Train Control
ETCS sys

ETCS System Compatibility
Dutch Borders

Document Management

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History

Author	Version	Date	§ Adapted	Reason
T. Destrée	1.1 draft 1	19/0/2022	/	Creation of the document based on PSI (TC, ETCSsys,z) Borders ESC TST DSC 1.2
T. Destrée	1.1	12/09/2022		Major version

Abrogated documents

Name	Version	Date

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1. Introduction

1.1 *Purpose of the document*

The purpose of this document is to define the test scenarios to perform to prove the ETCS System Compatibility (ESC) between the On-board and the trackside at the Infrabel network borders with The Netherlands.

This document is an annexe of [3].

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]	PSI (TC, ETCSsys,z) Borders ESC TST DSC 1.3	Infrabel
[4]	TD/011REC1028	ERA

1.4 *Annexes*

None

1.5 *Scope*

This document is applicable for all trains that would run under the protection of ETCS on lines close to borders of the Infrabel network with The Netherlands.

1.6 *Definitions, symbols and abbreviations*

DMI	Driver Machine Interface
ESC	ETCS System Compatibility
ETCS	European Train Control System
LS	Limited Supervision
SBG	Signal Balise Group

1.7 *Known imperfections*

This version does not contain the test descriptions for lines 19 and 55. Descriptions and tests for those lines will be completed in future releases.

2. On-board Equipment

Out of scope of railway manager Infrabel.

3. Lines crossing the Dutch border

3.1 *L4*

This border is equipped with ETCS2 on a high-speed line. This transition is covered by the Dutch ESC tests [4]: test cases defined for ESC type ESC-NL-21 (ESC type "ERTMS track HSL-South border Belgium").

3.2 *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 is tested in test case ESC_TR_13 (See [1]).
- The second transition is the STM-STM transition from MEMOR trackside to ATB trackside (see remark below).

The transition to Belgium also consists of two transitions:
- The first one is a STM-STM transition from ATB trackside to MEMOR trackside (see remark below).
- The second transition is a transition from level STM to ETCS2 with the design used on the Belgian network. This transition is tested in test case ESC_TR_16 (See [1]).
  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 and considered independent.

Remark:
The STM-STM transitions involving ATB and MEMOR are covered by the Dutch ESC tests [4] : test cases defined for ESC type ESC-NL-09 (ESC type "Class B track border Belgium").

3.3 *L19*

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

3.4 *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).
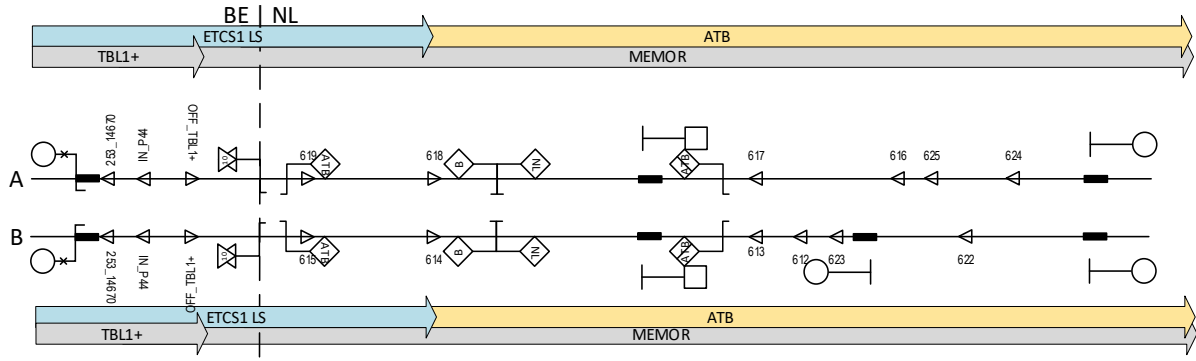

