

ERTMS/ETCS
Baseline Compatibility Assessment Final Report
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EXECUTIVE SUMMARY

This document has been produced by UNISIG and ERTMS Users Group (EUG) to report on the results of the Baselines compatibility assessment process. It presents the final results following the intermediate report delivered in May 2013. From the start ERA has been involved in the process.

This action was performed according to article 19 of the ERTMS MOU 2012 and co-financed by the EC in the TEN-T Multi Annual Programme.

The delta between Baseline 2 (2.3.0d) and Baseline 3 (including the first maintenance release) has been analysed with regards to backwards compatibility for each individual change identified by a Change Request (CR) recorded in the dedicated ERA database.

The action from the MoU (only backwards compatibility of Baseline 3 on-board to Baseline 2 trackside) was extended to other relevant combinations of on-board and trackside implementations. In particular all these CRs have been analysed for potential compatibility problems within Baseline 2, i.e. between Baseline 2 on-board and trackside.

The results of the analysis are the following:

- For all analysed CRs a conclusion was reached.
- A certain number of shortcomings with respect to backwards compatibility have been detected.
- Whenever possible these shortcomings have been corrected in the first maintenance release of Baseline 3.
- All other shortcomings, which are present in Baseline 2, are described in this report and possible mitigation measures are defined.

It is recommended that existing as well as new infrastructure with Baseline 2 functionality investigate whether the detected shortcomings are applicable to their trackside and, if necessary, to take corrective action according to the proposed mitigations in this report. In a few cases an on-board solution for B2 implementations has been recommended.

The results of this analysis have shown that feedback from ERTMS implementations is essential for the maintenance of the ERTMS specifications by ERA.

Within the scope of this analysis and provided that the above mentioned recommendations are taken into account, the first maintenance release of Baseline 3 is backwards compatible with Baseline 2.

1. INTRODUCTION

1.1 Purpose

1.1.1.1 This document has been produced by UNISIG and ERTMS Users Group (EUG) to report on the results from the Baseline Compatibility Assessment.

1.1.1.2 This action was performed according to article 19 of the ERTMS MOU 2012:

As laid down in the 2008 MoU, trains equipped with ERTMS Baseline 3 will be able to run on lines equipped with Baseline 2 version 2.3.0d without any additional technical or operational restrictions created by ERTMS/ETCS. Baseline 3 specifications are based on this principle of backward compatibility. This principle has been the basis of the work performed by the sector and ERA throughout the writing of the specifications and will be validated as a priority during the finalisation of the Baseline 3 specifications.

1.1.1.3 The MoU action requesting validation of the backwards compatibility of Baseline 3 on-boards to Baseline 2 trackside was extended to analyse the full compatibility between these baselines. The reason for this is explained in chapter 2.

1.2 Background

1.2.1.1 The ERTMS Baseline 3 first release (SRS v3.3.0) was built by packaging 410 Change Requests (CR) on top of Baseline 2 (SRS v2.3.0d): it can be said that these 410 CRs are the “delta” between these baselines.

1.2.1.2 In April 2014 the first maintenance release of the Baseline 3 specifications was defined (SRS v3.4.0). This maintenance release contains an additional set of 26 CRs.

1.2.1.3 In the following, “B2” means Baseline 2 (SRS v2.3.0d) and “B3” means Baseline 3 (SRS v3.4.0).

1.3 Scope

1.3.1.1 The scope of this document is to report on the results of the compatibility analysis of each of the 410 CRs in the delta between Baseline 2 and Baseline 3 first release and the additional 26 CRs included in the first maintenance release of Baseline 3; in total 436 CRs.

2. COMPATIBILITY ASSESSMENT

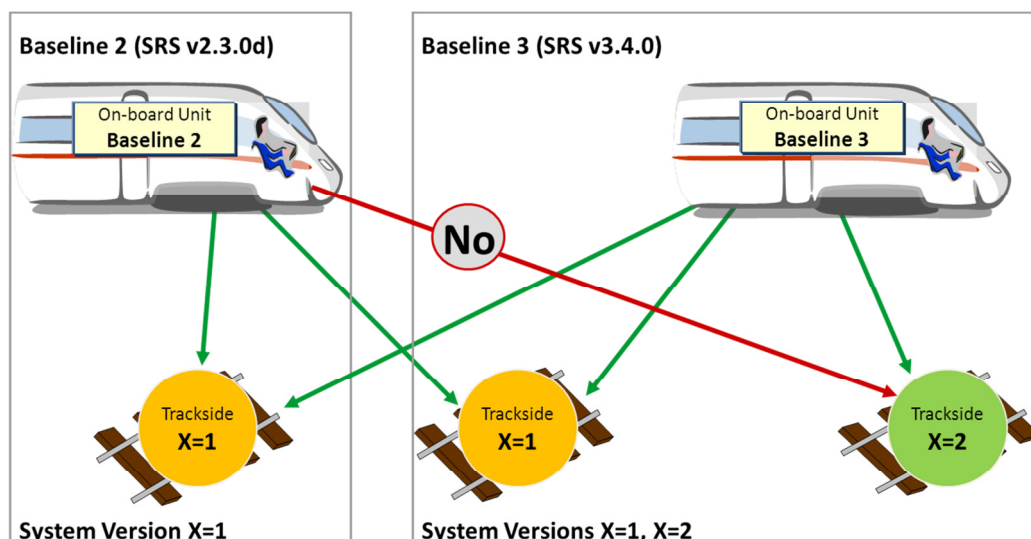
2.1 Work Process

- 2.1.1.1 The analysis was performed by UNISIG and EUG. From the start ERA has been involved in this analysis.
- 2.1.1.2 In a first step, the compatibility between on-boards and tracksides was analysed for each of the 410 CRs in the delta between Baseline 2 and Baseline 3 (SRS 3.3.0). In a second step, the same analysis was performed for the additional 26 CRs in the first maintenance release for Baseline 3 (SRS 3.4.0). The analysis is further detailed in Appendix A. The complete list of CRs analysed can be found in Appendix B.
- 2.1.1.3 Compatibility is considered to be achieved for a particular combination of on-board and trackside implementations when the on-board is able to run a normal service on that trackside.
- 2.1.1.4 For all CRs where a compatibility issue was identified for at least one of the analysed combinations, one of the following actions has been taken:
- If the issue can be solved in the B3 specifications, a CR was submitted to solve it.
 - If the issue cannot be solved in the B3 specifications, the potential problems and possible mitigations are described; for safety related issues these descriptions have been added to the UNISIG Hazard Log (Subset-113).

2.2 Results

- 2.2.1.1 For the vast majority of the 436 analysed Change Requests, the analysis demonstrated that the compatibility objectives for Baseline 3 requested by the MoU have been achieved and no potential compatibility problems were identified.
- 2.2.1.2 Nevertheless, some compatibility issues were identified due to shortcomings in the CR solutions introduced in the Baseline 3 specifications and new CRs were submitted to resolve these issues. These CRs have been included in the first maintenance release of the Baseline 3.
- 2.2.1.3 Some other potential compatibility issues were identified, due to shortcomings or 'grey areas' in Baseline 2, for which mitigation measures could be needed to ensure interoperability. Solving issues found in Baseline 2 by introducing mitigation measures is already foreseen by the ERTMS CCM process (ERA_ERTMS_0001_v20, Annex A).
- 2.2.1.4 The following trackside implementations should take into account the CRs that have been identified as having a compatibility issue and analyse whether the issue applies to their implementation:
- Baseline 2 tracksides, both existing and future ones
 - Baseline 3 tracksides where Baseline 2 on-boards are expected to run

2.2.1.5 The figure below illustrates the foreseen compatibility between on-boards compliant with a specific baseline and trackside operating with a specific system version. In baseline 2 the system version can only be X=1, but in baseline 3, a trackside may operate with system version X=1 or X=2.



2.2.1.6 As seen in the figure above, for the Baseline 3 trackside, it is only those operating with system version X=1 where Baseline 2 on-boards are able to run under ETCS supervision.

2.2.1.7 The following table presents an overview of the CRs identified to have a potential compatibility issue for trackside with system version X=1, distinguishing between B2 and B3 trackside. The absence of an 'X' in this table means that there was no issue identified during the analysis. The compatibility problems and recommended mitigations are described in detail in appendix A.

CRs with potential compatibility issue when running in B2 or B3 X=1 trackside			
CR #	CR heading	B2	B3
0040	Position report in case of passing an unlinked balise group	X	
0101	Permitted speed in RV mode	X	X
0166	Use of NID_OPERATIONAL	X	X
0345	Text message in SH, SN mode	X	
0410	Shunting in STM areas	X	X
0437	Use of N_ITER	X	
0484	Clarification required: Mode profile and Infill MA		X
0595	Braking curve calculation	X (*)	
0618	Inconsistencies between Subset 035 and Subset 026	X	X
0637	Limited Supervision	X	
0650	Train movement in L1 SB without Train Data	X	X

CRs with potential compatibility issue when running in B2 or B3 X=1 trackside			
CR #	CR heading	B2	B3
0657	Unsuitability of RBC-RBC handover procedure in case of radio network change	X	
0671	Inconsistency of Requests Parameter	X	X
0710	Clarify if received but not yet applicable National Values shall be deleted in NP	X	X
0712	Confusion in packets not transmitted by infill devices	X	
0757	Insufficient provisions for management of future ERTMS/ETCS system versions		X
0777	ETCS Override speed Supervision in SE/SN modes		X
0782	Reset of confidence interval	X	X
0800	Conditional level transition order overrides normal level transition order	X	
0813	FIFO principle for Ack requests	X	
0818	ETCS-STM Header Issue	X	X
0819	Balise group message consistency	X	X
0821	Removal of the STM European from the ETCS specifications	X	X
0841	Validity direction of transmitted information in RV mode (follow-up 253)	X	X
0842	Activation of supervision of safe radio connection /Follow-up 787	X	X
0843	Message with several non-revocable TSRs is discarded		X
0844	Unspecified train movement supervision after PT or RV distance is overpassed	X	X
0854	Exception [5] does not apply to acceptance of "Co-operative shortening of MA" in table of section 4.8.3 of the SRS		X
0865	Mode transitions [62] vs. [68]	X	X
0866	Entry into Level 2 questions	X	X
0878	Improvements for Passive Shunting (follow up of CR751)	X	
0895	Unintended extension of the permitted distance to run in Reversing due to filtering of info On-board	X	X
0896	Rejection of the Acknowledgement of Train Data when received in RV mode	X	X
0897	End Section / Overlap Timer	X	X
0899	Replacement of track description and linking information	X	
0907	Hazardous brake command in RV	X	X
0914	Missing repeat condition		X
0917	Display of permitted speed in RV	X	X

