

# Business unit I-AT-SAZ

## System management ETCS CH

### **Master test concept to obtain ETCS authorisation of placing in service** (On-board and trackside equipment)

## Version V1.5

Date: 17.05.2016

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## Document data sheet

|                        |   |
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## Proof of changes

| Version | Date       | Author           | Notes of modifications   |
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| X0.1    | 25.01.2012 | Paul Käser       | Draft  |
| X0.2    | 30.01.2012 | Paul Käser       | Revised following meeting with ZM and SCHM   |
| X1.0    | 01.02.2012 | Paul Käser       | Revised to include input from A. Indermühle  |
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| X1.2    | 27.06.2013 | Christina Ambrus | Updated formal revision of version X1.1 and consideration of input from SA ETCS L2 - TCT (T&IBS)   |
| X1.3    | 10.07.2013 | Christina Ambrus | Revision of master test concept based on the new version of the safety case concept [2].   |
| X1.4    | 13.11.2013 | Christina Ambrus | Incorporating review comments:<br>Titles used in version X1.3 have been adapted as follows (adjustments also in [2]):<br>Test Area XI is now called Test Area V<br>Certificate XI is now called Certificate V<br>Titles no longer used: Test Area XI, Certificate XI and Safety Case XI.<br>Section 3.2 of version X1.3 has been deleted (it is part of [2]).<br>Assessment by QA. |
| V1.4    | 19.11.2013 | Christina Ambrus | Incorporation of QA comments and release.  |
| V 1.5   | 17.05.2016 | M. Kehrli        | Reference to IOP testing requirements added in Chap. 2, references adapted.  |

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## Abbreviations

|          |  |
|----------|--|
| CH       | Switzerland  |
| DMI      | Driver-machine interface (driver's operating and display unit)     |
| ERTMS    | European Rail Traffic Management System                            |
| ETCS     | European Train Control System                                      |
| FAT      | Factory acceptance tests (in the lab)                              |
| GBL      | Gotthard base line   |
| GSM-R    | Global System for Mobile Communication – Railways                  |
| I-AT-ZBF | Train control systems (SBB organisational unit)                    |
| IOP      | Interoperability   |
| L1       | ETCS Level 1   |
| L2       | ETCS Level 2   |
| LBL      | Lötschberg base line   |
| LS       | Limited supervision  |
| MA       | Movement authority   |
| MATA     | Mattstetten branch line  |
| MMI      | Man-machine interface (operating and display unit)                 |
| NL       | Non-leading (operating mode)                                       |
| OBU      | On-board unit  |
| OR       | Operational Rule   |
| QA       | Quality assurance  |
| RBC      | Radio block centre   |
| RIU      | Railway infrastructure undertaking                                 |
| RTR      | Rothrist   |
| RU       | Railway undertaking  |
| RV       | Reversing (operating mode)   |
| SAT      | Site acceptance tests (on the line)                                |
| SBB      | Swiss Federal Railways   |
| SC       | Safety case  |
| SIOP     | Safety-related testing (phase A, phase B)                          |
| SL       | Sleeping (operating mode)  |
| SM       | System management  |
| SO       | Solothurn  |
| SPOC     | Single point of contact, contact person                            |
| TBD      | To be defined  |
| TET      | Test evaluation team (from the railway infrastructure undertaking) |
| TRK      | Trackside  |
| UNISIG   | Union Industry of Signalling                                       |
| V&T      | Verification and tests   |
| Veh.     | Vehicle(s)   |