Figure 1 : L40 to The Netherlands

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+).
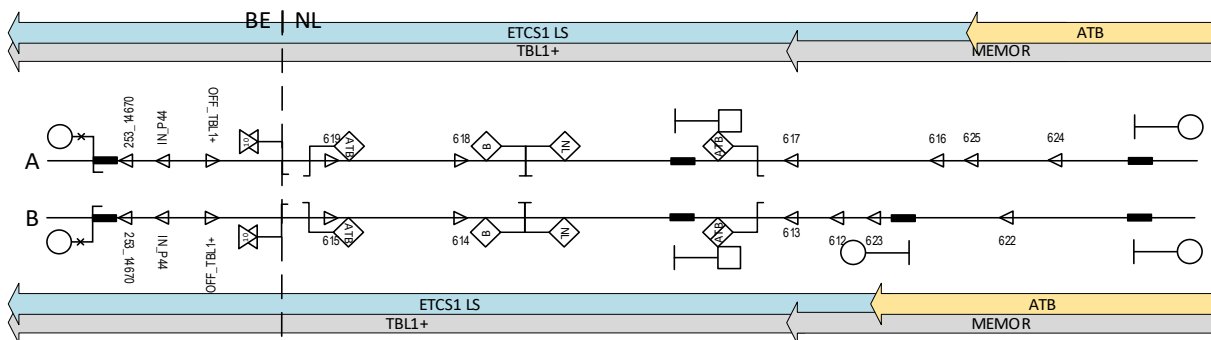
Figure 2 : L40 to Belgium

A specific test case should check also the degraded situation in case the ATB announcement BG is missed e.g. due to balise group failure or reversing between the announcement (A-BG, 428_619 or 428_615) and execution BG (E-BG, 428_618 or 428_614) of the transition to ATB (See ESC_BorderL40_4).

The border can be tested according to the test cases ESC_borderL40_1, ESC_borderL40_2, ESC_borderL40_3 and ESC_BorderL40_4 described in chapter 4.

