

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

**Document Management**

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T. Bastin	1.2	07/01/2021	/	Document release

**Abrogated documents**

Name	Version	Date

**Distribution of the document**

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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 describes 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

<b>Ref.</b>	<b>Title</b>	<b>Owner</b>
[1]	PSI (TC,ETCSsys,z) ESC TST PLN	Infrabel

## 1.3 Reference documents

<b>Ref.</b>	<b>Title</b>	<b>Owner</b>
[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

<b>Ref.</b>	<b>Title</b>	<b>Owner</b>
[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 <b>without</b> application of the override procedure
ESC_L1LS_2	Override of a closed main stop signal <b>with</b> 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

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_1	Transition ETCS 1 FS to ETCS 1 LS
ESC_TR_2	Transition ETCS 2 FS to ETCS 1 LS
ESC_TR_3	Transition ETCS 1 LS to ETCS 1 FS
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.

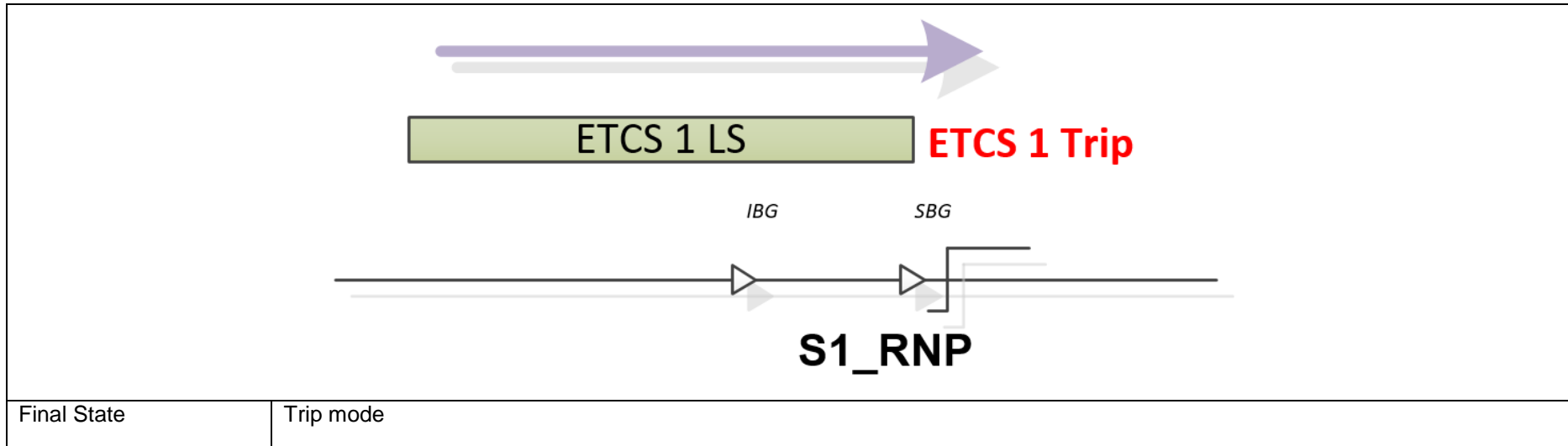
### 3. Test scenarios

#### 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 <b>without</b> application of the override procedure.		
Signal passed				
Name		Trackside datafile in service		
<b>S1_RNP</b> : <Signal name with aspect RNP>				
Test Scenarios				
Starting condition		Level 1		
		Mode : Limited Supervision		
		National Values ETCS 1 LS used by the train		
		<b>Be sure all authorisations are filled in before performing the test scenarios</b>		
Sequences of the test scenario				
Step	Step description	Description of what to be tested	Statement	Comment
	Overpassing the closed signal <b>S1_RNP without</b> application of the override procedure.	When overpassing <b>S1_RNP</b> , the train transits to trip mode and stops.	<b>Pass / Fail</b>	
Test scenario ESC_L1LS_1 finished				

