

Train Control ETCS sys

ETCS System Compatibility Borders

Document Management

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History

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Abrogated documents

Name	Version	Date

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Table of Contents

1. INTRODUCTION	4
1.1 PURPOSE OF THE DOCUMENT	4
1.2 BASIC DOCUMENTS	4
1.3 REFERENCE DOCUMENTS	4
1.4 ANNEXES	4
1.5 SCOPE	4
1.6 DEFINITIONS, SYMBOLS AND ABBREVIATIONS	4
1.7 KNOWN IMPERFECTIONS	5
2. ON-BOARD EQUIPMENT	5
3. LINES WITH AN EXTERNAL BORDER	6
3.1 WITH THE NETHERLANDS	6
3.1.1 L55	6
3.1.2 L12	6
3.1.3 L4	6
3.1.4 L19	6
3.1.5 L40	7
3.2 WITH GERMANY	8
3.2.1 L24	8
3.2.2 L37	8
3.3 WITH LUXEMBOURG	8
3.3.1 L42	8
3.3.2 L162	8
3.4 WITH FRANCE	8
3.4.1 165/1	8
3.4.2 165/2	8
3.4.3 L130A	8
3.4.4 L96	8
3.4.5 L1	8
3.4.6 L94	8
3.4.7 L75	8
4. TEST SCENARIOS	9
4.1 ESC_BORDERL40_1	9
4.1.1 Description	9
4.1.2 Scenario diagram	10
4.2 ESC_BORDERL40_2	11
4.2.1 Description	11
4.2.2 Scenario diagram	12
4.3 ESC_BORDERL40_3	13
4.3.1 Description	13
4.3.2 Scenario diagram	14

1. Introduction

1.1 Purpose of the document

The purpose of this document is to define the test scenarios to perform in order to prove the ETCS System Compatibility (ESC) between the On-board and the trackside at the Infrabel network borders. The success of these test scenarios shall prove the technical compatibility between ETCS On-board and the Trackside part ETCS of the CCS subsystems within the ETCS area on Infrabel network.

The technical specification for interoperability used for the border depends on the type program:

- Level 1 LS lines: [3], [4] and [5];
- Level 1 FS lines: [6] and [7];
- Level 2 FS lines: [8] and [9].

These test scenarios for ETCS system compatibility do not cover all design rules used in an ETCS area. If required, Infrabel can provide additional operational test scenarios performed during the verification that the trackside subsystem complies with the requirement of the TSI.

In case of doubt concerning the ESC of the board with the trackside, the railway undertaking shall take the required action with his supplier and inform Infrabel.

1.2 Basic documents

Ref.	Title	Owner
[1]	PSI (TC,ETCSsys,z) ESC TST PLN 1.4	Infrabel
[2]	Masterplan ETCS and IL 1.1 - Visie 2025 - Situatie ETCS	Infrabel

1.3 Reference documents

Title	Owner
[3] COMMISSION REGULATION (EU) 2016/919 of 27 May 2016	EU
[4] Corrigendum to Commission Regulation (EU) 2016/919 of 27 May 2016	EU
[5] COMMISSION IMPLEMENTING REGULATION (EU) 2019/776 of 16 May 2019	EU
[6] Commission Decision (EU) 2015/14 of 5 January 2015	EU
[7] Commission Regulation (EU) 2016/919 of 27 May 2016	EU
[8] Commission Decision (EU) 2012/88/EU of 25 January 2012	EU
[9] Commission Decision (EU) 2012/696/EU of 6 November 2012	EU

1.4 Annexes

Ref.	Title	Owner
[10]	None	

1.5 Scope

This document is applicable for all trains that would run under the protection of ETCS on an external border of the Infrabel network.

1.6 Definitions, symbols and abbreviations

CCS	Control Command System
DMI	Driver Machine Interface
ESC	ETCS System Compatibility
ETCS	European Train Control System
IBG	Infill Balise Group
LS	Limited Supervision

NR	Not Relevant
SBG	Signal Balise Group
TSI	Technical Specification for Interoperability
VBC	Virtual Balise Cover

1.7 *Known imperfections*

This document lists all international borders, but this version does not contain the test descriptions for all of them. It will be completed in next versions.