3.5 *L55*

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

4. Test scenarios

4.1 *ESC_BorderL40_1*

4.1.1 Description

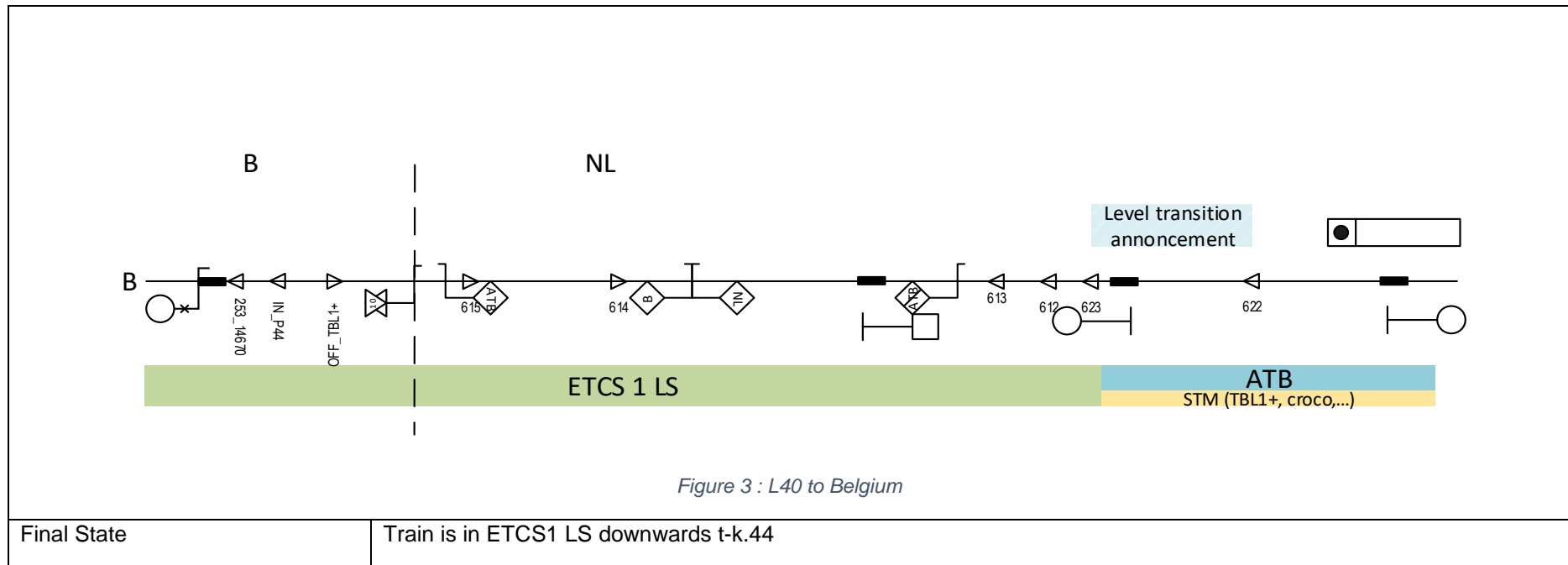| ID		Location / Line
	<dd/mm/yyyy>	Line 40
Description	Transition to ETCS1 LS **for Baseline 3 train** (From the Netherlands to Belgium) This test is not applicable to Baseline 2 trains for which ESC_BorderL40_2 is applicable.	
Signal passed		
Name		Trackside datafile in service
(NL) 905 is open		
(B) t-k.44 is open		
(B) T-K.44 is closed		
Test Scenarios		
Starting condition	Train is in the station of Eijsden in the level NTC mode SN used on the Dutch side of the border. Allowed NTC's are ATB, TBL1+, TBL2, TBL1. Memor, KVB.	
	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 passes the announcement BG 428_622.	a. DMI announces a level transition to Level 1. b. Train remains in level NTC. c. No brakes are applied.	Pass / Fail	
2	Train front end passes start of level acknowledgement window.	DMI shows level acknowledgement request.	Pass / Fail	
3	Driver acknowledges the level transition.	Train remains in level NTC.	Pass / Fail	
4	Train passes execution BG 428_623.	a. Train changes to level 1, mode LS. b. No brakes are applied.	Pass / Fail	

