

Train protection ETCS system ETCS 1 Limited Supervision ETCS System Compatibility Test Description

Document Management

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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 in order to:

- prove the ETCS System Compatibility (ESC) between the trackside ETCS Level 1 mode Limited supervision and the On-board.
- prove the On-board equipment reads and reacts according to the TBL1+ information given by the trackside.

The tests scenarios describe more in detail each “high level” scenarios defined in the ESC test plan[1].

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 1 LS area on Infrabel conventional network.
- the technical compatibility between On-board baseline 3 and the Trackside part NTC TBL1+.

The technical specification for interoperability used inside an ETCS 1 LS area on Infrabel network is TSI 2016/919 [2] and corrigendum [3], set of specification #3 with system version 2.0.

To allow the standalone TBL1+ and ETCS Baseline 2 On-board to run on the ETCS 1 LS infrastructure, the CR1338 is not implemented. The structure of the P44 is compliant with the TBL1+ and ETCS baseline 2 specifications.

These test scenarios for ETCS system compatibility do not cover all design rules used in an ETCS 1 LS 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 [2]&[3].

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	Infrabel

1.3 Reference documents

Ref.	Title	Owner
[2]	COMMISSION REGULATION (EU) 2016/919 of 27 May 2016	UE
[3]	Corrigendum to Commission Regulation (EU) 2016/919 of 27 May 2016	UE
[4]	COMMISSION IMPLEMENTING REGULATION (EU) 2019/776 of 16 May 2019	UE

1.4 Annexes

Ref.	Title	Owner
[5]	Document	Owner

1.5 Scope

This document is applicable for all trains would run under the protection of ETCS level 1 mode Limited Supervision in an ETCS 1 LS area on the Infrabel conventional network.

The tested functionalities are described in the table here under:

Test scenario (ref ESC TST PLN [1])	Tested functionality

ESC_L1LS_1	Override of a closed main stop signal without application of the override procedure
ESC_L1LS_2	Override of a closed main stop signal with application of the override procedure
ESC_L1LS_3	Reception of a packet 44 by a Baseline 3 train in level NTC (CR1338 non implemented)
ESC_TR_11	Transition ETCS 1 LS to STM TBL1+
ESC_TR_14	Transition STM TBL1+ to ETCS 1 LS
ESC_TR_1	Transition ETCS 1 FS to ETCS 1 LS
ESC_TR_3	Transition ETCS 1 LS to ETCS 1 FS

Some other functionalities are also verified during these scenarios:

- Display of the LSSMA at double yellow aspect (ESC_L1LS_1)
- Display of the release speed (ESC_L1LS_1)

The functionalities in the table here under are not yet described, see 1.7.

Test scenario (ref ESC TST PLN [1])	Tested functionality
ESC_TR_2	Transition ETCS 2 FS to ETCS 1 LS
ESC_TR_4	Transition ETCS 1 LS to ETCS 2 FS

The document will only describes the sequences to perform the scenarios but not all the actions to prepare the execution of the test scenarios.

1.6 Definitions, symbols and abbreviations

1.6.1 Definitions

/

1.6.2 Symbols

/

1.6.3 Abbreviations

CCS	Control Command System
DMI	Driver Machine Interface
ESC	ETCS System Compatibility
ETCS	European Train Control System
LGLJM	Reminder Yellow lamp
LS	Limited Supervision
TSI	Technical Specification for Interoperability
2Y	Aspect wo yellow displayed by the signal
RNP	Aspect Red not permissive displayed by the signal

1.7 Known imperfections

Test scenarios listed below can be performed with electrical trains when an infrastructure (trackside) will be available.

Some ETCS transitions scenarios will be only described when an infrastructure (trackside) will be available.

2. On-board Equipment

Out of scope of railway manager Infrabel.

