give a possible guidance, including examples, on the way:
- an ESC/RSC Type boundary can be defined both when only one IM is involved or at border crossing projects where additional actors of different Member States (MSs) are involved
 - ESC/RSC checks can be defined.

4 ESC/RSC activities

- 4.1.1.1 ESC/RSC are based on the following activities to be performed by an IM.
- 4.1.1.2 Allocation to an ESC/RSC Type of each line (or piece of track) equipped with ERTMS. Lines with the same “ERTMS characteristics” (see clause 4.2.1.1) will belong to the same Type. A Type which does not imply any check can be defined as well (it is often the case for RSC).
- 4.1.1.3 Definition of the set of checks corresponding to each Type. ESC/RSC checks can be performed on documents or by tests at level of on-board IC or of vehicle. Test can be performed in lab and/or on the field.

¹ TSI CCS 2022 draft under discussion will include provisions from the Application guide but they will not add more precise criteria to define Type and the relevant checks yet.

4.2 Definition of borders of ESC/RSC Type

4.2.1.1 The definition of specific ESC/RSC Type(s) should consider the following main “ERTMS characteristics”:

4.2.1.1.1 the ETCS level;

4.2.1.1.2 the ETCS system version (at least the first digit of X.Y) and the reference to TSI CCS²;

4.2.1.1.3 the trackside implemented set of ERTMS functions (these could also depend on the kind of line: High Speed, Conventional, Regional, Commuter) unless differences are not significant from the point of view of compatibility between on-board and trackside;

4.2.1.1.4 the implemented ERTMS engineering rules (e.g., the set of engineering rules makes reference to the same version of ERTMS implementing specifications provided by the IM and by the version of the trackside system); this usually implies that a change of the trackside supplier (and sometime of the trackside version even of the same supplier) brings to the definition of a new Type even if the relevant ESC/RSC checks are already defined for an already existing Type;

4.2.1.1.5 reasonable areas of use from trackside layout point of view; the resolution in the definition of a Type could be driven by the different services operated by trains (see clause 5.1.1.2).

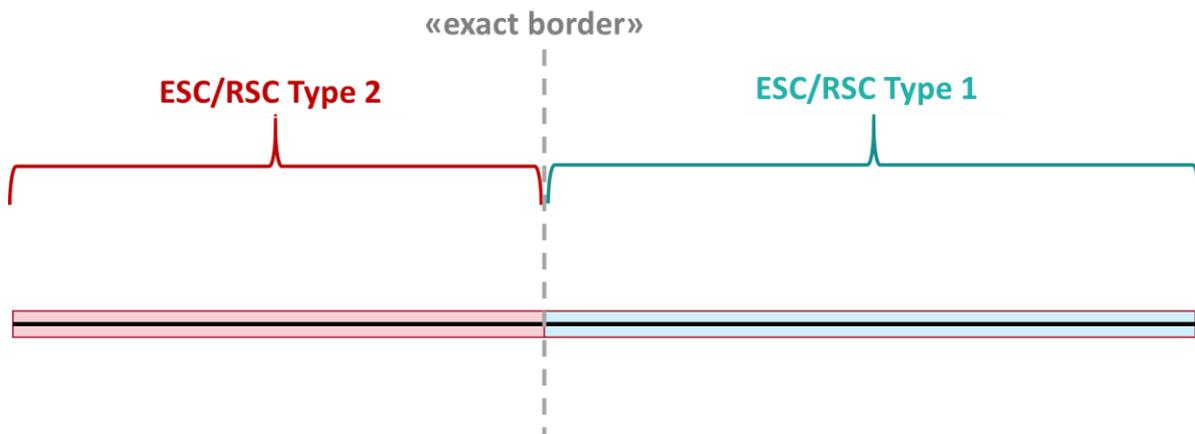
4.2.2 Examples of different kinds of ESC/RSC Type borders

4.2.2.1 Depending where and how “suddenly” each of the “ERTMS characteristics” changes, different kinds of ESC/RSC Type borders can be defined:

4.2.2.1.1 “Exact border”: when a clearly identifiable exact point can be indicated as border point between two or more ESC/RSC Types (e.g., a Level transition point);

4.2.2.1.2 “Border area”: when the identification of a clearly identifiable exact point to be considered as border point between two or more ESC/RSC Types is not possible or evident (e.g., a hand-over between RBCs of different suppliers).