PSI (TC,ETCSsys,z) Borders ESC TST DSC NL 1.1 E.docx

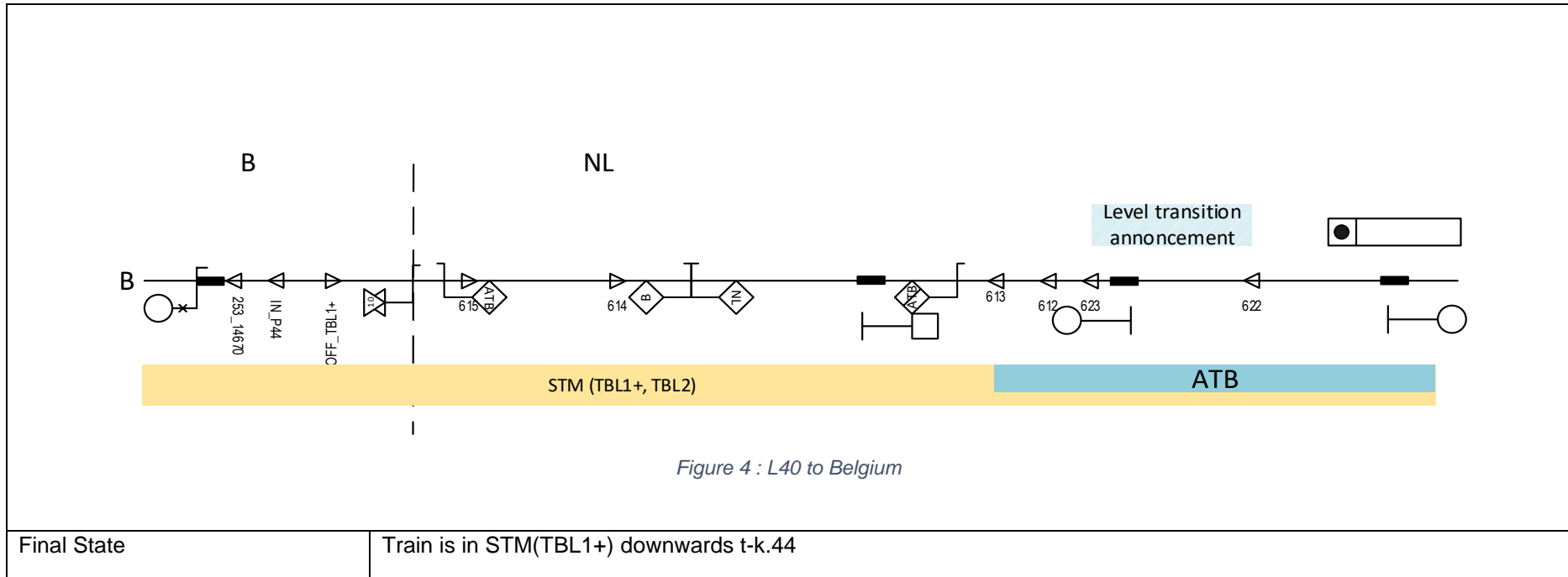| 5	Train continues toward Visé and passes BGs : • 428_612 • 428_613 • 428_614 • 428_615	a. Train remains in level 1 mode LS. b. No brakes are applied.	Pass / Fail	
6	Train passes independent warning signal t-k.44.	a. LSSMA 0 is displayed on the DMI. b. modem is registered to the Belgian network c. no brakes are applied	Pass / Fail	
Test scenario finished				

4.1.2 Scenario diagram

Figure 3 : L40 to Belgium

Final State	Train is in ETCS1 LS downwards t-k.44

4.2 ESC_BorderL40_2

4.2.1 Description

ID	Date		Location / Line
	<dd/mm/yyyy>		Line 40
Description	Transition to STM_YYY **for Baseline 2 trains** (From the Netherlands to Belgium). STM_XXX is the STM used in The Netherlands. It could be ATB, TBL1+, TBL2, TBL1. Memor, KVB. STM_YYY is the STM used in Belgium. It should be TBL1+ (or TBL2 if TBL1+ onboard is activated by TBL2 STM). 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 passes BG's : 428_622 and 428_623 with M_VERSION 2.0.	a. Train remains in level STM mode SN, STM_XXX. b. No brakes are applied	Pass / Fail	
2	Train passes announcement BG 428_612.	a. DMI announces a level transition to Level STM_YYY (unless train already is in STM_YYY) b. No brakes are applied.	Pass / Fail	