3.1.2 Scenario diagram



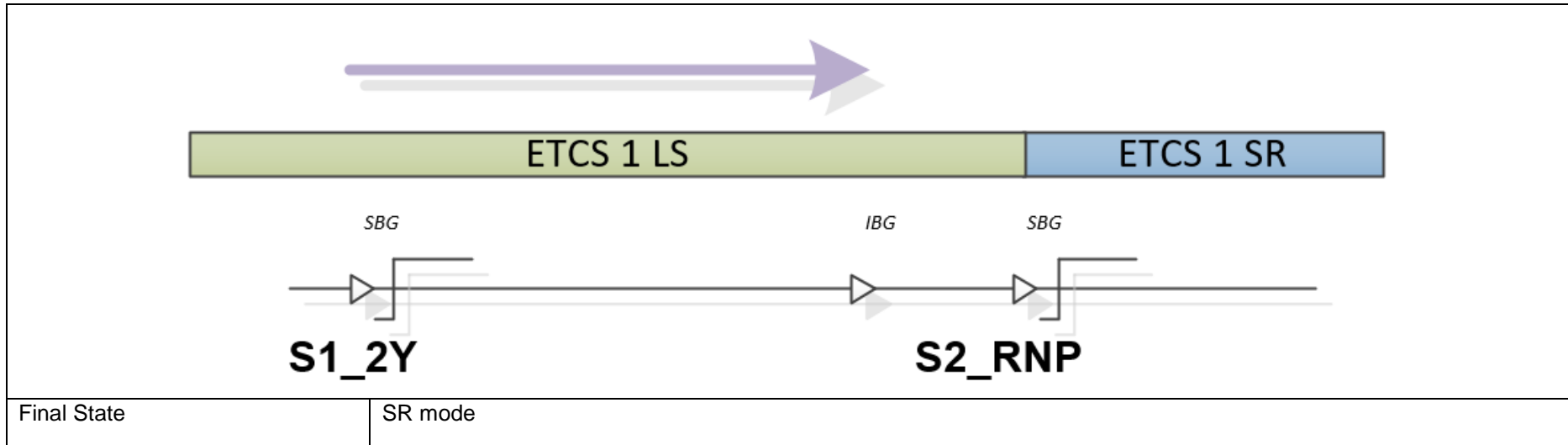


### 3.2 Tests ESC\_L1LS\_2: Crossing a closed non-permissive signal in LS with prior override

#### 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 <b>with</b> 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			
		<b>Be sure all authorisations are filled in before performing the test scenarios</b>			
Sequences of the test scenario					
Step	Step description	Description of what to be tested	Statement	Comment	
1	Overpassing of the signal <b>S1_2Y</b> with double yellow aspect	When the signal is overpassed, LSSMA (0) is displayed on the DMI	Pass / Fail		
2	Approaching of the signal <b>S2_RNP</b> with red not permissive aspect.	The release speed is displayed on the DMI.	Pass / Fail		
3	Overpassing of the closed signal <b>S2_RNP</b> 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 <b>S2_RNP</b> , the train keeps on proceeding in SR.	Pass / Fail		
Test scenario ESC_L1LS_2 finished					