4.2.2.2 Pictures hereafter represent some examples of ESC/RSC Type border definition.



² With the single set of specification principle which will enter in low starting from TSI CCS 2022, the reference to the system version will not be sufficient anymore to unambiguously identify a set of requirements because specification errors will be corrected without changing the system version.

Figure 1 – Ex. 1: ESC/RSC Type “exact” border when the border of all the “ERTMS characteristics” coincides in the same point

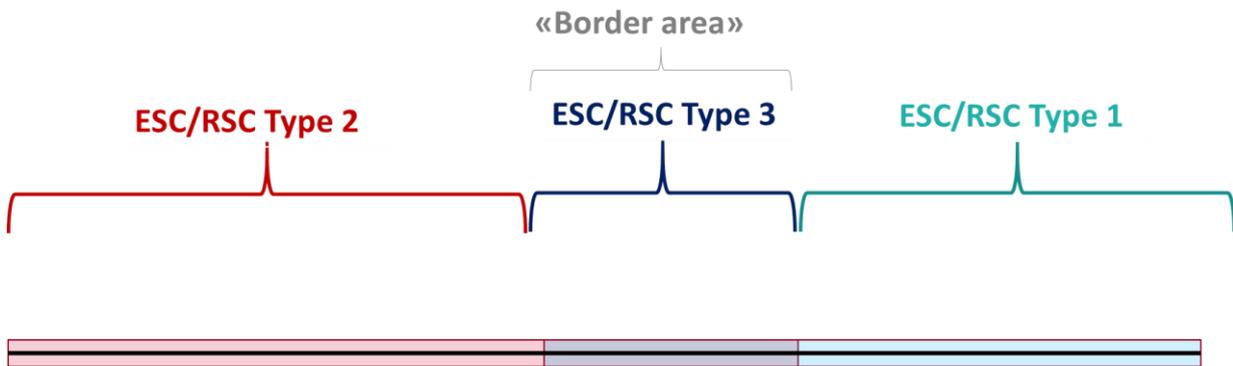


Figure 2 – Ex. 2: ESC/RSC Type border area when the border of all the “ERTMS characteristics” falls within an “area” (option 1)

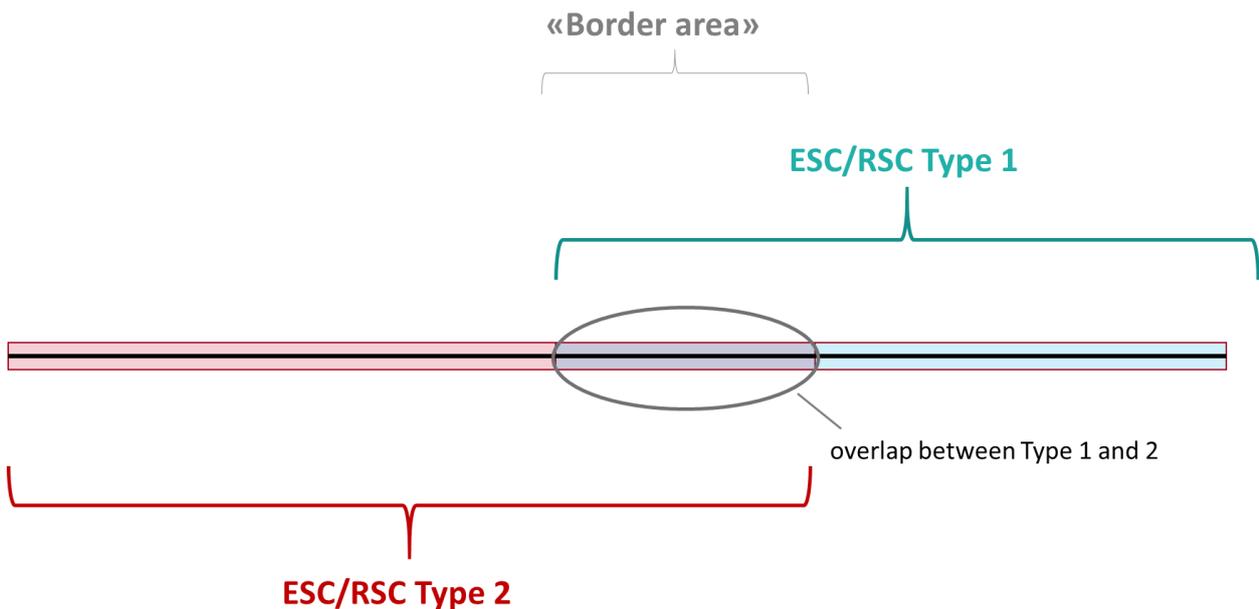


Figure 3 – Ex. 3: of ESC/RSC Type border area when the border of all the “ERTMS characteristics” falls within an “area” (option 2)

4.2.2.3 In case of Figure 3, the ESC/RSC checks relevant for the overlap are in common (see clause 4.3.1.2.2) for Type 1 and 2 and they can be performed only once making use of trackside system 1 and 2. To run in the overlap area only one of the 2 ESC/RSC Statement is necessary while to go through the overlap area both Statements are necessary.