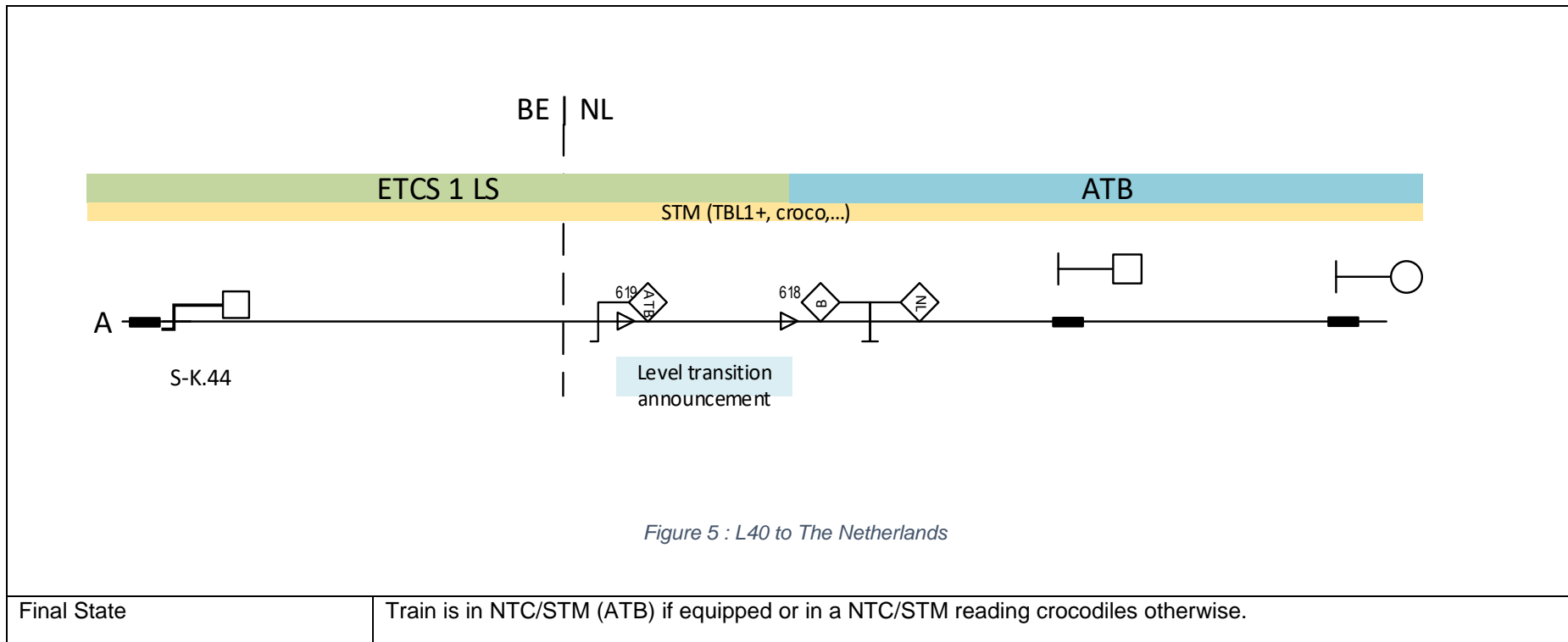|				
		c. Data to be used by applications outside ERTMS/ETCS is forwarded to the relevant system. d. National Values for braking curves are discarded; other information of the balise groups shall be considered		
3	Train front end passes the start of level acknowledgement window.	DMI shows level acknowledgement request. (unless train already is in STM_YYY)	Pass / Fail	
4	Driver acknowledges the level transition.	No reaction, train remains in level STM mode SN.	Pass / Fail	
5	Train passes the execution BG 428_613.	a. Train changes to level STM_YYY (unless train already was in STM_YYY in previous steps). b. No brakes are applied. c. Data to be used by applications outside ERTMS/ETCS is forwarded to the relevant system. d. National Values for braking curves are discarded; other information of the balise groups shall be considered	Pass / Fail	
6	Train continues toward Visé and passes BGs : • 428_614 • 428_615	a. DMI shows mode remaining level STM_YYY mode SN b. No brakes are applied.	Pass / Fail	
7	Train passes independent warning signal t-k.44.	a. Yellow lamp lights up. b. modem is registered to the Belgian network c. no brakes are applied d. DMI shows mode remaining level STM_YYY mode SN	Pass / Fail	
Test scenario finished				