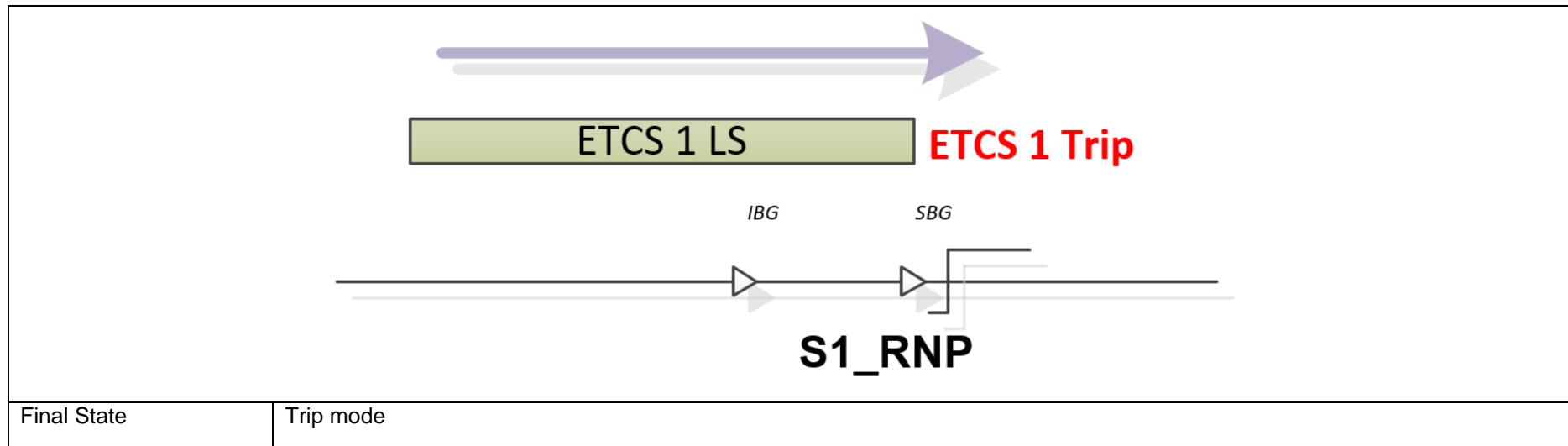
3. Test scenarios

3.1 Test ESC_L1LS_1: Crossing a closed non-permissive signal in LS without prior override

3.1.1 Description

ID		Date	Location / Line	
ESC_L1LS_1		dd/mm/yyyy	<Line>	
Description		Functionality tested : - Override of a closed non-permissive main stop signal without application of the override procedure.		
Signal passed				
Name		Trackside datafile in service		
S1_RNP : <Signal name with aspect RNP>				
Test Scenarios				
Starting condition		Level 1		
		Mode : Limited Supervision		
		National Values ETCS 1 LS used by the train		
		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	Overpassing the closed signal S1_RNP without application of the override procedure.	When overpassing S1_RNP , the train transits to trip mode and stops.	Pass / Fail	
Test scenario ESC_L1LS_1 finished				