2. On-board Equipment

Out of scope of railway manager Infrabel.

3. Lines with an external border

3.1 *With the Netherlands*

3.1.1 L55

This border will be equipped with ETCS1 LS, test description to be defined.

3.1.2 L12

This line is equipped with ETCS2 FS at the Dutch border.

The transition to The Netherlands consists of two independent transitions:

- The first one is a transition from ETCS2 to level STM with the design used on the Belgian network. This transition tested in ESC_TR_13.
- The second transition is the STM-STM transition from MEMOR trackside to ATB trackside.

The transition to Belgium also consists of two transitions:

- The first one is a STM-STM transition from ATB trackside to MEMOR trackside.
- The second transition is a transition from STM to ETCS2 like the transition STM to ETCS2 used on the Belgian network (test case ESC_TR_16).

The only difference with the transition used in the Belgian network is the NID_C of the first balise groups. In the case of this border, the NID_C of the first BG's up to the SBG of the first Belgian signal is the Dutch one.

The two transitions are more than 5 km apart.

Those transitions do not require ESC tests.

3.1.3 L4

This border is equipped with ETCS2 on a high-speed line, test description to be defined.

3.1.4 L19

This border will be equipped with ETCS1 LS, test description to be defined.

3.1.5 L40

Line 40 is equipped with ETCS1 LS (and TBL1+) in Belgium and ATB (and crocodiles) in The Netherlands. The transition to ATB (and crocodiles) is like the transitions to STM used in Belgium, only the levels of the P41 is modified (Figure 1).

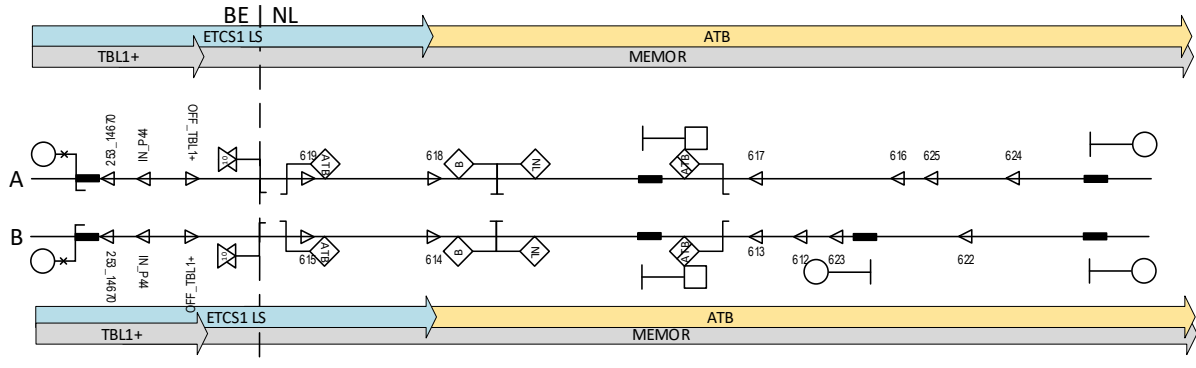


Figure 1 : L40 to The Netherlands

The transition to Belgium is composed of two transitions (Figure 2) :

- The first one is a transition to ETCS1 LS, sent with an ETCS1 LS MA and the ID of a virtual balise cover. This transition to ETCS1 LS is sent by M_VERSION 2 balises and shall be ignored by the Baseline 2 trains due to incompatible system versions.
- The transition to ETCS1 LS is followed by a transition to STM TBL1+. This second transition is ignored by Baseline 3 trains due to virtual balise covers and orders to Baseline 2 trains to changes to Level STM (TBL1+).