CRs with potential compatibility issue when running in B2 or B3 X=1 trackside			
CR #	CR heading	B2	B3
0919	Rejection of List of balises for SH area, error in solution of CR650	X	X
0923	Danger for SH in level 0 and STM	X	X
0925	Missing transition from TR mode	X	X
0942	Requirement for text display ambiguous in case start and end conditions are fulfilled	X	X
0958	Ambiguous exception	X	X
0961	Standardised balise IDs for LS projects		X
0963	Ambiguities in case of shortening of MA to the current position of the train	X	X
0977	Impact of message processing time	X	X
1015	Unsuitability of non-stopping areas announcement mechanism	X	X
1022	Communication Session/Safe radio connection request in radio hole	X	X
1030	Reduced adhesion areas	X	X
1036	Unclearities regarding the ETCS function change of traction system	X	X
1056	Gaps and faults in dimensioning rules tables	X	
1068	STM National Trip Procedure use for ETCS DMI Shunting and Level buttons	X	X
1155	CR712 follow-up: non-infill from infill device	X	X
1183	Unclear use of telegram header info when a balise telegram or BG message is ignored/rejected	X	X

(*) see A.2.1.4

- 2.2.1.8 The recommended mitigations contained in this document are provided as guidance to trackside implementation projects. Whether or not a particular mitigation is applicable, suitable, or necessary to implement in any particular project, is the responsibility of individual implementations of ERTMS/ETCS.

Appendix

A. RESULTS FROM THE ASSESSMENT

A.1 Analysis of Baseline Compatibility

A.1.1.1 As explained in the main document, the analysis focused on all combinations where either the on-board or the trackside had not implemented a CR as well as on the situation when none of them had done that. All combinations where both on-board and trackside have implemented the CR are, for obvious reasons, assumed to be compatible.

A.1.1.2 The analysis was therefore based on the four questions below, where the expression “running a normal service” shall be understood as “not penalised because of a reduction of performance or safety” (as defined in Subset-104, v3.1.0, clause 5.1.1.5):

Question 1) Can a B2 On-board implementing a CR run a normal service on a B2 Trackside not compliant to that CR?

Question 2) Can a B2 On-board not implementing a CR, run a normal service on a B3 X=1 Trackside or a B2 Trackside that implements that CR?

Question 3) Can a B3 On-board run a normal service on a B2 Trackside not compliant to a particular CR?

Question 4) Can a B2 On-board not implementing a CR run a normal service on a B2 Trackside not compliant to that CR?

A.1.1.3 For each CR, the analysis has answered to the four questions with either ‘Yes’ or ‘No’, depending on if the on-board could run a normal service or not, or ‘N/A’ (not applicable) in case the CR solution is not applicable to the particular combination of on-board and trackside.

A.1.1.4 The following table presents the combinations of on-board and trackside implementations to which the four questions apply, i.e. which combinations were analysed for compatibility.

Analysed combinations of implementations in on-board and trackside		Trackside			
		B2		B3	
		X=1	X=1+CR	X=1	X=2
On-board	B2	Q4	Q2	Q2	
	B2+CR	Q1			
	B3	Q3			

- A.1.1.5 Questions 1 and 3 both assess the backwards compatibility of the CRs regarding changes in on-board behaviour. The difference between the two questions is that Q1 investigates whether it is possible to have a B2 on-board implementing a specific CR, whereas Q3 checks the backwards compatibility of a B3 on-board running on a B2 trackside (as requested in the MoU, Q3 checks whether the provisions for backwards compatibility in the B3 specification are sufficient).
- A.1.1.6 Question 2 assesses the backwards compatibility of the CRs regarding changes in trackside behaviour, i.e. the possibility for a B2 on-board not implementing a CR to run in a trackside that has implemented that CR.
- A.1.1.7 Question 4 assesses the compatibility within Baseline 2 for the CRs; i.e. the possible impact on interoperability if neither on-board nor trackside implement a CR.
- A.1.1.8 All other combinations of on-board and trackside implementations are outside the scope of the compatibility assessment.

A.2 Recommendations

A.2.1 Introduction

- A.2.1.1 This chapter contains, for each CR with an identified compatibility issue, a detailed description of the issue, the potential impact and the recommended mitigation in order to achieve that:
- B2 on-boards can run normally on the B2 trackside.
 - B3 on-boards can run normally on the B2 trackside.
 - B2 on-boards can run normally on the B3 X=1 trackside.
- A.2.1.2 For every CR in this chapter there is a description of the compatibility issue(s) that have been identified and a recommendation on how to mitigate them.
- A.2.1.3 Depending on the CR different conclusions were achieved regarding the mitigations:
- For some CRs harmonised mitigations in form of engineering recommendations were agreed.
 - For some CRs no harmonised mitigation was agreed due to different possibilities for engineering, definition of operational rules, etc. Therefore, an interoperable mitigation must be found at project level and this report describes the aspects to be taken into account for this; in some cases examples are given.
 - For some CRs no mitigation could be found and the projects must analyse if the identified issue is relevant for them and if the risk is not tolerable they must try to find an interoperable solution for the issue at project level.
 - In a few cases, where mitigations were not possible in the trackside, mitigation measures are proposed for the on-board.
- A.2.1.4 The CRs 595, 1185, 1150, 1141, 1127, 1124, 1121, 1092, 1029, 1002, 996, 995, 959, 927, 924, 905, 902, 901, 880 and 862 have been assessed as forming an inseparable bundle; implementation of the harmonized braking curves in Baseline 2 has to consider

this bundle (i.e. to implement all the CRs in the bundle) and we recommend an update of the document ERA_ERTMS_040022 v2.0 accordingly. This updated document will be the input for an Infrastructure Manager of a B2 trackside to define appropriate measures to host an on-board implementing the harmonized braking curves.

A.2.1.5 Note: The references to Subset 113 are about any version of that document higher than or equal to 2.0.0.

A.2.2 Compatibility issues and recommendations

A.2.2.1 CR40

CR40	Position report in case of passing an unlinked balise group
Status in Subset-108 v1.2.0	Not classified (DC)
Compatibility issue(s) and possible impact	Q1 and Q3: The B3 on-boards and the B2 on-boards implementing this CR will reject the message on receiving Packet 58 with M_LOC spare value 011. Q4: The B2 on-board behaviour relative to 'use previous value of M_LOC' (M_LOC = 011) is not specified in the B2 Subset-026. It is therefore not clear what is the behaviour of a B2 on-board when this value is received.
Recommendation	<u>Engineering solution (for the B2 trackside):</u> B2 trackside should not use M_LOC = 011
Notes	

A.2.2.2 CR101

CR101	Permitted speed in RV mode
Status in Subset-108 v1.2.0	Not classified (DC)
Compatibility issue(s) and possible impact	Q2 and Q4: There is an ambiguity in B2 regarding when RV permitted speed should be displayed. Q1: CR101 (optional to B2) states that the RV permitted speed is only displayed on driver's request. As a consequence, because RV mode is often used for exceptional evacuation scenarios: it might lead to new hazardous scenarios if the driver first has to select the display of RV permitted speed.
Recommendation	No mitigation could be defined. CR101 should not be implemented in the B2 on-boards and on-boards should behave as specified by CR917, compatible with B2.

Notes	See CR917
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A.2.2.3 CR166

CR166	Use of NID_OPERATIONAL
Status in Subset-108 v1.2.0	Not classified (DC)
Compatibility issue(s) and possible impact	<p>The NID_OPERATIONAL variable consists of up to 8 digits. When shorter than 8 digits the remaining spaces are to be filled with the special "F" character.</p> <p>The CR166, optional in B2, clarified that the special "F" characters shall be added at the right of the number while in B2 Subset-026 nothing is specified in this sense.</p> <p>There could be an possible impact if a B2 + DC CR on-board/RBC expect this variable with the "F" characters at the right of the number and they are received not at the right not being able to process the variable and leading to compatibility problems.</p> <p>The impact refers to packets:</p> <ul style="list-style-type: none"> - Track to Train: Packet 140 "Train running number from RBC" (Q1) - Train to Track: Packet 11: "Validated train data", with NID_OPERATIONAL in B2. (Q2)
Recommendation	<p><u>Engineering solution (for the B2 trackside):</u></p> <p>The RBC should fill the variable NID_OPERATIONAL in Packet 140 'Train running number from RBC' with the F's always at the right of the number.</p> <p>AND</p> <p>The B2 RBC should be able to accept the Packet 11 "Validated train data" with the F's anywhere</p> <p><u>Engineering solution (for the B3 X=1 trackside):</u></p> <p>The RBC should fill the variable NID_OPERATIONAL in Packet 140 "Train running number from RBC" with the F's always at the right of the number.</p>
Notes	

A.2.2.4 CR345

CR345	Text message in SH, SN mode
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and	In B2 the variable M_MODETEXTDISPLAY (that indicates the modes for which a text message shall be displayed) has as valid values SH, SL, SF, IS,

possible impact	<p>SE and SN (i.e. 3, 5, 9, 10, 12, 13). However, the function to manage the display of text messages is not active in the modes corresponding to those values. So the B2 trackside could expect the on-board display the text messages, while the on-board will not do it.</p> <p>Q3: In B3 the inconsistency that is present in the B2 specification has been solved by redefining these values of M_MODETEXTDISPLAY as “spare” values; this means that a B3 on-board would reject a message containing those values and apply a consistency reaction.</p> <p>Q4: A B2 Trackside could expect the on-board to display the text messages, while the on-board does not.</p>
Recommendation	<p><u>Engineering solution (for the B2 trackside):</u></p> <p>Do not use any of the values 3, 5, 9, 10, 12, 13 for the variable M_MODETEXTDISPLAY in Packet 72.</p>
Notes	