3.1.2 Scenario diagram

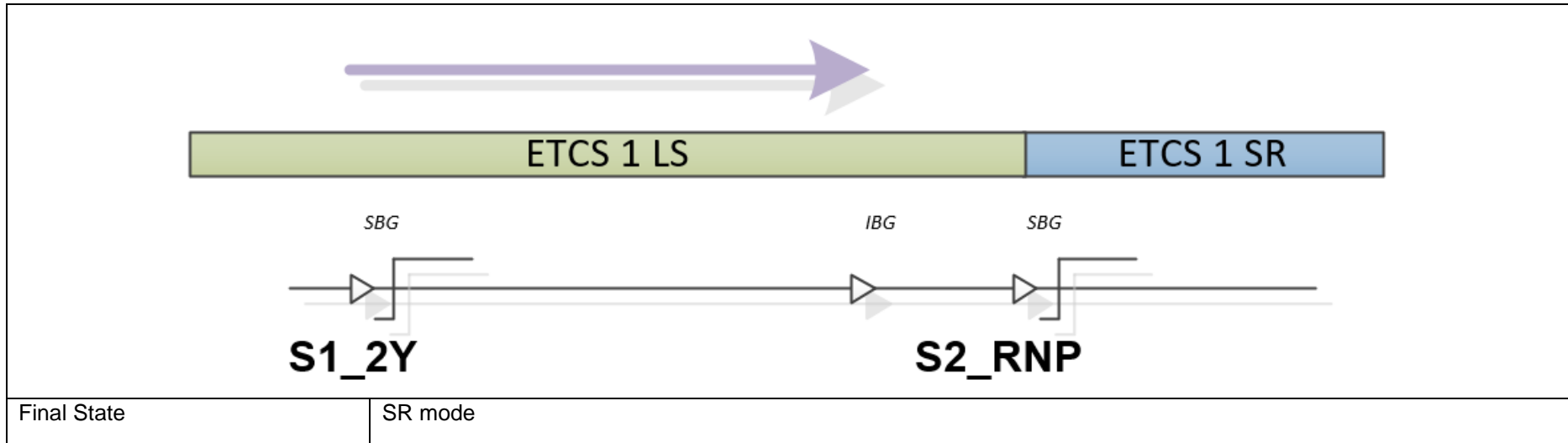


3.2 Tests ESC_L1LS_2: Crossing a closed non-permissive signal in LS with prior override

3.2.1 Description

ID		Date		Location / Line	
ESC_L1LS_2		<dd/mm/yyyy>		<Line>	
Description		Functionalities tested : - Display of the LSSMA at double yellow aspect - Display of the release speed - Override of a closed non-permissive main stop signal with application of the override procedure.			
Signal passed					
Name			Trackside datafile in service		
S1_2Y : <Signal name with aspect 2Y>					
S2_RNP : <Signal name with aspect RNP>					
Test Scenarios					
Starting condition		ETCS Level 1			
		Mode : Limited Supervision			
		National Values ETCS 1 LS used by the train			
		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	Overpassing of the signal S1_2Y with double yellow aspect	When the signal is overpassed, LSSMA (0) is displayed on the DMI	Pass / Fail		
2	Approaching of the signal S2_RNP with red not permissive aspect.	The release speed is displayed on the DMI.	Pass / Fail		
3	Overpassing of the closed signal S2_RNP with application of the override procedure.	Start the override procedure, the train is in Staff Responsible mode and overpasses the closed signal. When reading the SBG of S2_RNP , the train keeps on proceeding in SR.	Pass / Fail		
Test scenario ESC_L1LS_2 finished					

