

ERTMS/ETCS – Class 1

Test Plan

REF : SUBSET-076-0
ISSUE : 2.3.3
DATE : 25/02/2012

Company	Technical Approval	Management approval
ALSTOM		
ANSALDO SIGNAL		
BOMBARDIER		
INVENSYS RAIL		
SIEMENS		
THALES		

0. MODIFICATION HISTORY

Issue Number Date	Section Number	Modification / Description	Author
0.0.1, 001025	All	Creation	A. Göhler
0.0.2, 001103	All	Changes according to review comments	A. Göhler
0.1.0, 15 Nov 00	All	Modifications after review meeting, editorial changes	A. Göhler
0.1.1, 05 Feb 01	All	Update, editorial changes	A. Göhler
0.2.0, 06 Apr 01	All	Edition for delivery, editorial changes	Ch. Frerichs
2.2.0, 30 Jul 02	All	Editorial changes and comments received from UNISIG partners.	E. Fernández
2.2.1, 15 May 03	All	Edition for delivery.	Jorge Iglesias.
2.2.2 18 June 2003	2.2 and 2.3	Edition for delivery after decisions made in the Control Group Meeting (11 June 2003) regarding the official delivery of the electronic format (Data Bases) of both Test Cases and Test Sequences.	Jorge Iglesias
2.2.3 04 November 2005	All	Edition for delivery after the review of the whole set of Test Specifications	Jorge Iglesias
2.3.0 14 April 2008	All	Alignment to SRS 2.3.0. Ready for delivery.	Oscar Rebollo
2.3.1 25 February 2009	1, 2.2.1, 2.3.16	Editorial changes	Oscar Rebollo
2.3.2 20 November 2011	2.2.1	Alignment to testcases and sequences 2.3.2	Oscar Rebollo
2.3.3 25 February 2012	2.2.1	Alignment to testcases and sequences 2.3.2. Ready for external delivery.	Oscar Rebollo





1. TABLE OF CONTENTS

0. MODIFICATION HISTORY.....	2
1. TABLE OF CONTENTS.....	4
2. TEST SPECIFICATION.....	5
2.1 Introduction.....	5
2.2 Test Specification Documents.....	6
2.2.1 Document Version and Reference Table.....	6
2.3 Contents of the Test Specification Documents.....	8
2.3.1 Subset-076-0: Test Plan.....	8
2.3.2 Subset-076-1: Test Architecture.....	8
2.3.3 Subset-076-2: Methodology to Prepare Features.....	8
2.3.4 Subset-076-3: Methodology of Testing.....	8
2.3.5 Subset 076-4-1: Test Sequences Generation: Methodology and Rules.....	8
2.3.6 Subset 076-4-2: ERTMS ETCS Class 1 States for Test Sequences.....	9
2.3.7 Subset 076-5-1: Feature List.....	9
2.3.8 Subset 076-5-2: Test Cases.....	9
2.3.9 Subset 076-5-3: On-Board Data Dictionary.....	9
2.3.10 Subset 076-5-4: SRS v2.3.0 Traceability.....	9
2.3.11 Subset 076-6-1: Test Cases Data Base.....	9
2.3.12 Subset 076-6-2: Test Sub-Sequences.....	10
2.3.13 Subset 076-6-3: Test Sequences.....	10
2.3.14 Subset 076-6-4: Test Case Coverage.....	10
2.3.15 Subset 076-6-5: Test Sequence Data Base.....	10
2.3.16 Subset 076-6-6: Test sequences changes from 2.0.0 to 2.3.0.....	10
2.3.17 Subset 076-6-7: Test Sequences Evaluation and Validation.....	10
2.3.18 Subset 076-6-8: Generic train data for Test Sequences.....	10
2.3.19 Subset 076-7: Scope of the Test Specifications.....	11
2.3.20 Subset 076-10: Test Sequence Viewer (TSV).....	11
2.3.21 Subset 076-6-11: Test Sequence Debugger (TSD).....	11
2.3.22 Subset 076-6-12: Test Sequence Wizard (TSW).....	11



2. TEST SPECIFICATION

2.1 Introduction

This document is made up from the references to the corresponding versions of the documents comprising the Test Specification for the Subset-026 SRS v2.3.0.

The suite of documents comprising the Subset-076 has been created by the Test Spec WG, which was composed by CEDEX, DLR, EEIG UG, ERSA, TIFSA, Multitel and the UNISIG companies.

The technical contents are compiled within the respective document listed in the next chapter.