A.2.2.5 CR410

CR410	Shunting in STM areas
Status in Subset-108 v1.2.0	N/A beyond 2.3.0 in Subset 108 v1.2.0
Compatibility issue(s) and possible impact	<p>Q1 and Q2: The CR410 was introduced in B2 as N/A beyond 2.3.0, so legally it could be implemented. Later some shortcomings were found regarding the solution and CRs 923, 925, 1068 were created to solve the problems detected. However there is no technical means in the B2 or B3 X=1 trackside to stop a B2 on-board implementing CR410 (and therefore not the others) in Level STM SH mode.</p> <p>Q3: For a B3 on-board performing national shunting movements in STM SH mode, the B2 trackside could not have taken provisions to stop the train to perform national shunting movements: a B2 trackside may use BG with level transition order to stop any train that performs national shunting movements. While a B2 on-board in level STM mode SN will be tripped due to the level transition order the B3 on-board will store the level transition order and not leave the SH mode, i.e. the B3 train would not be stopped.</p>
Recommendation	See Subset-113 Hazard ETCS-H0035
Notes	See CR923, CR925 and CR1068

A.2.2.6 CR437

CR437	Use of N_ITER
Status in Subset-108 v1.2.0	OUT
Compatibility issue(s) and possible impact	Q3 and Q4: There is no requirement in B2 Subset-026 for how an on-board could interpret a National Values packet with no NID_C (Packet 3 with N_ITER = 0).
Recommendation	<u>Engineering solution (for the B2 trackside):</u> B2 Trackside should not use National Values packet with N_ITER = 0.
Notes	

A.2.2.7 CR484

CR484	Clarification required: Mode profile and Infill MA
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>According to Subset-026 v2.3.0 §3.12.4.3 “On the reception of a new MA without Mode Profile the ETCS On-board equipment shall delete the current Mode Profile.”</p> <p>Q2: If the start location of a mode profile is situated in advance of an infill BG, when the train reads this BG in FS mode, this mode profile previously memorised may be deleted by the B2 on-board (the infill MA cannot repeat this mode profile) in case the B2 on-board is implemented to apply §3.12.4.3 also in rear of the reference location of the in-fill information.</p> <p>The issue is limited to B2 on-boards running in Level 1 areas.</p>
Recommendation	See Subset-113 Hazard ETCS-H0032
Notes	Even though the answer to Q4 for this CR is ‘Yes’ due to clear requirements in Subset-026 v2.3.0d, the hazard is also relevant for a B2 trackside.

A.2.2.8 CR618

CR618	Inconsistencies between Subset 035 and Subset 026
Status in Subset-108 v1.2.0	Not classified (DC)
Compatibility issue(s) and	Q2 and Q4: In a B2 on-board, if the emergency brake is triggered in level STM, it may be revoked following transition to a different level. This can lead to

possible impact	a safety critical situation with safety implications.
Recommendation	See Subset-113 Hazard ETCS-H0038
Notes	

A.2.2.9 CR637

CR637	Limited Supervision
Status in Subset-108 v1.2.0	N/A
Compatibility issue(s) and possible impact	Q3: When a B3 X=2 on-board in L1/2/3 LS mode is transitioning to a B2 RBC the B2 RBC would consider the B3 X=2 LS mode of the train as Level 1/2/3 SE mode. This means that the RBC will consider this on-board in SE mode+ L1/2/3 which is not a consistent combination of level and mode. This could lead to the RBC rejecting the train.
Recommendation	<u>National solution (for B3 X=2, border between a B3 LS are and a B2 Level 2 area):</u> No global mitigation could be defined. This should be left to a project specific solution e.g. "do not engineer LS in the boundaries adjacent to a B2 RBC area" or "The B2 RBC could be modified to handle the reporting of L1/2/3 SE mode for LS".
Notes	<p>The possibility was investigated to solve the problem in B3 by translating the LS mode into OS or SR mode (also mode profiles) for the case when a B3 on-board in LS communicates with a B2 RBC.</p> <p>However this is not possible. Different operational rules apply for the operation in mode OS and SR on the one hand and in mode LS on the other hand. The operation in OS implies a display of MA which is not true for LS. The scenarios which apply for the modes OS and SR, are different to mode LS. Depend on whether the reported mode OS a B2 RBC could apply special checks or could take assumptions which are not suited for the actual situation. The relevant current speed is different. A B2 RBC could transmit the mode OS or SR to a further system which could there lead to misinterpretations of the mode.</p>

A.2.2.10 CR650

CR650	Train movement in L1 SB without Train Data
Status in Subset-108 v1.2.0	Not classified (DC)
Compatibility issue(s) and	Q1: CR650, optional for B2, creates an issue whereby the B2 on-board could change to SH mode but reject the list of balises for SH mode sent. This could lead to hazardous situations because the on-board will not supervise the

possible impact	borders of the SH area though this supervision is required by trackside. This problem is resolved in CR919.
Recommendation	See Subset-113 Hazard ETCS-H0045
Notes	

A.2.2.11 CR657

CR657	Unsuitability of RBC-RBC handover procedure in case of radio network change
Status in Subset-108 v1.2.0	OUT
Compatibility issue(s) and possible impact	Q3 and Q4: There is a problem if the communication session is established with the Accepting RBC using a network which coverage disappears soon after entering the Accepting RBC area.
Recommendation	<u>Engineering solution (for the B2 trackside):</u> The problem does not arise if in B2 trackside the coverage of the network of the accepting RBC (ACC RBC) is such that the on-board is already registered to it when receiving the transition order (which, without the CR, is sent by the HOV RBC when detecting that a route is set for a train to enter the ACC area). This can be achieved by extending the network coverage of the ACC RBC or by delaying the route setting or by a combination of the two.
Notes	

A.2.2.12 CR671

CR671	Inconsistency of Requests Parameter
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>There is an inconsistency between maximum rate for sending position reports in Subset-40, Subset-41 and the values of the variable T_CYCRQST in Subset-026.</p> <p>Q2: A B2 on-board may implement defensive reaction based on SS-40 §4.3.5.1 (T_CYCLOC < 5s): It could reject a Message because such value causes a violation of the trackside rule and in such sense is a forbidden value) For the B3 X=1 this rule is deleted, so from trackside point of view sending such value is not forbidden.</p> <p>Q4: For a B2 train in a B2 line, the on-board may have interpreted the trackside rule as "do not ask for MA request more frequently than 1 every 5 seconds, because in each MA request there is a position report packet" =></p>

	<p>T_CYCRQST > 5s; whereas the Trackside could have interpreted it only in terms of T_CYCLOC > 5s.</p> <p>Other examples of this kind are conceivable, regarding possible interpretations of that trackside rule (for example: request to report position at each BG encountered, which can be translated in time between PRs using distance between BGs and speed; combined use of time plus distance;...)</p>
Recommendation	<p><u>Engineering solution (for the B2 and B3 X=1 trackside):</u></p> <p>A general mitigation for the B2 and B3 X=1 trackside for all combinations of parameters that result in frequency of position reporting is not practical.</p> <p>A mitigation for the "most direct" parameters that influence the frequency can be that a X=1 trackside should use T_CYCRQST >= 5s and T_CYCLOC >=5s.</p>
Notes	

A.2.2.13 CR710

CR710	Clarify if received but not yet applicable National Values shall be deleted in NP
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>In B2 it is not clearly specified what happens to received but not yet applicable National Values when going to NP. In B3 they have to be deleted. Based on this gap, different expectations between on-board and trackside are possible:</p> <p>Q1 and Q3: A B2 (with the CR implemented) or a B3 on-board delete these not yet applicable NVs that the trackside was expecting the on-board to keep.</p> <p>Q2: A B2 on-board could keep not yet applicable NVs that the B2 (with the CR implemented) or a B3 X=1 trackside was expecting the on-board to delete.</p> <p>Q4: B2 on-board could delete not yet applicable NVs that the trackside was expecting the on-board to keep or on-board could keep not yet applicable NVs that the trackside was expecting the on-board to delete</p> <p>Under the premise that No Power is part of normal operation, the answers are therefore "No".</p>
Recommendation	See Subset-113 Hazard ETCS-H0057
Notes	

A.2.2.14 CR712

CR712	Confusion in packets not transmitted by infill devices
Status in Subset-108 v1.2.0	Not covered

Compatibility issue(s) and possible impact	<p>In B3 it is precise about the transmission media for some Packets /Messages and the information that can be sent as non-infill information in infill devices. Due to these changes Packets 42, 45, 46, 72, 76 and 79 were not allowed in the Euroloop and Packets 42, 46, 72, 76 and 79 in the RIU. No railways have reported the need of 42, 45, 46, 72, 76 and 79 in these devices. However, Packet 44 is used in some B2 implementations.</p> <p>Q1 and Q3: However this CR introduced: B3 on-boards or B2 on-boards implementing the CR are not allowed to receive the Packet 44 from loop/RIU as non-infill information.</p> <p>Q4: In B2 it is not clear which packets (if any) are allowed to be transmitted as non-infill by loop or RIU. A B2 on-board might reject a loop or RIU message containing non-infill information. However this does only apply for B2 on-boards running in L0 or LSTM because they do not communicate with a loop or an RIU.</p>
Recommendation	<p><u>Engineering solution (for the B2 trackside):</u></p> <p>B2 trackside should not send:</p> <ul style="list-style-type: none"> - Packet 42, 44, 45, 46, 72, 76, 79 as non-infill information from the loop - Packet 42, 44, 46, 72, 76, 79 as non-infill information from the RIU <p>If the engineering solution is not feasible see Subset-113 Hazard ETCS-H0054</p>
Notes	CR1155

A.2.2.15 CR757

CR757	Insufficient provisions for management of future ERTMS/ETCS system versions
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2: The requirements for the system version in different telegrams of the same BG are more relaxed in B3 X=1 than in B2. A B2 on-board might not expect a BG message made up of telegrams with different versions: this is allowed for B3 X=1 trackside but it is ambiguous in B2 (see Subset-026 v2.3.0d §3.17.3.1).</p>
Recommendation	<p><u>Engineering solution (for the B3 X=1 trackside):</u></p> <p>B3 X=1 trackside should not use BG messages with telegram of different versions</p>
Notes	