4.2.3 ESC/RSC Type border definition at Member State border crossing projects

- 4.2.3.1 In case of member state border crossing projects, in addition to the “ERTMS characteristics” mentioned in clause 4.2.1.1, the scenario where the border between IMs’ responsibilities (e.g. on the maintenance of the infrastructure and/or the signalling system, Figure 4 provides some examples) does not coincide with the border of NSAs’ responsibilities should be considered.
- 4.2.3.2 This scenario can depend on bilateral agreements at Member State level or on the position of the political border with respect to the railways line (e.g., while the political border can fall in the middle of a line, the change of signalling system usually happen in a station).



Figure 4 – Example of “ERTMS characteristics” borders not coinciding with the border of NSAs and IMs responsibilities

4.3 Definition of checks

- 4.3.1.1 A check can be described in a generic way in order to be applicable for more than one Type (where it will be customised according to the specific “ERTMS characteristics”) or it can be already detailed for each specific application (there are no harmonised binding rules for the definition of ESC/RSC checks).
- 4.3.1.2 According to the level of detail of the description of an ESC/RSC check, a check can be considered as:
 - 4.3.1.2.1 valid for one or more Types meaning it has to be repeated for each single Type it belongs to (by making use of the different trackside subsystems of each Type);
 - 4.3.1.2.2 valid for more Types meaning the check passed once does not need to be repeated and it is valid for each Type it belongs to.
- 4.3.1.3 Check definition has to consider possible NTRs implemented trackside, but it is not the objective of the ESC/RSC check to validate the correct implementation of the NTR on the on-board.

5 Considerations

5.1.1.1 A higher fragmentation of ESC/RSC Types definition not necessarily mean to increase the number of checks and it can bring benefit in terms of flexibility for the ESC/RSC Statement applicants which could minimize the number of checks to be performed according to the intended vehicle mission profile.

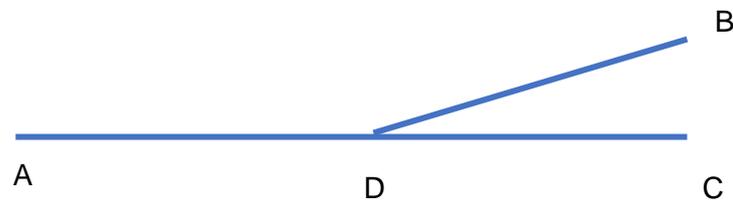


Figure 5 - Examples of fragmentation of Types

5.1.1.2 With reference to Figure 5, when 3 Types are defined (A-D, D-B, D-C), trains only running between A and B can avoid to perform checks which are relevant for D-C connection; this would not be the case when only one single Type (A-B-C) is defined.

5.1.1.3 A lower fragmentation of ESC/RSC Type can bring the benefit of a lower bureaucratic burden for the ESC/RSC Statement applicants since a minor number of ESC/RSC Statements have to be managed in the vehicle technical files and it could facilitate the management of contracts with trackside system suppliers when ESC/RSC checks are performed through the help of the suppliers.

5.1.1.4 For border crossing projects between MSs, according to the border of responsibility between IMs, ESC/RSC Type could be defined by one IM considering “ERTMS characteristics” derived from the other IM.

5.1.1.5 In this situation all recommendations related to the collaboration between the two involved IMs for border crossing projects (specifically for testing activities) remain valid for the management of the ESC/RSC at border as well (see [BX Guidelines]).

5.1.1.6 The direct involvement of NSAs is also recommended similar as the deployment of ERTMS on border crossing lines (see [BX Guidelines]) for a correct respect of IMs responsibilities and for the possible definition of dedicated ESC/RSC Type useful for specific services (e.g., train running up to the border station and then turning back). NSA involvement is helpful because some bilateral agreement between NSAs can have an impact on the definition of the Type border (e.g., a vehicle authorization could be provided by an NSA until the border station, even if this border station is (at least partially) in the neighbour country).