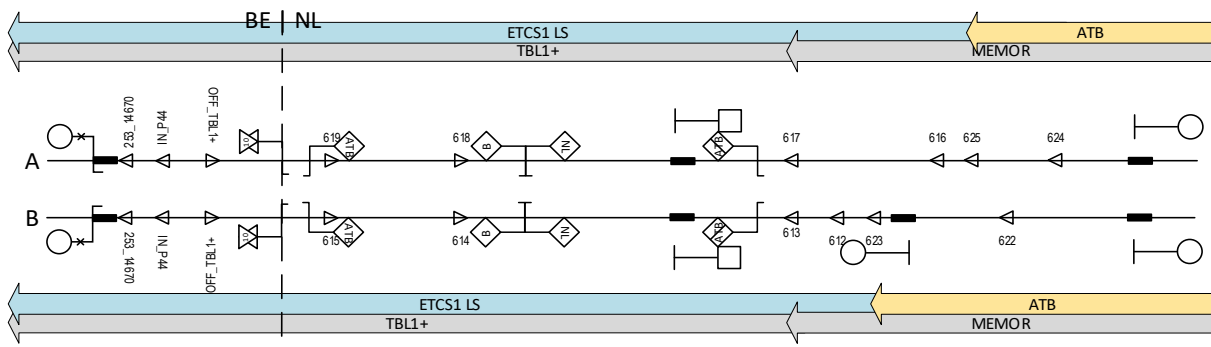


Figure 2 : L40 to Belgium

The border can be tested according to the test cases ESC_borderL40_1, ESC_borderL40_2 and ESC_borderL40_3 described in chapter 4.

3.2 *With Germany*

3.2.1 L24

This border will be equipped with ETCS1 FS, test description to be defined.

3.2.2 L37

This border will be equipped with ETCS1 FS, test description to be defined.

3.3 *With Luxembourg*

3.3.1 L42

This border is equipped with ETCS1 FS, test description to be defined.

3.3.2 L162

This border is equipped with ETCS1 FS, test description to be defined.

3.4 *With France*

3.4.1 165/1

This border is equipped with ETCS1 FS, test description to be defined.

3.4.2 165/2

This border is equipped with ETCS1 FS, test description to be defined.

3.4.3 L130A

This border will be equipped with ETCS1 LS, test description to be defined.

3.4.4 L96

This border will be equipped with ETCS1 LS, test description to be defined.

3.4.5 L1

Out of scope, this border is not equipped with ETCS.

3.4.6 L94

This border is equipped with ETCS1 FS, test description to be defined.

3.4.7 L75

This border will be equipped with ETCS1 FS, test description to be defined.