A.2.2.16 CR777

CR777	ETCS Override speed Supervision in SE/SN modes
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>A B2 on-board will supervise the ETCS Override speed, time and distance while in level NTC/STM. A B3 on-board will not supervise this.</p> <p>Q2: Technically this is acceptable but may cause operational issues. The ETCS override speed in a B2 track will still supervise in the STM area where it is expected that the National System Speed supervision will work and this speed is likely to be higher than the ETCS override speed. The only difference is that the B2 trackside should be aware of this issue while there is nothing in the B3 specs for the B3 X=1 trackside to foresee this situation.</p>
Recommendation	<p><u>Engineering solution (for the B3 X=1 trackside):</u></p> <p>For lines where B2 on boards operate in level STM and the override speed of the national system is higher than the ETCS Override speed, you need to change this NV (V_NVSUPOVTRP) to increase the ETCS override speed accordingly, and to decrease them again (via new NV) when leaving the STM area.</p> <p>AND</p> <p>If relevant, similar considerations needs to be taken into account to the distance and the time during which the override is active (D_NVOVTRP and T_NVOVTRP variables).</p>
Notes	

A.2.2.17 CR782

CR782	Reset of confidence interval
Status in Subset-108 v1.2.0	DC
Compatibility issue(s) and possible impact	<p>In B2 there is no harmonised solution for resetting the odometric confidence interval and relocating all location related information. Therefore:</p> <p>Q1 and Q3: A trackside not compliant with CR782 may not have taken provisions as expected by the on-board due to this CR.</p> <p>Q2: B3 X=1 trackside takes margins as requested by the CR782, but B2 on-board may have already taken them so performance impact. Note that the margins cannot be quantified, so trackside could have made insufficient estimate (safety issue in this case).</p> <p>Q4: In B2 it is unknown by whom and how the safe provisions are taken, so it can happen that provisions are taken by both on-board and trackside</p>

	(performance issue) or by none (safety issue).
Recommendation	See Subset-113 Hazard ETCS-H0018
Notes	

A.2.2.18 CR800

CR800	Conditional level transition order overrides normal level transition order
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q1, Q2, Q3 and Q4: The management of the Conditional Level Transition Order (Packet 46) is not defined in B2, if there is an announcement or order of non-conditional Level Transition (Packet 41) stored on-board. In B3, the CLTO it is rejected in this scenario. Therefore trackside design might assume on-board behaviour different from the implemented one.
Recommendation	<u>Engineering solution (for the B2 trackside):</u> A B2 trackside system should not send Packet 46 (Conditional Level Transition Order) in a telegram or message which contains the Packet 41 (Level Transition Order). In addition, it should not send Packet 46 between a level transition announcement and the announced location of the level transition.
Notes	

A.2.2.19 CR813

CR813	FIFO principle for Ack requests
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q1, Q3 and Q4: In the B3 DMI specification the FIFO (First In, First Out) principle is followed for the display of acknowledgement requests. In B2 there is no mandatory DMI specification. However, the CENELEC document TS50459 (informative DMI specification in B2 which could optionally be implemented) already considered this FIFO principle so B2 on-boards could also be implemented according to this principle.</p> <p>There could be a compatibility issue with both the B2 and B3 on-board if this principle is not taken into account by the B2 trackside as in the following scenario detected in the Netherlands:</p> <ol style="list-style-type: none"> 1) Train awakes in L2 and after the awakening procedure the driver presses the Start button. 2) The RBC sends an SR authorisation resulting in DMI display of an acknowledgement request for SR (Subset-026 §5.4 S24).

	<p>3) While the driver contacts the signal man for a written order to start in SR, the RBC sends a regular MA with On Sight mode profile (OS MA).</p> <p>4) The received OS MA results on the DMI in an acknowledgement request for OS which is however "hidden" behind the pending acknowledgement for SR due to the FIFO principle (B3 ERA_ERTMS_015560 §5.4.1.9 and B2 document TS50459 (optional)).</p> <p>5. The driver acknowledges. SR, and the on-board changes to SR mode (Subset-026 §4.6.3 [8]).</p> <p>6. Due to the transition to SR the OS MA is deleted (Subset-026 §4.10). The acknowledgment for OS is not displayed. The train remains in SR.</p> <p>Q1 and Q4: It is not clear how a B2 on-board will react as the function was not harmonised. Some B2 on-boards follow the CENELEC document TS50459 which states "ACKs shall be sequentially presented" which is the same functionality as the FIFO principle demonstrated in this scenario.</p>
Recommendation	<p><u>Engineering solution (for the B2 trackside):</u></p> <p>After sending an authorisation to run in SR mode, the B2 RBC should wait for the on-board to report SR mode before sending an OS Movement Authority.</p>
Notes	

A.2.2.20 CR818

CR818	ETCS-STM Header Issue
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2 and Q4: For those trackside using Packet 44 for a national system who knows the co-ordinate system of the balise group by other means inherent to the National System itself, the information will be rejected by a B2 on-board without the CR818.</p> <p>Q2 and Q4: If there is a consistency error where balise groups are duplicated and one is correctly read the information shall not be rejected if it is meant for a National System. This is true for linked or unlinked balise groups but not possible for B2 on-boards without the CR818.</p>
Recommendation	<p><u>National solution required (for B2 on-boards):</u></p> <p>No harmonized mitigation could be defined (in the trackside). A national solution can be implemented in the on-board to solve the issue, e.g. connect directly the STM with the antenna so it is purely for the STM to process the information without been submitted through the ETCS.</p>
Notes	

A.2.2.21 CR819

CR819	Balise group message consistency
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Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2: In B3, if the balises are duplicated within a balise group and a balise is not read or not decoded correctly but the duplicated balise is, then regardless of whether the balise group is linked or unlinked the message shall not be rejected and no linking reaction shall be applied.</p> <p>Q4: However, for B2 on-boards without the CR (i.e. without this modification) the duplication of a balise would be useless in terms of message delivery (if balise was duplicated with the goal to receive the BG message even if one of the 2 balises was not read)</p>
Recommendation	See Subset-113 Hazard ETCS-H0058
Notes	

A.2.2.22 CR821

CR821	Removal of the STM European from the ETCS specifications
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2: Today there is no real issue because there are no known implementations of STM European, but as long the Baseline 2 specifications are in force the implementation of STM European is legal. Thus, a B2 on-board reporting in mode SE will not be able to run in a B3 X=1 trackside or in a B2 trackside implementing this CR.</p>
Recommendation	Do not use SE mode in an on-board equipped with radio.
Notes	

A.2.2.23 CR841

CR841	Validity direction of transmitted information in RV mode (follow-up 253)
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2 and Q4: Without this CR implemented, B2 on-boards in mode RV may apply a brake reaction due to a balise transmission alarm, which may or may not be caused by BMM.</p>
Recommendation	No mitigation could be defined
Notes	

A.2.2.24 CR842

CR842	Activation of supervision of safe radio connection /Follow-up 787
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2 and Q4: The behaviour of a B2 on-board not implementing this CR may lead to a hazardous situation if not removing level transition information from the transition buffer when the communication is terminated with the RBC.
Recommendation	See Subset-113 Hazard ETCS-H0016
Notes	

A.2.2.25 CR843

CR843	Message with several non-revocable TSRs is discarded
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2: A B2 on-board may not accept a message containing several non-revocable TSRs.
Recommendation	See Subset-113 Hazard ETCS-H0056
Notes	Even though the answer to Q4 for this CR is 'Yes' due to clear requirements in Subset-026 v2.3.0d, the hazard is also relevant for a B2 trackside.

A.2.2.26 CR844

CR844	Unspecified train movement supervision after PT or RV distance is overpassed
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2 and Q4: In B2 it is not clear if after the brake release due to an overpassed distance for moving backwards in PT or RV mode, the on-board should command again the service brake for any further movement in the direction opposite to the train orientation. In principle the distanced authorised to run backwards is already overpassed and this distanced should still be supervised by the on-board.
Recommendation	See Subset-113 Hazard ETCS-H0055
Notes	

A.2.2.27 CR854

CR854	Exception [5] does not apply to acceptance of “Co-operative shortening of MA” in table of section 4.8.3 of the SRS
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2: If a B2 on-board in level 2/3 mode FS/OS receives a Request to shorten MA with a mode profile while a CES is applied (not yet revoked), the new EoA may be accepted while the mode profile is rejected. This could lead to potential hazards, e.g. a B2 on-board going to FS in an OS area.
Recommendation	See Subset-113 Hazard ETCS-H0024
Notes	Even though the answer to Q4 for this CR is ‘Yes’ due to clear requirements in Subset-026 v2.3.0d, the hazard is also relevant for a B2 trackside.

A.2.2.28 CR865

CR865	Replace by: Mode transitions [62] vs. [68]
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2 and Q4: In the unlikely case that a B2 on-board is tripped while in SH mode and then executes a level transition to level 0/STM being in TR mode, the transition will take place and the on-board would be in UN/SN with no valid Train Data (instead of being back in SH mode), for which there is no defined behaviour.
Recommendation	No mitigation could be defined
Notes	

A.2.2.29 CR866

CR866	Entry into Level 2 questions
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2 and Q4: For a Conditional Emergency Stop message stored in the transition buffer, the B2 on-board will compare the stop location with the position of the train when this message is extracted from the buffer, while a B3 train will compare it with the position when it was received. Thus, depending on when the buffer is evaluated, a B2 on-board may reject a CES that a B3 on-board accepts.