4.2.2   Scenario diagram

Figure 4 : L40 to Belgium

Final State	Train is in STM(TBL1+) downwards t-k.44

4.3 *ESC_BorderL40_3*

4.3.1 Description

ID		Date		Location / Line
		<dd/mm/yyyy>		L40
Description		Transition to STM_XXX on line 40 (From Belgium to the Netherlands) STM_XXX is the NTC/STM used in The Netherlands. It could be in order of priority ATB, TBL1+, TBL2, TBL1. Memor, KVB.		
Signal passed				
Name			Trackside datafile in service	
S.K-44 is open.				
Test Scenarios				
Starting condition		Train is in order of priority: 1. In ETCS1 LS for B3 trains 2. in STM(TBL1+) for B2 trains equipped with TBL1+ STM 3. In STM(TBL2) for B2 trains using STM TBL2 to activate TBL1+ onboard.		
		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 runs from Belgium towards the Netherlands.	No reaction expected.	Pass / Fail	
2	Train passes the ATB announcement BG 428_619.	a. DMI announces a level transition to Level NTC/STM (STM_XXX) unless train already is in STM_XXX. b. Train remains in initial level and mode. c. No brakes are applied. d. National Values for braking curves are discarded by baseline 2 trains; other	Pass / Fail	

		information of the balise groups shall be considered		
3	Train front end passes the start of level acknowledgement window.	DMI shows level acknowledgement request (unless train already is in STM_XXX)	Pass / Fail	
4	Driver acknowledges the level transition.	Train remains in initial level and mode.	Pass / Fail	
5	Train passes the execution BG 428_618.	a. Train changes to Level NTC/STM (STM_XXX) unless train already is in STM_XXX b. No brakes are applied. c. Data to be used by applications outside ERTMS/ETCS is forwarded to the relevant system.	Pass / Fail	
6	Train passes BG 428_617.	a. modem is registered to the Dutch network b. DMI shows mode remaining level NTC/STM mode SN (STM_XXX) c. No brakes are applied.	Pass / Fail	
7	Train passes Network registration BG 428_616	a. no brakes are applied b. DMI shows mode remaining mode SN	Pass / Fail	
8	Train passes BG's 428_625 and 428_624.	a. no brakes are applied b. DMI shows mode remaining mode SN	Pass / Fail	
Test scenario finished				

4.3.2   Scenario diagram

BE | NL

ETCS 1 LS

ATB

STM (TBL1+, croco,...)

A

S-K.44

619   ATB

618   B   NL

Level transition
announcement

Figure 5 : L40 to The Netherlands

Final State	Train is in NTC/STM (ATB) if equipped or in a NTC/STM reading crocodiles otherwise.

4.4 *ESC_BorderL40_4*

4.4.1 Description

ID		Date	Location / Line
		<dd/mm/yyyy>	L40
Description		Transition from Level 1 LS / STM_YYY to NTC/STM (STM_XXX) without announcement. (From Belgium to The Netherlands) STM_XXX is the NTC/STM used in The Netherlands. It could be ATB, TBL1+, TBL2, TBL1. Memor, KVB. STM_YYY is the STM used in Belgium. It should be TBL1+ (or TBL2 if TBL1+ onboard is activated by TBL2 STM).	
Signal passed			
Name			Trackside datafile in service
S.K-44 is open.			
Test Scenarios			

Starting condition		Train is in order of priority:
		   1. In ETCS1 LS for B3 trains
		   2. in STM(TBL1+) for B2 trains equipped with TBL1+ STM
		   3. In STM(TBL2) for B2 trains using STM TBL2 to activate TBL1+ onboard..	

		Train is at standstill downwards the ATB announcement BG (428_619).	
		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	Driver performs a start of mission without changing level or type of STM.	Trains is in level 1 SR, STM (TBL1+) or STM (TBL2).	Pass / Fail	
2	Train runs and passes execution of the transition BG 428_618.	a. DMI shows level changes to Level NTC/STM (STM_XXX) unless if onboard without STM (ATB) and in Level STM (TBL1+ or TBL2). b. DMI shows mode is mode SN c. DMI shows level acknowledgement request	Pass / Fail	