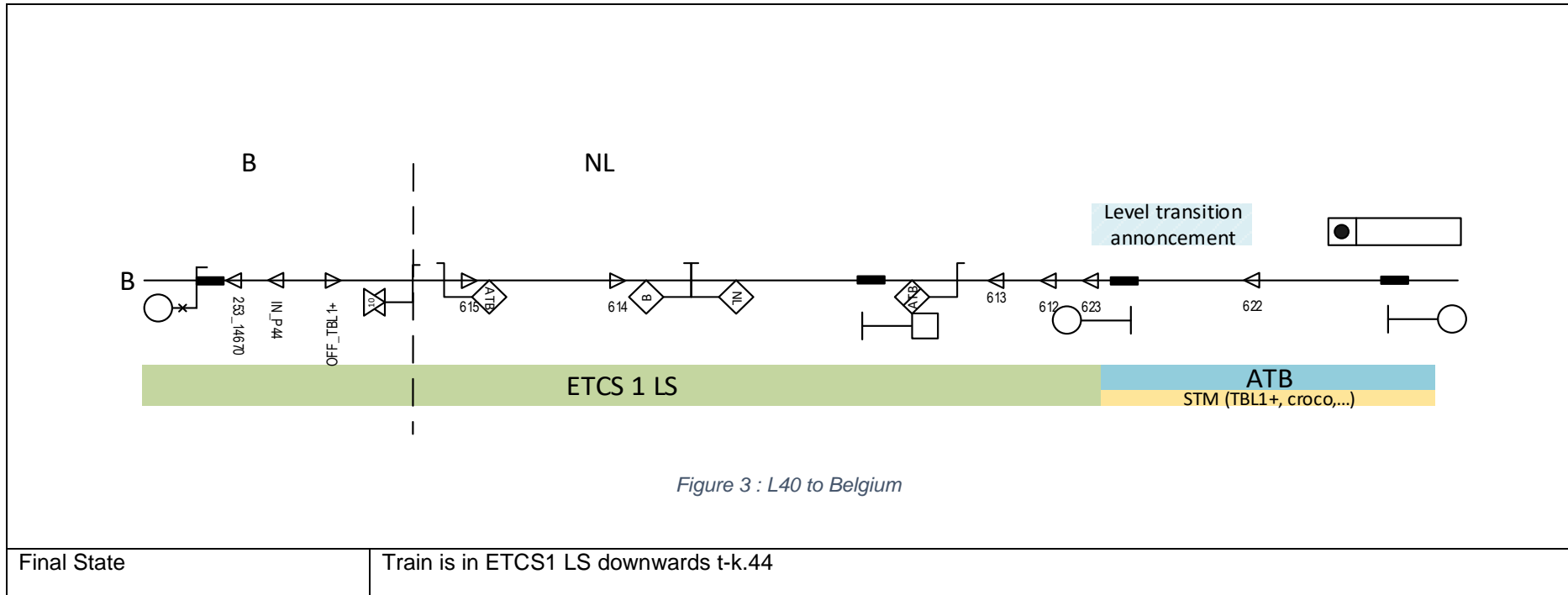
4. Test scenarios

4.1 ESC_BorderL40_1

4.1.1 Description

ID	Date	Location / Line		
	<dd/mm/yyyy>	Line 40		
Description	Transition to ETCS1 LS for Baseline 3 train. This test is not applicable to Baseline 2 trains for which ESC_BorderL40_2 is applicable.			
Signal passed				
Name	Trackside datafile in service			
(NL) 905 is open				
(B) t-k.44 is open				
(B) T-K.44 is closed				
Test Scenarios				
Starting condition	Train is in the station of Eijsden in the STM mode used on the Dutch side of the border.			
	Be sure all authorisations are filled in before performing the test scenarios			
Sequences of the test scenario				
Step	Step description	Description of what to be tested	Statement	Comment
1	Train starts in direction of Belgium and approaches signal 905.	Train receives a level transition announcement to Level 1.	Pass / Fail	
2	Driver acknowledges the level transition. Train passes signal 905.	Train changes to ETCS1 LS mode.	Pass / Fail	
3	Train passes independent warning signal t-k.44.	LSSMA 0 is displayed on the DMI.	Pass / Fail	
Test scenario finished				