3.2.2 Scenario diagram

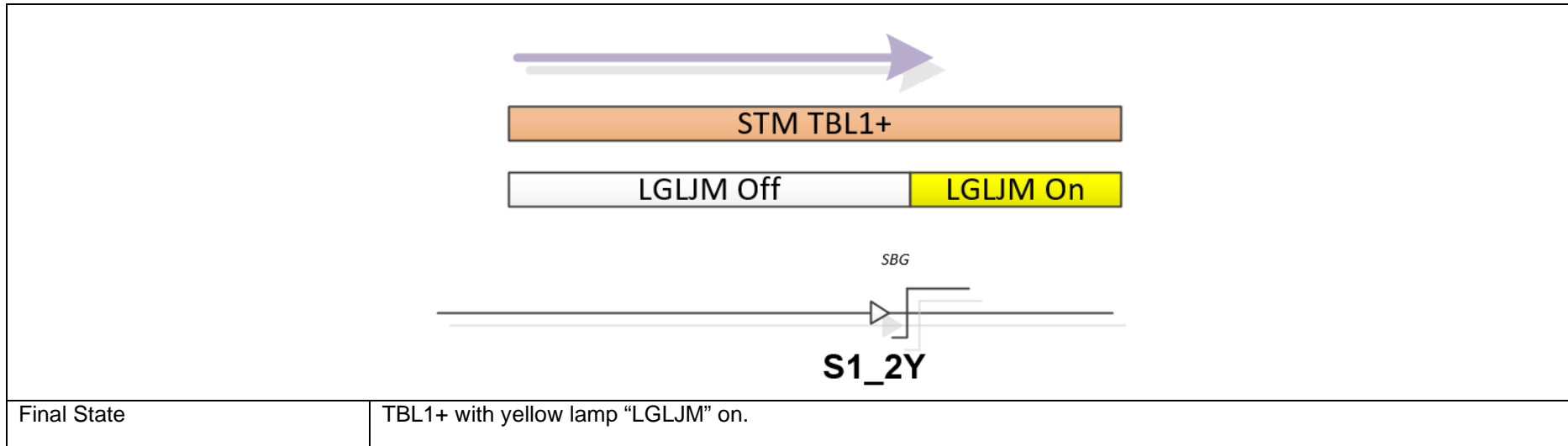


3.3 Tests ESC_L1LS_3: Reception of a packet 44 by a Baseline 3 train in level NTC (CR1338 non implemented)

3.3.1 Description

ID		Date		Location / Line	
ESC_L1LS_3		<dd/mm/yyyy>		<Line>	
Description		Functionalities tested : - Baseline 3 On board equipment reads and reacts according to TBL1+ information given by a baseline 3 infrastructure . (P44 designed according to TBL1+ and baseline 2 specifications)			
Signal passed					
Name			Trackside datafile in service		
S1_2Y : <Signal name with aspect 2Y>					
Test Scenarios					
Starting condition		NTC Level			
		TBL1+			
		Yellow lamp "LGLJM" off			
		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	Overpassing of the signal S1_2Y with double yellow aspect	When the signal is overpassed, the TBL1+ yellow lamp is lit on board.		Pass / Fail	
Test scenario ESC_L1LS_3 finished					

3.3.2 Scenario diagram

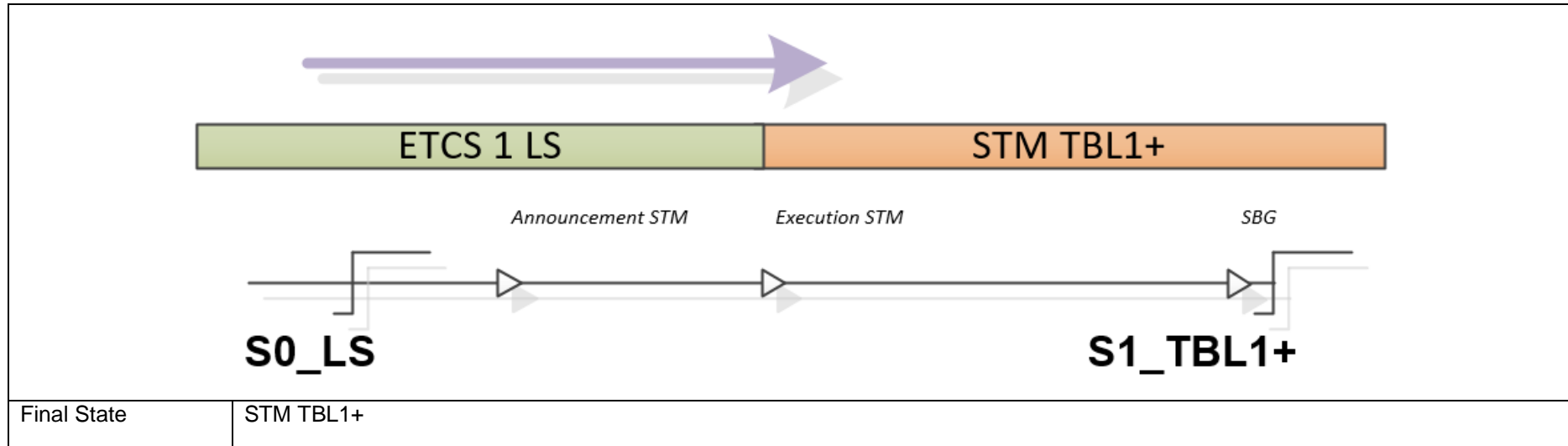


3.4 Test ESC_TR_11: Transition ETCS 1 LS to STM TBL1+

3.4.1 Description

ID	Date	Location / Line		
ESC_TR_11	dd/mm/yyyy	<Line>		
Description	Functionality tested : - Transition ETCS 1 LS to TBL1+			
Signal passed				
Name	Trackside datafile in service			
S0_LS : <Last Signal in ETCS 1 LS				
S1_TBL1+ : <First signal equipped with TBL1+ only>				
Test Scenarios				
Starting condition	ETCS Level 1			
	Mode : Limited Supervision			
	National Values ETCS 1 LS used by the train			
	Train overpasses signal S0_LS in ETCS 1 LS			
	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	In front of S1_TBL1+ reception of the announcement of the level transition	The announcement is displayed on the screen with a sound and the driver shall acknowledge the transition;	Pass / Fail	
2	In front of S1_TBL1+ , the execution of the transition occurs	The train proceed his movement in STM TBL1+ just before and after overpassing S1_TBL1+ .	Pass / Fail	
Test scenario ESC_TR_11 finished				