Recommendation	See Subset-113 Hazard ETCS-H0053
Notes	

A.2.2.30 CR878

CR878	Improvements for Passive Shunting (follow up of CR751)
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q3: Scenario: A shunting unit with B3 on-board is moving on a B2 line. At a certain point the driver selects passive shunting and then leaves the cab – on-board is in mode PS. The rolling stock is then moved (in PS mode) into a different area. A driver enters the cab, opens the desk and the on-board goes to SH mode.</p> <p>If this is not operationally acceptable for the area where the train is now, there is no way to avoid this technically because the packet introduced by this CR, which prevents the scenario, is not used in a B2 area.</p>
Recommendation	<p>No technical mitigation measure could be defined. However the use of Passive Shunting should be regulated by national operational rules.</p> <p>Operational rules are also needed for the case that a driver opens the desk and finds the on-board unexpectedly in SH mode instead of SB mode (due to the previous PS mode). This could happen in an area where shunting is allowed as well as in an area where shunting is not allowed. In both cases, the driver needs to know how to handle the situation.</p>
Notes	

A.2.2.31 CR895

CR895	Unintended extension of the permitted distance to run in Reversing due to filtering of info On-board.
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2 and Q4: In RV mode the trains are allowed to run for a maximum distance, given by trackside: the on-board calculates the permitted end location using as a fixed reference location the end of the RV Area (also given by trackside).</p> <p>The RBC can update both the Reversing Area and the maximum distance to run, however the B2 on-board in RV rejects this second information. Therefore, if the RBC updates both RV Area and maximum distance to run, the B2 on-board in RV would ignore the new Reversing Area info, which however defines also the starting point of the new maximum distance to run.</p>

	The on-board would then calculate the new end location for the reversing movement starting from a reference location different from the one used by the RBC. The end location in the RBC view would be different from the one in on-board view. This can be hazardous if the train runs for a larger RV distance than allowed, or is not able to leave a dangerous area because the supervised distance to run in RV is too short.
Recommendation	See Subset-113 Hazard ETCS-H0030
Notes	

A.2.2.32 CR896

CR896	Rejection of Acknowledgement of train data when received in RV mode
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2 and Q4: The Acknowledgement of Train Data is rejected by aB2 ETCS on-board in RV mode. This can lead to hazardous situations because the on-board will reject new messages sent by RBC, i.e. Reversing Supervision Information. For example:</p> <p>a) A train in RV has lost the safe radio connection and the communication session is considered terminated. The B2 on-board receives a Packet 42 (Session Management), contacts the RBC, initiates a new Communication Session and sends the validated train data. However it will reject the Acknowledgement of train data received from RBC. Further info sent by RBC, like extension of distance to go in RV, is rejected by the on-board because of Subset-026 chapter 4.8.4, exception [3]. Note: Relevant for those infrastructures where a train running in reversing mode can encounter packet 42 in balise groups.</p> <p>b) The train data are changed from external source (e.g. train interface) and are sent to the RBC. This scenario is train-dependent. In that case, as the acknowledgement of train data is rejected by on-board and the RBC cannot update RV information to on-board even if it is connected and in session.</p>
Recommendation	See Subset-113 Hazard ETCS-H0041
Notes	

A.2.2.33 CR897

CR897	End Section / Overlap Timer
Status in Subset-108 v1.2.0	Not covered
Compatibility	Q2 and Q4: A B2 on-board could consider an Overlap/End Section timer in as

issue(s) and possible impact	<p>less restrictive than expected by trackside:</p> <ol style="list-style-type: none"> 1. RBC sends MA with overlap and overlap/end section timer. 2. Train passes on-board overlap/end section timer start location; timer starts on-board. 3. Train enters the route section beyond the overlap/end section timer start location (normally entry to end section); timer starts in interlocking 4. RBC repeats MA from step 1 (SvL and overlap/end section timer start location is equal to the first one) 5. On-board restarts the overlap/end section timer. <p>Note: (Subset-026 §3.8.5.1) "A new MA shall always replace the one previously received" and as a consequence the on-board shall manage accordingly the section timers (see also §3.8.4.2.1). However it is not specifically required to restart overlap/end section timer.</p> <ol style="list-style-type: none"> 6. Since the overlap/end section timer in the interlocking was started (step 3) before the overlap/end section timer in the ETCS on-board (step 5), it expires first. The signalman can therefore revoke the overlap/end section at a time when the on-board still considers it as valid.
Recommendation	See Subset-113 Hazard ETCS-H0020
Notes	

A.2.2.34 CR899

CR899	Replacement of track description and linking information
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q1, Q2, Q3 and Q4: In B2 specifications it is stated that 'new track description and linking information shall replace (in the on-board equipment) previously received track description and linking information'. This is generally no problem, but the reading could lead to different interpretations regarding the update of track conditions, i.e. whether new track condition information will overwrite only previously received track conditions of the same type, or any type of track conditions. In B3 it is clarified how to update the track description and linking.</p> <p>Therefore the on-board behaviour may be different to the expectations of trackside e.g. additional track conditions may be deleted unexpectedly.</p>
Recommendation	See Subset-113 Hazard ETCS-H0031
Notes	

A.2.2.35 CR907

CR907	Hazardous brake command in RV
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2 and Q4: When the permitted distance to run in RV mode (D_RV) is overpassed, the brake will be applied. For B2 on-boards it is not clear that it is the emergency brake which shall be used, and that emergency brake shall not be released before standstill, even if a new D_RV is received. Brake release before standstill could lead to a potential danger related to safety of vehicle dynamics because the cars in the rear will still be braking while the front ones release the brakes. In addition, vehicle dynamics related to the use of other brakes (different from emergency brakes) during reverse movement have not been sufficiently documented to allow their use.
Recommendation	No mitigation could be defined
Notes	The compatibility issue is not about technical compatibility ETCS track - train; it is related to vehicle dynamics.

A.2.2.36 CR914

CR914	Missing repeat condition
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2: In B2 specification the waiting time before sending a radio message repetition is not defined for the on-board (and could be different among suppliers), while in B3 it is fixed to 15s. For B2 no currently known cases of severe operational impact were detected due to missing harmonisation in B2. However if aB3 X=1 RBC relies on the 15 s to determine the time available for responding to on-board requests, there could be an issue for a B2 on-board running in the line B3 X=1.
Recommendation	<u>Warning (to B3 X=1 line):</u> RBC design for B3 X=1 lines should not assume that B2 on-boards will repeat radio messages according to the value of 15 seconds defined in B3.
Notes	

A.2.2.37 CR917

CR917	Display of permitted speed in RV
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Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2 and Q4: There is an ambiguity in B2 regarding when RV permitted speed should be displayed. CR101 (optional to B2) states that the RV permitted speed is only displayed on driver's request.</p> <p>Because RV mode is often used for exceptional evacuation scenarios, it might lead to new hazardous scenarios if the driver first has to select the display of RV permitted speed. The issue is solved for on-boards implementing CR917.</p>
Recommendation	No mitigation could be defined.
Notes	See CR101

A.2.2.38 CR919

CR919	Rejection of List of balises for SH area error in solution of CR650
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q1, Q2, Q3, and Q4: ETCS Trackside has the possibility to limit a shunting area in which a train can move, to a certain number of balise groups allowed for the train to pass over. This information is sent to the ETCS on-board with Packet 49 "List of balises for SH area". If the train passes other balise groups, the ETCS on-board will be tripped.</p> <p>However, in some specific situations there is a risk that the B2 on-board will not use the list of balise groups.</p> <p>Thus the driver can mistakenly exit the shunting area without being stopped by ETCS. Subset-113 Appendix C identifies some of these situations or cases.</p>
Recommendation	See Subset-113 Hazard ETCS-H0045
Notes	

A.2.2.39 CR923

CR923	Danger for SH in level 0 and STM
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q4: A problem appears for a B2 on-board that has implemented the CR410 and not 923. See CR410 problem description.</p> <p>Q2: A B3 X=1 trackside will expect that the 'danger for shunting' information is considered by the B2 on-board with CR410 at level borders, which will not be</p>

	<p>the case.</p> <p>Q2: A B3 X=1 trackside will expect that the 'danger for shunting' information is considered by the B2 on-board in Level 0 mode SH at level borders, which will not be the case.</p>
Recommendation	See Subset-113 Hazard ETCS-H0035
Notes	See CR410

A.2.2.40 CR925

CR925	Missing transition from TR mode
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q4: The problem appears for a B2 on-board that has implemented the CR410. CR410 has introduced the mode SH in level STM. This means that if the shunting movement in level STM is tripped, the on-board is in TR mode, without valid train data. In table 4.6.3 there is no condition other than NP mode to continue after this trip. It seems that the escape from trip was forgotten in the solution of CR410.
Recommendation	No mitigation could be defined.
Notes	See CR410

A.2.2.41 CR942

CR942	Requirement for text display ambiguous in case start and end conditions are fulfilled
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2 and Q4: A B2 on-board may apply the brake if, for a text message to be acknowledged, the start conditions become fulfilled while the end conditions are also fulfilled AND the conditions for applying the brake for outstanding acknowledgement are also fulfilled at this moment.
Recommendation	<p><u>Engineering solution (for the B2 and B3 X=1 trackside):</u></p> <p>Trackside should avoid sending text messages which ask for brake application for an outstanding driver acknowledgement</p>
Notes	

A.2.2.42 CR958

CR958	Ambiguous exception
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q1, Q2, and Q4: 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.</p> <p><u>Regarding the running on a B2 trackside:</u></p> <p><u>Scenario 1a:</u></p> <ol style="list-style-type: none"> 1. On-board sends SoM Position Report containing "invalid" LRBG. The on-board considers that the start condition (defined in Subset-026 §3.6.2.2.2.3) for accepting messages containing LRBG set to "unknown" is fulfilled. 2. B2 RBC (not implementing the CR) responds with Train Accepted message containing the "invalid" LRBG. 3. Upon reception of the Train Accepted message, the on-board deletes the stored position information and considers that the end condition (defined in 3.6.2.2.2.3) for the acceptance of messages with LRBG set to "unknown" is fulfilled. <p>All subsequent messages from the RBC (which will contain LRBG set to "unknown") are rejected by the on-board (due to the end condition for their acceptance being fulfilled in Step 3). There is a deadlock requiring closure of the desk and a new SoM.</p> <p>Note: a subsequent SoM attempt should be successful because in Step 1 the on-board would no longer have a stored LRBG (the position information was deleted during the previous SoM attempt). The on-board would therefore report an unknown position in Step 1, and in Step 2 the RBC would use LRBG set to "unknown", thus avoiding the deadlock situation.</p> <p><u>Scenario 1b:</u></p> <ol style="list-style-type: none"> 1. On-board sends SoM Position Report containing "invalid" LRBG. 2. B2 RBC (not implementing the CR) responds with Train Accepted message containing the "invalid" LRBG. 3. On-board rejects the Train Accepted message because the on-board considers that the RBC message is non-compliant with 3.6.2.2.2.2 (which requires the RBC to use LRBG set to "unknown"). There is a deadlock as the on-board cannot proceed beyond A23 in the SoM flowchart. <p>Note: Unlike scenario 1a, a subsequent SoM attempt would not be successful in this case, due to the fact that the stored position is not deleted during the first SoM attempt (the trigger for the on-board to delete the stored position information is the acceptance of the Train Accepted message; but this message is rejected).</p> <p><u>Regarding the running on a B3 X=1 trackside:</u></p> <p><u>Scenario 2:</u></p> <p>It is assumed that the RBC sends a Train Accepted message containing the</p>