3.2.2 Scenario diagram

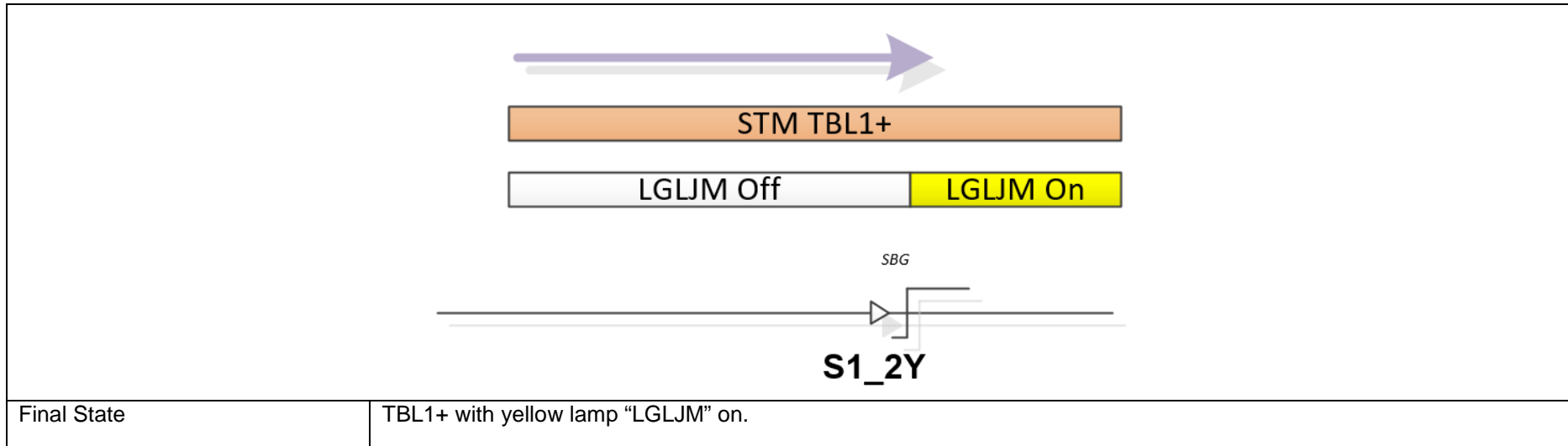


### 3.3 Tests ESC\_L1LS\_3: Reception of a packet 44 by a Baseline 3 train in level NTC (CR1338 non implemented)

#### 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 <b>baseline 3 infrastructure</b> . (P44 designed according to TBL1+ and baseline 2 specifications)			
Signal passed					
Name			Trackside datafile in service		
<b>S1_2Y</b> : <Signal name with aspect 2Y>					
Test Scenarios					
Starting condition		NTC Level			
		TBL1+			
		Yellow lamp "LGLJM" off			
		<b>Be sure all authorisations are filled in before performing the test scenarios</b>			
Sequences of the test scenario					
Step	Step description	Description of what to be tested	Statement	Comment	
1	Overpassing of the signal <b>S1_2Y</b> with double yellow aspect	When the signal is overpassed, the TBL1+ yellow lamp is lit on board.	<b>Pass / Fail</b>		
Test scenario ESC_L1LS_3 finished					

3.3.2 Scenario diagram

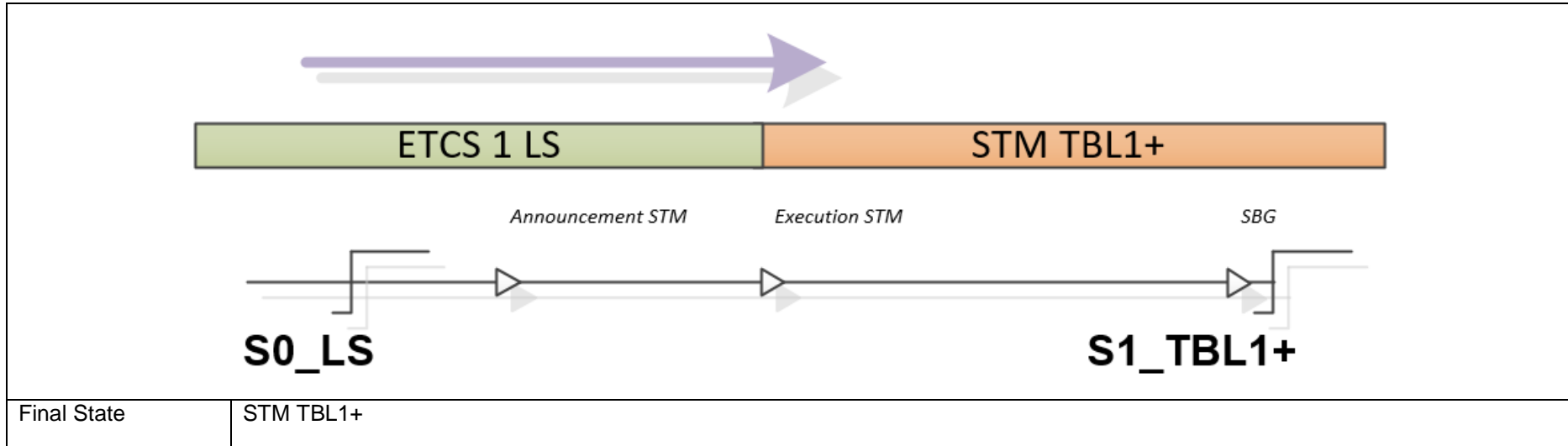


### 3.4 Test ESC\_TR\_11

#### 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		
<b>S0_LS</b> : <Last Signal in ETCS 1 LS				
<b>S1_TBL1+</b> : <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 <b>S0_LS</b> in ETCS 1 LS		
		<b>Be sure all authorisations are filled in before performing the test scenarios</b>		
Sequences of the test scenario				
Step	Step description	Description of what to be tested	Statement	Comment
3	In front of <b>S1_TBL1+</b> 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	
4	In front of <b>S1_TBL1+</b> , the execution of the transition occurs	The train proceed his movement in STM TBL1+ just before and after overpassing <b>S1_TBL1+</b> .	Pass / Fail	
Test scenario ESC_TR_11 finished				

3.4.2 Scenario diagram



### 3.5 ESC\_TR\_14

#### 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		
<b>S0_TBL1+ : &lt;Last Signal in TBL1+&gt;</b>				
<b>S1_LS : &lt;First transition Signal in ETCS 1 LS&gt;</b>				
Test Scenarios				
Starting condition		STM TBL1+		
		Train overpasses signal <b>S0_TBL1+</b> in STM TBL1+		
		<b>Be sure all authorisations are filled in before performing the test scenarios</b>		
Sequences of the test scenario				
Step	Step description	Description of what to be tested	Statement	Comment
1	In front of <b>S1_LS</b> , 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 <b>S1_LS</b> , 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