2.2 Test Specification Documents

2.2.1 Document Version and Reference Table

Name	M/I	Reference number	Version (date / issue)
Test Plan	I	SUBSET-076-0	25 February 2012 / 2.3.3
Test Architecture	-	SUBSET-076-1	Intentionally deleted.
Methodology to Prepare Features	I	SUBSET-076-2	14 April 2008 / 2.3.0
Methodology of testing	I	SUBSET-076-3	25 February 2009 / 2.3.1
Test Sequences Generation: Methodology and Rules.	I	SUBSET-076-4-1	25 February 2009 / 1.0.2
ERTMS ETCS Class 1 States for Test Sequences	I	SUBSET-076-4-2	25 February 2009 / 1.0.2
Feature list	I	SUBSET-076-5-1	29 February 2012/ 2.3.3
Test cases	M	SUBSET-076-5-2	29 February 2012/ 2.3.3
On-board Data Dictionary	I	SUBSET-076-5-3	14 April 2008 / 2.3.0
SRS v2.3.0 Traceability	I	SUBSET-076-5-4	28 February 2012 / 2.3.3
Test Case Data Base	I	SUBSET-076-6-1	29 February 2012/ 2.3.3
Test Sub Sequences	Int	SUBSET-076-6-2	Intentionally deleted.
Test Sequences	M	SUBSET-076-6-3	29 February 2012/ 2.3.3
Test Case Coverage	I	SUBSET-076-6-4	29 February 2012/ 2.3.3
Test Sequences Data Base	I	SUBSET-076-6-5	Intentionally deleted.
Test sequences changes from 2.0.0 to 2.3.0	Int	SUBSET-076-6-6	Intentionally deleted
Test Sequences Evaluation and Validation	I	SUBSET-076-6-7	29 February 2012 / 1.1.0
Generic train data for Test Sequences	I	SUBSET-076-6-8	14 April 2008 / 1.0.1
Scope of the Test Specifications	M	SUBSET-076-7	25 February 2009 / 1.0.2
Test Sequence Viewer (TSV)	I	SUBSET-076-6-10	3.2.2
Test Sequence Debugger (TSD)	Int	SUBSET-076-6-11	2.3.0d
Test Sequence Wizard (TSW)	Int	SUBSET-076-6-12	3.2.2



M/I/Int.- M:Mandatory, I:Informative, Int: Internal document, not to be delivered or to be delivered as a read-only version.



2.3 Contents of the Test Specification Documents

2.3.1 Subset-076-0: Test Plan

This document summarises the set of documents included in the ETCS Test Specifications.

2.3.2 Subset-076-1: Test Architecture

Intentionally deleted. This document has been superseded by Subset-094.

2.3.3 Subset-076-2: Methodology to Prepare Features

Features are the basis of the test specification. This document describes how features are to be identified and how a feature list is to be made up. The Feature list was the starting point to create the current Test Specifications. Once the main features were defined, each feature was developed by means of writing the specific set of Test cases for it. Tested requirements are clearly identified in each test case. After writing the test cases, there is a feedback from them to the feature list, in the sense of including inside each feature the tested requirements. The final release of the Feature list is therefore created automatically from the test cases data base.

2.3.4 Subset-076-3: Methodology of Testing

Here is the procedure to create Test cases given. This methodology is based on a formal description of the Test cases. The Test Case template is described here.

2.3.5 Subset 076-4-1: Test Sequences Generation: Methodology and Rules

Test Cases have been concatenated in Test sequences in order to be tested in a laboratory. This document shows how test sequences are to be built up. Principles and rules are given as a guideline for this process. As it is not possible to test all the Test cases in all the applicable Level/mode combinations, this document describes how the different Mode/Level combinations (states) are tested. A Test Frame defines all possible transitions between two states by a set of Test Sub-sequences (concatenated Test cases) starting at the initial state and ending at the final one. The different Frames were classified by their priority and all relevant Frames were taken into account to be included into the Test sequences. This process was followed to create the release 1.0.0 of the Test Sequences.

The methodology followed by using Test Frames and Test Sub-Sequences can be considered as the starting point for the Test Specifications creation, however, further on updates of the Test Specification just need to update both Test Cases and Test Sequences. Therefore the review done to update Test Sequences from release 1.0.0 to 1.0.1 has been done by reviewing the Test Cases (2.2.2 to 2.3.0) and including them into the new Test Sequences.



2.3.6 Subset 076-4-2: ERTMS ETCS Class 1 States for Test Sequences

This Excel document contains a table with all the possible states (Mode/Level combinations) according to SRS 2.3.0, the equivalent states table and the reduced states table. It also contains the list of Test Frames, its correspondence with the SRS (Transitions Table 4.6.2), as well as the classification of Test Frames according to its priority.

2.3.7 Subset 076-5-1: Feature List

The list is a mean of producing test cases. A Feature is a group of requirements, which fulfilment can be tested at the available interfaces. Features shall be the characteristics expected from a system by the operator and therefore outwardly visible. Features are grouped into hierarchies.

2.3.8 Subset 076-5-2: Test Cases

Test Cases are the basis of the Test Specification. These are the formal, functional and technical descriptions of the tests needed in order to prove interoperability, or in other words it is the way of demonstrating the compliance of an ETCS equipment with the SRS 2.3.0. Each Test Case includes the set of requirements tested. It is expected that, due to their lack of technical description of interfaces, trackside test cases are only functionally described.