	<p>LRBG set to “unknown”. This is the behaviour mandated by the CR, and is also the behaviour of some B2 RBCs.</p> <ol style="list-style-type: none"> 1. On-board sends SoM Position Report containing “invalid” BG. 2. RBC (implementing the CR) responds with Train Accepted message containing the LRBG set to “unknown”. 3. On-board rejects the Train Accepted message, as it expects the Train Accepted message to contain the last reported LRBG ID. There is a deadlock. <p>Note: there is no requirement for the B2 on-board to reject the Train Accepted message in Step 3, and a survey found that none of the B2 on-boards of the UNISIG companies would reject the message. Nonetheless, given the ambiguity in the requirements in B2, it cannot be ruled out that a B2 on-board could consider that the RBC has used an incorrect LRBG in the Train Accepted message, causing rejection of the message.</p> <p>In this case a subsequent SoM attempt would not be successful, due to the fact that the stored position is not deleted during the first SoM attempt (the trigger for the on-board to delete the stored position information is the acceptance of the Train Accepted message; but this message is rejected).</p>
Recommendation	No mitigation could be defined.
Notes	

A.2.2.43 CR961

CR961	Standardised balise IDs for LS projects
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2: According to Subset-026 §3.18.4.4.3 it is allowed for an unlinked BG to have the same identity as another unlinked BG or as a certain linked BG. However, this could cause some safety-related problems.
Recommendation	See Subset-113 Hazard ETCS-H0042
Notes	

A.2.2.44 CR963

CR963	Ambiguities in case of shortening of MA to the current position of the train
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2 and Q4: Repositioning might be seen by the B2 on-board as shortening of the MA in some cases, and may lead to a deletion of linking and track description which is not foreseen by trackside. This would have an impact on

	normal service in case no track description is given at the next main BG, but only an MA. In this case the new MA is not fully covered by SSP and gradient profile and therefore rejected by the on-board.
Recommendation	<p><u>Engineering solution (for the B2 and B3 X=1 trackside):</u></p> <p>Trackside mitigations to avoid loss of information due to repositioning being interpreted as a shortening of the MA:</p> <ol style="list-style-type: none"> 1. Send complete track description (starting at the main BG) together with the MA at all main balise groups encountered after a repositioning BG <p>OR</p> <ol style="list-style-type: none"> 2. Deliberately keep the first MA so short that repositioning is not seen as shortening by the on-board.
Notes	

A.2.2.45 CR977

CR977	Impact of message processing time
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q1 and Q3: A B3 on-board or a B2 on-board with implementing the CR can introduce a potential delay in transition to TR mode when passing an EoA (due to ongoing processing of BG message). This delay may not be considered by B2 trackside and may invalidate existing project safety analysis, e.g. if Subset-026 v2.3.0 §3.13.7.2.2 second bullet is applied.</p> <p>Q2 and Q4: For a B2 on-board not implementing the CR, an unintended trip reaction can result depending on the engineering of the distance between the balise and the EoA due to the time needed by the on-board to process a BG message.</p>
Recommendation	<p>For the safety issues (Q1 and Q3): See Subset-113 Hazard ETCS-H0001</p> <p>AND</p> <p>For performance issues (Q2 and Q4) the respective mitigations for the different baselines:</p> <p><u>Engineering solution (for the B2 and B3 X=1 trackside):</u></p> <p>Take into account on-board processing times as much as possible when designing a trackside (regarding distance of balise groups to EoA).</p> <p><u>Engineering solution (for the B2 trackside):</u></p> <p>Apply the engineering rule from Subset-040v3.2.0 clause 4.1.1.4</p>
Notes	

A.2.2.46 CR1015

CR1015	Unsuitability of non-stopping areas announcement mechanism
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q1: A B2 on-board which implements CR1015 but not CR1109 may not inform the driver about a non-stopping area if the driver applies the brakes.
Recommendation	When a B2 on-board implements CR1015 it should also implement CR1109.
Notes	

A.2.2.47 CR1022

CR1022	Communication Session/Safe radio connection request in radio hole
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q2 and Q4: For a B2 on-board in a B2 or B2 or B3 X=1 line there is an operational issue in the following scenario: announced radio hole and communication session terminated because of a loss of safe radio connection happened before the train entered the announced radio hole. Without the CR, in this scenario the on-board does not initiate the establishment of a new session at the end of the radio hole area, with the resulting operational impact.
Recommendation	<p><u>Engineering solution (for the B2 and B3 X=1 trackside):</u></p> <p>Engineer a BG at the end of the announced radio hole area with an order to establish communication session</p> <p>OR</p> <p><u>National solution required (operational):</u></p> <p>Define a national operational solution, e.g. driver to initiate SoM at the end of the radio hole area.</p>
Notes	

A.2.2.48 CR1030

CR1030	Reduced adhesion areas
Status in Subset-108 v1.2.0	Not covered
Compatibility	Q1 and Q3: A B3 on-board or a B2 on-board implementing the CR will keep in

issue(s) and possible impact	<p>the transition to SN the reduced adhesion entered by the driver; therefore a B2 trackside could observe a loss of performance in comparison with a B2 on-board when for example the train is back in L2 after having gone to LNTC from L2.</p> <p>Q2: A B2 on-board will always reset the adhesion factor entering SN mode, also if it was selected by driver. A B3 X=1 trackside where the adhesion factor is managed operationally (instructions to drivers to set them) would have to consider that the "reduced adhesion" set by the driver would stay in a B3 on-board whereas it would disappear in a B2 on-board – when entering SN mode; this means that in case on-board comes back to e.g. FS it would have still reduced adhesion in the B3 train but not in the B2 train.</p> <p>Note: The compatibility problem arrives if the functional modification is applied to one part but not the other (on-board/trackside).</p>
Recommendation	<p><u>National solution required (operational) (Q1 and Q3):</u></p> <p>For a B2 line: B2 infrastructure engineering / operation should consider that a CR-compliant on-board will not reset, when entering SN mode, the reduced adhesion if set by driver. An operational rule for the driver to set the adhesion to non-slippery in the described scenario could be considered.</p> <p><u>For a B2 and B3 X=1 line (Q2):</u></p> <p>See Subset-113 Hazard ETCS-H0059</p>
Notes	

A.2.2.49 CR1036

CR1036	Unclarities regarding the ETCS function change of traction system
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2 and Q4: In the B2 it is not clearly specified how to apply only the relevant part of the procedure of "change of traction power without powerless section" (Subset-026 v2.3.0d § 5.18.2.1.1).</p> <p>The trackside cannot know whether the respective rolling stock part of a train has to change to another pantograph or whether it is configured to make a voltage change internally but without the need to change the pantograph, but probably with the need to open the main switch. The trackside cannot know this; it is dependent on the rolling stock configuration. The change of traction system icon would appear without warning, and it is not clear when this icon will be removed.</p>
Recommendation	<p><u>Engineering solution (for the B2 and B3 X=1 trackside):</u></p> <p>In a B2 or B3 X=1 line where B2 trains are expected and where it is a problem for the IM that the wrong pantograph is up after point F (Change of traction system location), then engineer the change of traction system together with</p>

	the lower pantograph.
Notes	

A.2.2.50 CR1056

CR1056	Gaps and faults in dimensioning rules tables
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q4: Based on the maximum number of iterations in 1 packet and on the fact that no minimum number of mode profile sections memorised on-board is specified for ERTMS/ETCS B2 on-board equipment supporting only system version number X=1, it cannot be assumed that it stores more than 3 mode profile sections.
Recommendation	<u>Engineering solution (for the B2 trackside):</u> B2 trackside should apply engineering rule in Subset-040 v3.2.0, Annex 6 §6.3.1.1.
Notes	

A.2.2.51 CR1068

CR1068	STM National Trip Procedure use for ETCS DMI Shunting and Level buttons
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	Q4: The problem only applies for a B2 on-board that has implemented the CR410. When selecting ETCS SH mode, the fact that the STM is put in Cold Standby state when entering this mode will lead to immediate release of the brake related to a national trip procedure. Because the level button is enabled, an inadvertent level change by the driver will result in an ETCS trip or will not permit a new STM to become active.
Recommendation	Specific instructions should be given to the driver to handle the national trip procedure.
Notes	See CR410

A.2.2.52 CR1155

CR1155	CR712 follow-up: non-infill from infill device
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Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2: B2 on-board may not expect to receive packet 44 from loop or RIU as non-infill information and applies a defensive programming reaction. However this does only apply for B2 on-boards running in L0 or LSTM because they do not communicate with a loop or an RIU.</p> <p>Q4: see CR712, applying only to B2 on-boards running in L1 supervision” with “see CR712. However this issue does not apply to B2 on-boards running in L0 or LSTM because they do not communicate with a loop or an RIU.</p>
Recommendation	<p><u>Engineering solution (for the B2 and B3 X=1 trackside):</u></p> <p>Trackside should not send Packet 44 as non-infill information from the loop or the RIU.</p>
Notes	See CR712

A.2.2.53 CR1183

CR1183	Unclear use of telegram header info when a balise telegram or BG message is ignored/rejected
Status in Subset-108 v1.2.0	Not covered
Compatibility issue(s) and possible impact	<p>Q2 and Q4: A B2 on-board could use the default National Values when a mismatch has been detected between the country or region identifier read from a BG and the corresponding identifier of the applicable NV, although the BG message is rejected (e.g. when the BG was not announced in the linking information). This behaviour may be unexpected for the trackside and might be hazardous if the default NV are less restrictive than the applicable National Values.</p> <p>Q2 and Q4: A B2 on-board may use as reference to report its position to the RBC a BG although the BG message has been rejected (due to message inconsistency). An RBC might assume that the reporting of a BG as LRBG means that the message has been accepted and may conclude that therefore the RBC does not have to provide by radio message the information which was contained in the BG e.g. National Values or a level transition announcement.</p>
Recommendation	See Subset-113 Hazard ETCS-H0060
Notes	