4.1.2 Scenario diagram

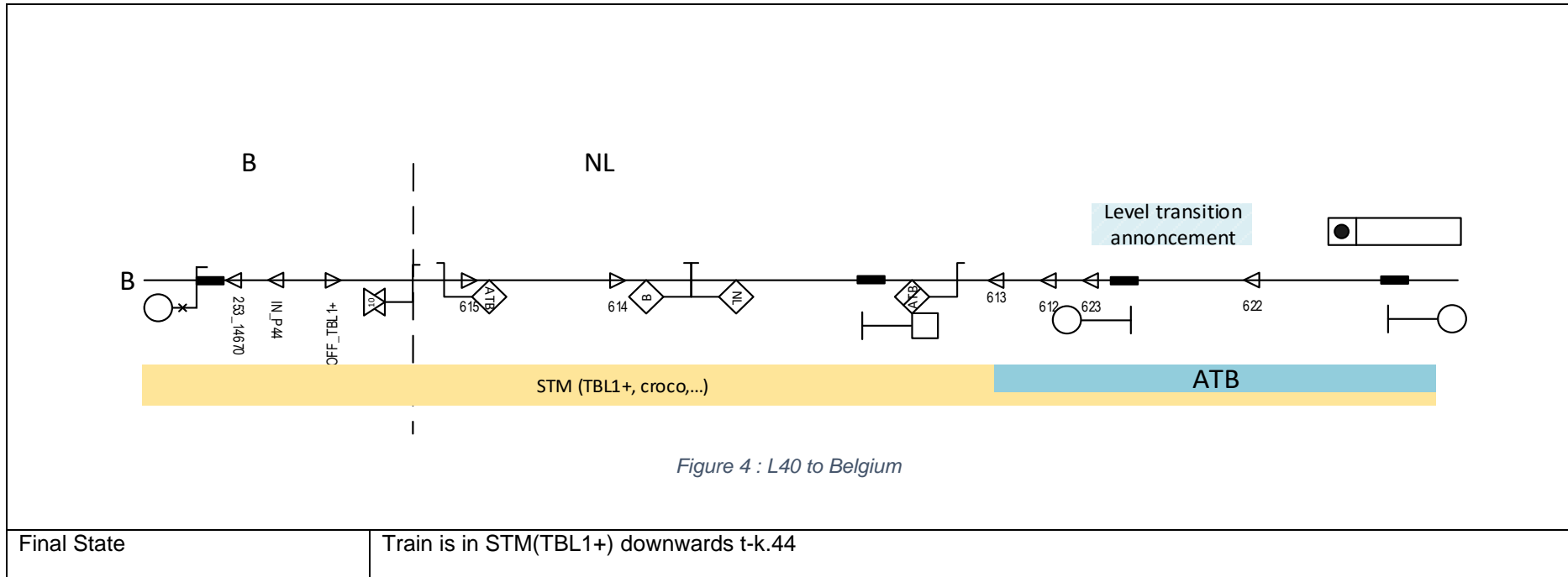


4.2 ESC_BorderL40_2

4.2.1 Description

ID	Date	Location / Line		
	<dd/mm/yyyy>	Line 40		
Description	Transition to STM (TBL1+) for Baseline 2 trains. This test is not applicable to Baseline 3 trains for which ESC_BorderL40_1 is applicable.			
Signal passed				
Name	Trackside datafile in service			
(NL) 905 is open				
(B) t-k.44 is open				
(B) T-K.44 is closed				
Test Scenarios				
Starting condition	Train is in the station of Eijsden in the STM mode used on the Dutch side of the border.			
	Be sure all authorisations are filled in before performing the test scenarios			
Sequences of the test scenario				
Step	Step description	Description of what to be tested	Statement	Comment
1	Train starts in direction of Belgium and approaches signal 905.	No expected reaction.	Pass / Fail	
2	Train passes signal 905.	Train receives a level transition announcement to Level STM TBL1+.	Pass / Fail	
3	Driver acknowledges the level transition.	Train changes to level STM TBL1+.	Pass / Fail	
4	Train passes independent warning signal t-k.44.	Yellow lamp lights up.	Pass / Fail	
Test scenario finished				

4.2.2 Scenario diagram



4.3 **ESC_BorderL40_3**

4.3.1 **Description**

ID		Date			Location / Line	
		<dd/mm/yyyy>			L40	
Description		Transition to STM (ATB) on line 40				
Signal passed						
Name				Trackside datafile in service		
S.K-44 is open.						
Test Scenarios						
Starting condition		Train is in ETCS1 LS for B3 trains or in STM(TBL1+) for B2 trains.				
		Be sure all authorisations are filled in before performing the test scenarios				
Sequences of the test scenario						
Step	Step description	Description of what to be tested	Statement	Comment		
1	Train passes the ATB announcement panel.	Train receives a level transition announcement to STM.	Pass / Fail			
2	Train approaches the change of lateral signaling panel.	Train changes to level STM (ATB) if equipped or an STM reading crocodiles otherwise.	Pass / Fail			
Test scenario finished						

4.3.2 Scenario diagram