2.3.9 Subset 076-5-3: On-Board Data Dictionary

The document includes formal definitions of the words and sentences to be used in Test Cases. These definitions are useful to harmonize the Test Cases produced by different companies.

2.3.10 Subset 076-5-4: SRS v2.3.0 Traceability

The document provides an analysis of traceability between all the requirements of the SRS and the Test Cases. It clearly shows that all testable requirements are tested in the complete set of Test Cases. To perform this analysis all the requirements included into the SRS 2.3.0 have been classified in several categories:

- 1) Testable, non-testable or non requirement
- 2) On-Board, Trackside or Driver requirement
- 3) Level (0, 1, 2, 3, STM)
- 4) Level transition
- 5) Balise Infill, RIU or Euroloop.

2.3.11 Subset 076-6-1: Test Cases Data Base

This Data Base is a MS Access document including all Test Cases in an electronic standard format. The same Test Cases that constitute the Subset-076-5-2 are included in this Data Base (Subset-076-6-1). The Master document is the Subset-076-5-2, but a complete traceability between both documents is assured. The current version contains the new release of the Test cases (2.3.3).



2.3.12 Subset 076-6-2: Test Sub-Sequences

Intentionally deleted

2.3.13 Subset 076-6-3: Test Sequences

This document is the final output of the Test Spec WG. A Test Sequence is a set of concatenated Test Cases starting in NP mode and finishing in NP mode. A Test Sequence shall be used for an automatic execution of the test cases, by concatenating them into scenarios which can be run within the test environments defined in the above-mentioned Subset-094. The complete set of Test Sequences covers all Test Cases and therefore, all SRS requirements. In the release 2.3.0 is only Level 0, 1 and 2 functionality covered including RIU and Euroloop. The Test sequences emerge as a complete defined trip, ready to be implemented in a Test Environment. Both the trip speed profile and the messages (radio, loop and balise) sent to the On-Board system are completely defined in each trip. The release 2.3.0 contains a zip file per each Test Sequence including the following files: Test Sequence Word file description (.doc), Test Sequence Data Base(.mdb), Test Sequence Speed Profile (.bmp) and the Test case coverage corresponding to this Test Sequence (.xls)

2.3.14 Subset 076-6-4: Test Case Coverage

This document shows the traceability between Test Cases and Test Sequences. It gives evidence of how every Test Case has been used at least once in the complete set of Test Sequences. As in the release 2.0.0 only are Level 0, 1 and 2 covered including RIU and Euroloop.

2.3.15 Subset 076-6-5: Test Sequence Data Base

Intentionally deleted.

2.3.16 Subset 076-6-6: Test sequences changes from 2.0.0 to 2.3.0

Intentionally deleted

2.3.17 Subset 076-6-7: Test Sequences Evaluation and Validation

This document explains the ranges for validating in an automatic way the steps of a Test sequence, as well as the mainlines to evaluate the result of a Test Sequence execution in a laboratory compliant with Subset-094.

2.3.18 Subset 076-6-8: Generic train data for Test Sequences

This document describes the generic train data which should be used for the Test sequences. The Reference Lab which will be used for running the Test sequences shall be able to simulate the train behaviour according to the train data specified within this document. This train data is based on the locomotive S-252.

2.3.19 Subset 076-7: Scope of the Test Specifications

This document explains briefly the Scope of these Test Specifications: Only On-Board requirements for levels 0, 1 and 2 are included in these Test Specifications. Requirements from SRS 2.3.0 are related to STM, in fill information, RIU and Euroloop have been included for this release (complementing other tests for sub-components i.e. subset-74, subset-72,...).

2.3.20 Subset 076-10: Test Sequence Viewer (TSV)

The Test Sequence Viewer is a tool that takes the Test Cases from the Test Cases Data Base (Subset-076-6-1) and gives the operator the possibility of viewing the Test sequences (Subset-076-6-3). The TSV is delivered in read-only mode and is not able to modify any of the data included in the Test Sequence.

2.3.21 Subset 076-6-11: Test Sequence Debugger (TSD)

All the Test sequences issued in the current release (2.3.3) - have been run in a lab in order to check its goodness. For this purpose the TSD tool has been developed inside the Test specifications WG. This tool simulates the behaviour of an EVC by implementing the whole set of SRS requirements, and allows to run the Test Sequences in a lab without needing a real industrial EVC. The TSD executable file will not be included into the TSI and will be kept only for internal use.

2.3.22 Subset 076-6-12: Test Sequence Wizard (TSW)

The TSW is a tool that has been used to build up the Test sequences. This tool takes the Test cases from the Test Cases Data Base (Subset-076-6-1) and gives the operator the possibility of building a Test sequence, by defining all the needed data (speed profile, the balise, loop or radio messages...). The tool creates the Data Base corresponding to the Sequence, the word file, the bit map speed profile and the test cases coverage. A read-only version of the TSW will be included in the TSI for external use.