B. LIST OF CRs ANALYSED

CR n°	Headline
0005	Message names
0010	Message flow during termination of a communication session
0012	Supervision of sequence
0015	NID-C description
0030	Editorial clarifications
0031	Clarification of terms
0038	Meaning of M_ERROR special values
0040	position report in case of passing an unlinked balise group
0047	missing transition from TR, PT to SL
0049	Telegram or Message Counter
0057	Mode related speed restriction in SH
0058	incorrect comment on NID_STM in packet 72
0071	Insertion of packet 0 in all messages from train to RBC
0076	Splitting of an ERTMS train
0090	High Priority channel (3)
0099	MMI versus internal information
0100	MMI versus mode table
0101	Permitted speed in RV
0103	There is no acceleration data specified as specific train data.
0105	Availability of Acknowledgement button
0107	Output information
0123	TSR in L2/L1
0124	Passing a signal in SR mode
0128	Short number programmed in balise identification.
0130	Confusing definition of Tamt.
0132	Waiting for train data Ack by RBC
0133	Requirement doesn't belong to the chapter
0134	L MAMODE for a shunting area
0137	Q EMERGENCYSTOP definition
0140	Reversing distance sent by the RBC
0141	Geographical position in shunting mode
0142	Position report in level transition
0148	Leaving Isolation mode
0157	Valid direction for Reverse Movement Protection in SR
0166	NID OPERATIONAL
0168	MA request
0177	Loss of End of Profile elements
0180	Braking without indication of reason at standstill supervision
0186	Message 42 further deletions

0198	Revocation of Emergency Stop in SR
0201	Supervision of radio link : unclear requirement
0203	Default gradient of TSR forgotten
0204	Report of train position when change of train orientation
0205	Note to be removed
0216	Ambiguity of distance information in profile data
0232	Unknown text message
0235	Train data after loss of radio communication
0237	Service Brake T NVCONTACT
0242	ERTMS system version management
0247	List of expected balises in SR mode
0269	Transition SB-->SN after ACK from driver (Condition [58])
0284	ETCS accepted information from STM X (SE)
0285	Smooth transition and continuous supervision at the level Transition
0293	End of Mission
0296	Linking reaction info to RBC.
0297	Override request
0301	ETCS functions access by the STM in SL Mode
0309	RBC transition order analogue to level transition order
0312	Level Transition at estimated - or maximum safe front end
0317	Failure of Packet 51 "ASP"
0336	Storage of and text interpretation for Q_SLEEPSESSION
0338	Some Errors in Active Functions Table
0342	Redefinition of the international train categories
0343	Time between attempts to establish a safe connection
0345	Text messages in SH, SE. SN mode
0346	List of trackside supported levels
0373	Mixed level transition announcement
0374	Reason for TR on DMI
0381	Display of maximum shunting speed
0383	Transmission media for packet 12 is not only balise.
0399	Message 153
0402	When is linking used on-board
0403	Acknowledgement of train data also in TR and PT
0408	Brake application and revocation by the same system
0410	Shunting in STM areas
0411	STM transition in trip situation
0412	Brake command in NP mode
0413	Level crossing modification
0414	Application rules for packets
0415	Transition between STM levels
0416	"No track condition information will be received" message to the driver in NL mode.
0418	Target speed & distance output information to driver

0423	Names NC_DIFF and V_DIFF
0426	SRS reference missing
0433	Linking reaction, logging thereof
0437	Use of N_ITER
0438	Mistake in Active Function Table for SH mode
0446	Resuming initial state for non-continuous profile data
0450	Mode transition condition not correctly worded.
0451	Further changes with reference to CR66 and CR91
0452	Linking to unknown orientation is not possible
0453	National/Default values
0455	Position report sending when passing level transition location with train rear end
0459	National values sent by radio during SoM
0461	Inconsistency: Sent train data and accept Acknowledgement in NL
0463	MA shortening due to change of train data
0466	Transition from TR to UN
0471	No acknowledgement of termination of a communication session received
0478	Establishment of Safe Connection - Retries
0481	Supervision of the Radio Link
0482	Balise detect function
0484	Clarification required: Mode profile and Infill MA
0485	Review of SRS by STM WG
0487	Impossibility to discriminate MA request reason
0488	Geographical position handling in RV mode
0490	No driver indication if permitted distance is exceeded in PT mode
0491	Acknowledgement of the Route Related Information
0492	Missing information in the pre-announcement message
0493	Removal of Emergency Stop data from Route Related Information
0494	Communication of SR balise list on the RBC/RBC interface
0495	Restriction of capacity within the Route Related Information Request
0497	Repetition of information between an in-fill balise group and the related main balise group
0503	Network address format at fixed interface / interface to GSM-R
0505	Train Orientation not well defined
0506	Update of ETCS Safety Analyses needed
0509	Confusing reference in table 4.5.2
0511	Train speed indication in SB mode.
0513	Non Leading mode
0514	Cold movement detection
0521	Train location function for non leading and sleeping engines
0522	Misleading sentences for RBC/RBC announcement.
0524	Reporting of fatal error by Sleeping and Non leading engines.
0535	Door control supervision
0540	SR mode acknowledgement
0546	No train data in shunting and non leading

0548	Transition from TR to UN in level 0 when the on-board equipment was previously in SH mode.
0557	Reset of MA request parameters and position report parameters
0558	Wording inconsistencies for linking
0559	Inconsistencies in procedure "Shunting initiated by driver"
0561	Availability of "Start" button in SE/SN mode
0563	MA request if section timer expires
0564	Missing Parameter in the Route Related Information message
0565	Reporting / recording of balise errors
0582	Permitted speed in UN mode
0583	Indications on DMI in SR/OS mode
0584	STM max speed
0591	Change of train length
0593	Awakening on loops
0594	Speed definitions
0595	Braking curve calculation
0597	Communication session in SL mode
0599	Reconnection after unexpected radio hole
0604	Override procedure
0605	Shortening of track description – SSP and gradient profile must not have "open end"
0607	Shunting request information to be displayed in UN mode
0614	Informing the RBC when track description has been deleted on-board
0618	Inconsistencies between Subset 035 and Subset 026
0623	ETCS communication session
0625	Backward movement after entry in FS/OS mode
0632	Inconsistencies in stored/not stored info between A3.4 and 4.10
0634	Q_EMERGENCYSTOP variable not in line with CLR91 and CLR532
0635	Extension of MA following TAF not clear
0636	System Start-up / Execution of Self-Tests
0637	Limited Supervision
0641	Local time
0649	Inconsistency in position report specification and Active Functions Table
0650	Train movement in L1 SB without Train Data
0651	Availability of "Shunting request" input for driver
0652	Impossibility to perform mode transition PT => FS/OS in Level 1
0654	Unsuited wording of variable description
0656	Follow up of CR126
0657	Unsuitability of RBC-RBC handover procedure in case of radio network change
0659	Inconsistency override procedure during SoM
0660	Non ETCS air gap data for STM
0661	JRU, Inconsistencies between SRS and FFFIS JRU Downloading I/F
0663	On-board management of TAF request update
0665	Session Termination order received when establishment still on-going
0671	Inconsistency of Requests Parameter

0672	Definition of Level transition acknowledgement
0676	Allowed current consumption
0679	Inconsistency in 4.5.2 for Manage Emergency Stops
0680	Definition of expectation window
0684	Using Override for overpassing SR distance
0685	Using Override in case of Conditional Emergency stop
0687	Awakening performance requirement
0689	M_LOADINGGAUGE value 0
0696	Follow up of CR382 clarification
0697	Deletion of level transition when entering SR mode
0698	Train Data not entered by driver
0701	List of balises in SR missing in 4.8
0710	Clarify if received but not yet applicable National Values shall be deleted in NP
0712	Confusion in packets not transmitted by infill devices
0716	Definition of Available STM
0717	Validity of "Former EOA" data
0719	Ambiguity on Text Message Conditions
0724	Clarification on cooperative shortening of MA decision criterion
0727	Missing Ack input
0731	Inconsistencies between SRS chapter 7 and SUBSET-054
0732	Follow up CR151: Eddy current brake switch off
0733	Button protection
0742	Change Requests for an optimized use of the Radio In-fill function
0745	Permitted braking distance
0749	Number of keys per on-board
0751	Start of mission in Level 2
0752	ERTMS-reference architecture
0753	Use of the term DMI
0757	Insufficient provisions for management of future ERTMS/ETCS system versions
0758	KMC-ERTMS entity interface specification
760	DMI harmonisation (including data entry)
0763	Ack feedback to RBC
0764	Reconnection time limited
0767	Shunting and level transitions
0768	Harmonised Network Registration
0772	Overlap between SRS and Subset 027
0777	ETCS Override speed Supervision in SE/SN modes
0779	Distances for Axle Load Speed Profiles
0782	Reset of confidence interval
0784	Accepting track condition information in TR mode
0786	Management of track condition excluding Big Metal Masses
0789	Inconsistency in level transition conditions
0794	Inconsistency in level transition announcement
0800	Conditional level transition order overrides normal level transition order