3.4.2 Scenario diagram

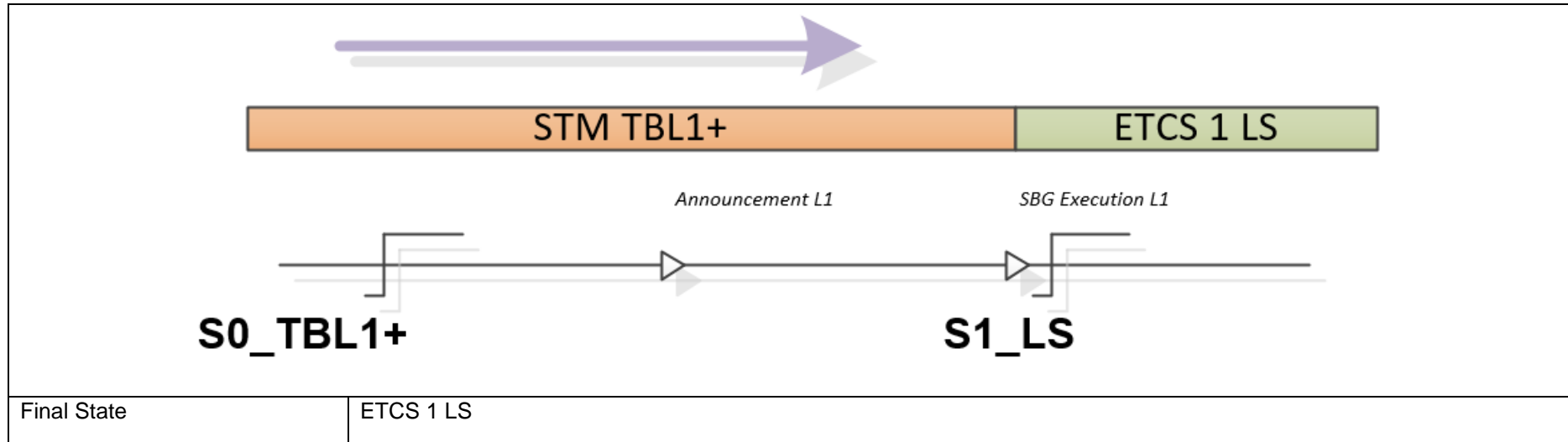


3.5 ESC_TR_14 : Transition STM TBL1+ to ETCS 1 LS

3.5.1 Description

ID		Date		Location / Line	
ESC_TR_14		<dd/mm/yyyy>		<Line>	
Description		Functionalities tested : - Transition STM TBL1+ to ETCS 1 LS			
Signal passed					
Name			Trackside datafile in service		
S0_TBL1+ : <Last Signal in TBL1+>					
S1_LS : <First transition Signal in ETCS 1 LS>					
Test Scenarios					
Starting condition		STM TBL1+			
		Train overpasses signal S0_TBL1+ in STM TBL1+			
		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	In front of S1_LS , reception of the announcement of the transition to Level 1 ETCS	The message is displayed on the DMI with a sound and the driver shall acknowledge the transition message	Pass / Fail		
2	In front of S1_LS , the execution of the level transition occurs, and the driver shall acknowledge the Limited supervision mode	The message for the transition to Limited supervision is displayed on the DMI with a sound and the driver shall acknowledge the message	Pass / Fail		
Test scenario ESC_TR_14 finished					