## Terms used

|   |  |
|---|--|
| Applicant                                 | Natural person or legal entity requesting an APS or type approval for a vehicle (more details concerning the type approval procedure can be found in [14]). For vehicles, the APS is issued to the vehicle keeper (VK). For lines, the APS is issued to the licensed railway infrastructure undertaking (RIU).   |
| Authorisation of placing in service (APS) | Decree with which the FOT confirms that the vehicle or the components have been adequately checked from both a technical and operational standpoint so that its deployment for a particular purpose under specific conditions of use is possible and that the vehicle is compliant with ETCS TSI requirements – if necessary. If type approval exists, the authorisation of placing in service also declares conformity with the type.   |
| Homologation/<br>type approval            | <p>Decree with which the FOT confirms that the object of homologation has been adequately checked from both a technical and operational standpoint so that its deployment for a particular purpose under specific conditions of use is possible and that the vehicle is compliant with ETCS TSI requirements – if necessary. For vehicles, the type approval is generally issued at the same time as the APS for the first vehicle in a series.</p> <p>Type approval is intended for vehicles and components thereof that are used multiply in exactly the same way and in the same function (series). Type approval is intended to simplify and accelerate the FOT's testing for the authorisation of placing in service procedure (Art. 7 Railways Ordinance, reference [14]).</p> |
| Operational IOP tests                     | Tests based on the integrated technical system consisting of a line and vehicle and the corresponding operating rules (OR). All of these must be verified in order for a railway vehicle to be given ETCS Authorisation for Placing in Service in Switzerland (APS ETCS CH).   |
| Overall system                            | Technical and operational interaction between railway vehicles and railway line using ETCS.  |
| Railway infrastructure undertaking (RIU)  | Licensed railway infrastructure undertaking: a registered undertaking to which infrastructure equipment is assigned. In particular, an RIU is responsible for the life cycle of trackside systems.   |
| Test scope                                | A test scope includes the test cases, test subjects and objectives that are required for the corresponding safety case. Generally, each test scope belongs to a safety case - using the same Roman numeral in brackets.  |
| Vehicle keeper (VK)                       | Natural or legal person who is responsible for the homologation, authorisation of placing in service and operating capability of a vehicle. The Vehicle Keeper (VK) may be an RU, a rolling stock leasing company or a vehicle supplier.   |
| Vehicle operator (VO)                     | The railway undertaking (RU) operating a vehicle, or the operator of infrastructure vehicles.  |

## References

- [1] Intentionally deleted.
- [2] SBB (Hrsg.): SM ETCS CH: *Safety case concept to obtain ETCS homologation in Switzerland (On-board and trackside equipment)*, Version V2.0, 22.11.14.
- [3] Intentionally deleted.
- [4] SBB (Hrsg.): SM ETCS CH: *Test scope/cases for SIOP B of ETCS on-board equipment* – Version V1.7; 19.01.2010; SIOP B ENG\_v17
- [5] SBB (Hrsg.): SM ETCS CH: *Requirements for the use of vehicles on ETCS lines* - the currently valid version according to FOT homepage
- [6] SBB (Hrsg.): Network access: *operational IOP tests* – the latest version including a test list in the appendix can be found on the FOT homepage.
- [7] Alstom (Hrsg.): Technical IOP test set RTR-MATA/SO: – *Technical interoperability statement of the vehicles and the SA-NBS trackside equipment* – the valid version must be requested from the supplier.
- [8] Thales (Hrsg.): Technical IOP test set LBS  
Thales determines the test set to be performed on the basis of the OBU configuration. The most recent document can be obtained from the railway infrastructure undertaking BLS Netz AG, which will then contact the supplier to obtain the test set.
- [9] Thales (Hrsg.): Technical IOP test set: *IOP Concept Gotthard Base Line (GBL) 2015* – V1 dated 11.01.2013 (S6F54) also valid for the Pully-Villeneuve line, which was also equipped by Thales.  
Thales determines the test set to be performed on the basis of the OBU configuration. The most recent document can be obtained from the RBC supplier.
- [10] Siemens (Hrsg.): Technical IOP test set: - for the Sion-Sierre line, the valid version must be requested from the supplier.  
Siemens determines the test set to be performed on the basis of the OBU configuration.
- [11] ERA (2012/88/EU, Hrsg.): Current Legal References for ERTMS: *TSI CCS Annex A for Baseline 2 and Baseline 3* – the latest valid documents can be found on the ERA homepage.
- [12] SBB (Hrsg.): Regulation D05: *Safety-related processes to obtain an APS from SBB for signalling and automation systems* – Version V1 dated 12 June 2008.
- [13] SBB (Hrsg.): SA ETCS Level2: *TET- Concept SA ETCS CH* – Version V1.0 dated 19 November 2012.
- [14] FOT (Hrsg.): Guideline: *Type approval for elements of railway equipment* – Version V2.0 dated 01 September 2014.
- [15] SBB (Hrsg.): SM ETCS CH: *Specification document regarding IOP testing* (for ETCS-equipped vehicles and lines) Version V 1.0, 28.05.2016.