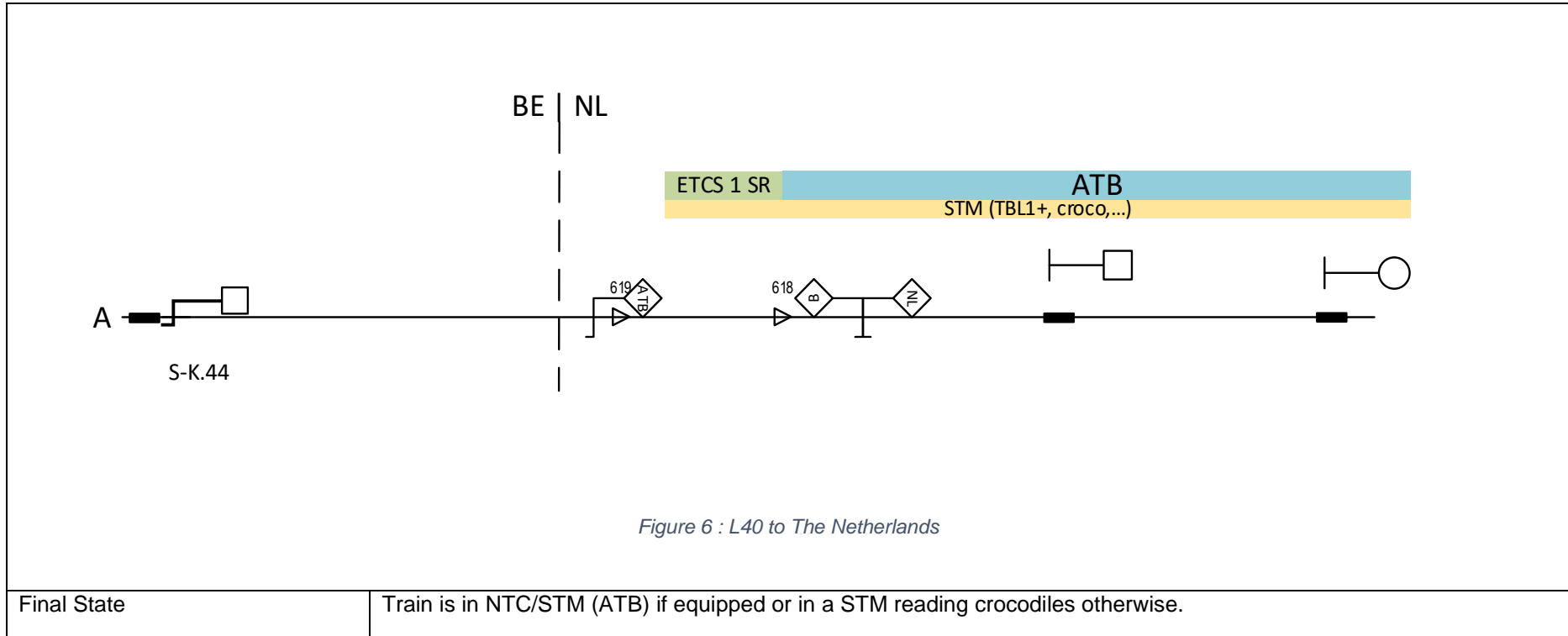| 3	Driver acknowledges level transition within 5 seconds after passing transition location.	No brakes are applied.	Pass / Fail	
4	Train passes BG 428_617.	a. modem is registered to the Dutch network b. DMI shows mode remaining level STM_XXX mode SN c. No brakes are applied.	Pass / Fail	
5	Train passes Network registration BG 428_616	a. no brakes are applied b. DMI shows mode remaining mode SN	Pass / Fail	
6	Train passes BG's 428_625 and 428_624.	a. no brakes are applied b. DMI shows mode remaining mode SN	Pass / Fail	
Test scenario finished				

4.4.2 Scenario diagram

Figure 6 : L40 to The Netherlands

Final State	Train is in NTC/STM (ATB) if equipped or in a STM reading crocodiles otherwise.