0801	Precedence of chapter 4 transitions over chapter 5 procedures
0802	Controversial on-board implementations
0804	National value for default location accuracy of balise group
0805	SR mode inconsistencies
0807	Inconsistencies radio in-fill area information
0808	Train location/position unclear
0809	Direction of balise arrows in figures
0811	Level 3 is missing
0812	STM max speed unclear
0813	FIFO principle for Ack requests
0814	Key validity period
0817	Shunting request pending
0818	ETCS-STM Header Issue
0819	Balise group message consistency
0820	Inconsistency in SRS 4.8.3 and 4.8.4
0821	Removal of the STM European from the ETCS specifications
0822	Single balise group with M_MCOUNT = 254
0823	Delete route suitability function
0824	Jumping braking curves (follow up of CR601)
0826	Transition from SR to OS/SH for a further location
0827	Ambiguity in CR223
0828	Add language as stored information
0829	Adhesion cannot be unknown
0841	Validity direction of transmitted information in RV mode (follow-up 253)
0842	Activation of supervision of safe radio connection /Follow-up 787
0843	Message with several non-revocable TSRs is discarded
0844	Unspecified train movement supervision after PT or RV distance is overpassed
0847	Handling of direction dependent data from RBC without coordinate system
0854	Exception [5] does not apply to acceptance of "Co-operative shortening of MA" in table of section 4.8.3 of the SRS
0855	Establishment of radio communication session when manually changing the level to 2 or 3
0856	FRS references embedded in SRS
0857	RIU is missing in 3.5.3.7
0858	Inappropriate driver's indications
0859	Awakening on loop unclear
0862	Indication limit vs. new speed and monitoring chapter
0864	Unclear steps in start of mission procedure
0865	Mode transitions [62] vs. [68]
0866	Entry into Level 2 questions
0867	Length of balise telegrams
0868	Driver's navigations during SoM
0869	Issues related to management of session / radio connection
0871	"End of Non Leading" selection still existing (follow up of CR513)

0872	Train running number set to "unknown" (follow up CR656)
0873	Discrepancies between Level and RBC id/phone number selections
0875	New Q_TEXT value "Acknowledgement"
0877	DMI specification update for baseline 3
0878	Improvements for Passive Shunting (follow up of CR751)
0879	Missing release condition in PT
0880	Gaps/inconsistencies in speed/distance monitoring chapter
0881	findings from DMI WG (mainly SRS table 4.7.2)
0883	Unclear requirement on downwards compatibility
0884	Missing train category
0890	Installation of balises in curved track
0893	TSR revocation in TR mode
0894	Driver selection of Level in SoM opens second radio session
0895	Unintended extension of the permitted distance to run in Reversing due to filtering of info On-board.
0896	Rejection of the Acknowledgement of Train Data when received in RV mode
0897	End Section / Overlap Timer
0899	Replacement of track description and linking information
0901	Braking curves correction factors
0902	Conversion model and brake build up time related issues
0903	Driver confirmation of Train Data received from External Sources
0904	V_LOA for STM
0905	Capture of brake percentage when more than one combination of special brakes is possible
0906	Findings from SRS 3.0.0 editorial review
0907	Hazardous brake command in RV
0908	Impossibility to release the brake command in case of STM failure
0909	New text message to be confirmed with the same ID (Follow up CR763)
0910	Location dependent Speed Restrictions to be deleted behind the train rear (Follow up of CR798)
0911	Contradictions in the display of track conditions (Follow up of CR170)
0912	Train speed in position report
0913	Misleading remarks in message description
0914	Missing repeat condition
0915	Start/ End conditions for SoM
0916	Traceability 4.7.2
0917	Display of permitted speed in RV
0918	Clause 5.8.2.1 a) vs. a speed limit for triggering the override function equal to 0
0919	Rejection of List of balises for SH area, error in solution of CR650
0922	Reduce 5 minutes on loss of connection
0923	Danger for SH in level 0 and STM
0924	Inappropriate definition of the speed monitoring
0925	Missing transition from TR mode
0927	Safe speed supervision for calculation of EBI

0928	Driver's indication of brake command(s)
0929	Indication of the reasons of non stopping areas
0942	Requirement for text display ambiguous in case start and end conditions are fulfilled
0943	Standstill while capturing data
0944	Data unit/resolution/size
0945	Incorrect SoM start condition
0946	Train category 210 mm cant deficiency
0947	Data view for fixed train data entry
0948	Change of Driver ID in SH mode
0949	"Balise read error" indication in NL mode
0951	Train Data entry mechanism
0952	Marker board problem
0953	Train related speed restriction
0954	Default list of levels
0955	Availability for use of level 2/3
0956	Override when override is active
0957	Overlapping of CR solutions
0958	Ambiguous exception
0959	Braking curve problems
0961	Standardised balise IDs for LS projects
0963	Ambiguities in case of shortening of MA to the current position of the train
0964	Computation of distances displayed on the planning information
0965	Inconsistency in LS-->OS and OS-->LS transitions
0966	Inconsistencies related to Track Conditions "Door Control" and "Current Consumption"
0967	Route Suitability data to be stored on-board
0969	Clarification chapter 6 table headings
0970	Calculation method for CBC-MAC
0971	Encryption/decryption of the K-MAC
0972	Safe areas management
0976	Isolation mode inconsistency
0977	Impact of message processing time
0978	DMI specification - figure mistakes
0979	brightness/volume adjustment from external button
0980	DMI specification - editorial mistakes
0981	Data entry completion for half grid windows with multiple input fields
0982	Acknowledgement vs. data entry capture
0983	missing condition on TRN for start button in SB
0984	text message display during 1sec FIFO delay
0986	Start of Reversing movement
0987	Unclear distinction between SR and OS on DMI
0989	Unclear LX icon display conditions
0992	LUC completion
0995	Feedback from the review of document for early implementation of braking curves in baseline 2

0996	Service brake build up time
1000	Sound horn
1001	Editorial improvements to procedure
1002	M_NVEBCL=0 (follow-up CR901)
1003	Miscellaneous editorial findings in SRS 3.1.0
1004	Wrong definition for M_AXLELOAD
1008	Inconsistency between clauses 3.18.3.8 and A3.6.2.1
1009	Ambiguity in conditional transition order: can it be sent by an RBC or not
1015	Unsuitability of non-stopping areas announcement mechanism
1018	Obtaining list of available networks
1019	System version management in reversing
1020	Unnecessary brake reaction at SoM
1022	Communication Session/Safe radio connection request in radio hole
1024	Maximum value for M_POSITION
1025	Missing condition for start in SR
1027	Change of Train Data in RV mode
1029	Engineering rules for braking curves input parameters
1030	Reduced adhesion areas
1032	Management of Balises transmitting system version number X equal to 0
1036	Unclearities regarding the ETCS function change of traction system
1038	Mismanagement of Packet 39 in B3
1039	Safety requirements for data entry processes are not clear
1041	General update of Euroballise documents
1042	Scope and purpose of the FFFIS STM
1043	FFFIS STM version management
1044	Concept of STM group
1045	STM test procedure
1046	Performance requirements in relation to the FFFIS STM
1047	Engineering Requirements for the Level NTC transitions
1048	DMI inconsistencies regarding use of area C1 and regarding SR distance
1049	Inconsistency between Subset-101 and STM specifications
1050	Inconsistency regarding Ack for SR mode
1052	CRC coding in Interface 'K'
1053	Trip situation is reported by STM
1056	Gaps and faults in dimensioning rules tables
1062	DMI spec inconsistencies regarding Start button in Figure 134
1065	Subset-054 upgrade to baseline 3
1066	Unified/Customised DMI for STM
1067	Inhibition of ETCS DMI objects by STM
1068	STM National Trip Procedure use for ETCS DMI Shunting and Level buttons
1069	Handover of DMI display in case of level NTC transition
1070	Display of STM health condition
1071	FFFIS STM upgrade to baseline 3

1072	DMI layout for STM train data entry
1073	ETCS functional apportionment, distributed architecture and safety levels for use by STMs
1074	Organisation of STM train data entry
1079	Inconsistent definition of leaving the indication status
1081	Visibility of speed hooks
1088	Subset-039 upgrade to Baseline 3
1090	Clarification regarding data checks
1092	Errors in formula for release speed calculation
1093	Subset-041 upgrade to Baseline 3
1096	Unclear brake release conditions after an unwanted further movement in PT/RV mode
1097	Miscellaneous editorial findings in SRS&DMI spec 3.2.0
1098	Handling of "No track conditions will be received" message in NL mode
1102	Alignment of SUBSET-091 with the new CCS TSI
1103	Subset-040 upgrade to Baseline 3
1104	Subset-094 upgrade to baseline 3
1105	Subset-091 upgrade to Baseline 3
1106	Definition of ODO-4 needs to be clarified
1108	ETCS FRS removal from TSI annex A
1109	Error non-stopping areas (Follow-up CR1015)
1121	Unsafe handling of track conditions inhibiting special brakes
1124	Findings on SRS section 3.13 "Speed and distance monitoring"
1126	Handling of Big Metal Mass in Level NTC
1127	Non convergence of the release speed calculated on-board
1131	Unnecessary reset of V_NVLIMSUPERV
1132	KMC interworking issues
1133	Tunnel stopping area functionality on B2 lines
1134	Protection of "Exit Shunting" button
1135	SUBSET-023 upgrade to baseline 3
1136	Subset-034 upgrade to baseline 3
1137	Subset-037 upgrade to Baseline 3
1138	Subset-092 upgrade to Baseline 3
1139	Subset-038 upgrade to Baseline 3
1140	Translation of M_AXLELOAD in SRS chapter 6
1141	Conversion model for long trains
1142	General update of Euroloop documents
1143	Freezing of ETCS variables not reflected in chapter 6
1147	DMI text message handling
1148	Trigger of specific NTC data entry
1149	Alignment of PBD SR requirements with the new braking curve model
1150	Incomplete V_MRSP definition vs train position
1151	Error in Subset-037 Table 11
1153	Train interface passive shunting input simplification
1154	Train interface - clarification of isolation output

1155	CR712 follow-up: packets sent as non-infill information from infill device
1157	SUBSET-076 upgrade to Baseline 3
1158	SUBSET-074 upgrade to Baseline 3
1159	Missing train-to-track message specification for RBC X=1
1168	Unspecified ACC RBC behaviour when receiving new pre-announcement messages in ongoing transaction
1173	Miscellaneous problems with STM specifications
1176	Feedback on SRS chapter 6 from Baselines compatibility assessment
1183	Unclear use of telegram header info when a balise telegram or BG message is ignored/rejected
1185	Miscellaneous editorial findings in SRS&DMI spec 3.3.0
1223	Display in Limited Supervision
1231	Miscellaneous editorial findings in SUBSET-027 v3.0.0
1232	Subset-091 upgrade to Baseline 3 First Maintenance Release
1233	Subset-104 upgrade to Baseline 3 First Maintenance Release