3.5.2 Scenario diagram

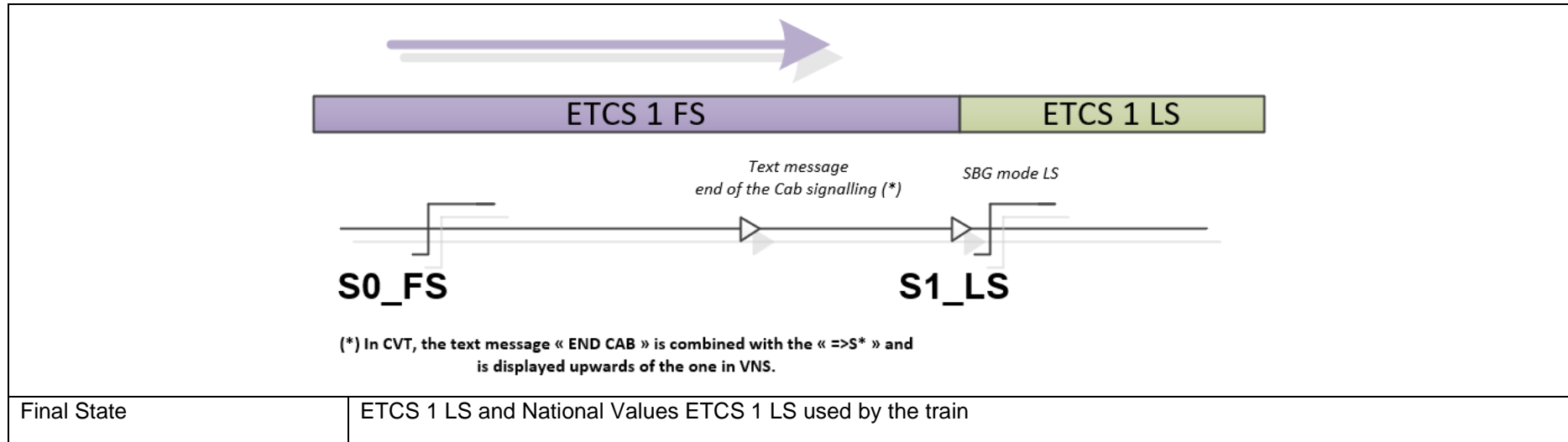


3.6 ESC_TR_1 : Transition ETCS 1 FS to ETCS 1 LS

3.6.1 Description

ID		Date		Location / Line	
ESC_TR_1		<dd/mm/yyyy>		<Line>	
Description		Functionalities tested : - Transition ETCS 1 FS to ETCS 1 LS			
Signal passed					
Name			Trackside datafile in service		
S0_ETCS 1 FS : <Last Signal in ETCS 1 FS>					
S1_LS : <First transition Signal in ETCS 1 LS>					
Test Scenarios					
Starting condition		ETCS Level 1			
		Mode : Full Supervision			
		National Values ETCS 1 FS used by the train			
		Train overpasses signal S0_ETCS 1 FS in ETCS 1 FS			
		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	Upwards of S1_LS , reception of the text message "END CAB" when driving in VNS or "END CAD =>S*" when driving in CVT.	The message is displayed on the DMI with a sound and the driver shall acknowledge the message used to inform the driver the end of the cab signalling.	Pass / Fail		
2	In front of S1_LS , the execution of the level transition occurs, and the driver shall acknowledge the Limited supervision mode	The message for the transition to Limited supervision is displayed on the DMI with a sound and the driver shall acknowledge the message	Pass / Fail		
Test scenario ESC_TR_1 finished					

3.6.2 Scenario diagram



3.7 Test ESC_TR_3: Transition ETCS 1 LS to ETCS 1 FS

3.7.1 Description

ID		Date	Location / Line	
ESC_TR_3		dd/mm/yyyy	<Line>	
Description		Functionality tested : - Transition ETCS 1 LS to ETCS 1 FS		
Signal passed				
Name		Trackside datafile in service		
S0_LS : <Last Signal in ETCS 1 LS				
S1_FS : <First signal equipped with ETCS 1 FS>				
Test Scenarios				
Starting condition		ETCS Level 1		
		Mode : Limited Supervision		
		National Values ETCS 1 LS used by the train		
		Train overpasses signal S0_LS in ETCS 1 LS		
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	Upwards of the S1_FS	The train proceed his movement in Level 1 mode Limited Supervision	Pass / Fail	
2	When overpassing S1_FS , the driving mode changes	The driving mode of the train changes directly to mode Full Supervision.	Pass / Fail	
Test scenario ESC_TR_3 finished				

3.7.2 Scenario diagram