## Explanatory notes on references

### Reference [5]:

*The currently valid requirements annexes are to be obtained from FOT or SM ETCS CH. It is also important to take into account the documented difference between the FOT's national technical rules (NTR) – to be addressed in safety case II or safety case VI for on-board equipment or in safety case IV for trackside equipment – and the notified national technical rules (NNTR) provided by the European Union Agency for Railways (ERA) – to be addressed in safety cases X and VI. In both cases, the NTR and the NNTR must not be older than 2016.*

### Reference [6]:

*The SM ETCS CH requirements (V2.2, 2014) 'Network Access Tests ETCS Switzerland' need to be taken into account: these network access tests are a prerequisite for obtaining an APS for on-board equipment and hence for the network access to be agreed upon in the arrangement for network access signed by the RU and the IM.*

### References [7], [8], [9] and [10]:

*Here the situation depends on the OBU configuration and the RBC supplier. The supplier of on-board equipment must obtain an IOP Statement (safety case VII) for the vehicle in question from the corresponding supplier of trackside equipment. In addition, the test cases described in the latest IOP test sets drafted by the supplier of trackside equipment must be verified.*

### Reference [11]:

*Lists of reference documents valid for ETCS systems have been provided for Baseline 2 and Baseline 3. These lists include the subsets 074, 076, 085 and 103 from test specifications for ETCS products. Suppliers of ETCS products are to refer to the corresponding specifications provided in the reference documents.*

FOT homepage: <https://www.bav.admin.ch/bav/de/home/themen/alphabetische-themenliste/zugbeeinflussung/etcs.html>

ERA homepage: <http://www.era.europa.eu/Core-Activities/ERTMS/Pages/Current-Legal-Reference.aspx>



# 1 Aim, purpose and scope

- 1.1.1.1 This master test concept is based on the safety concept [2]. It describes the test areas needed to achieve a complete, fully functioning, interoperable and integrated ETCS system in Switzerland.
- 1.1.1.2 The test concept indicates which parties are responsible for individual test areas.
- 1.1.1.3 The test concept identifies the test specifications and references to be used in the individual test areas.
- 1.1.1.4 The test concept excludes estimates of the resources needed in order to conduct individual tests with vehicles on ETCS Level 2 lines. This is due to the fact that the specific range of tests for TET vehicles [13] still needs to be decided.

# 2 Procedure

- 2.1.1.1 In [15], we find a description of the typical procedures followed when carrying out IOP tests to verify technical Interoperability along with clarification of the roles and responsibilities of the parties involved.

# 3 Context

- 3.1.1.1 The dependencies of the present master test concept are shown in the chart below (Fig. 1).

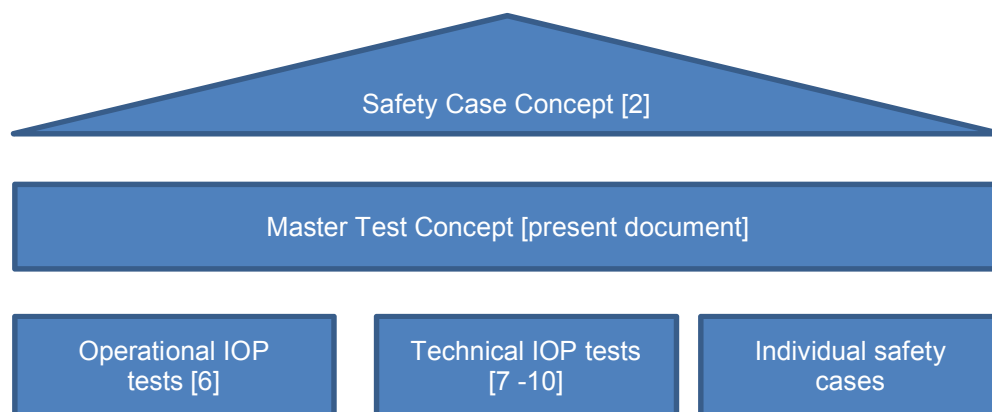


Figure 1: Positioning of master test concept

# 4 Limitations in scope

- 4.1.1.1 The present Master Test Concept is limited to the use of ETCS in Switzerland, i.e. ETCS L2, ETCS L1 LS and ETCS L0 P44 (ETM: EuroZUB, EuroSIGNUM).
- 4.1.1.2 The present Master Test Concept makes no statements about the ETCS operating mode L1 FS or L3, since these ETCS applications are not used in Switzerland.

- 4.1.1.3 The present Master Test Concept does not describe applications at transitions between different national train control systems or between ETCS and national train control systems. These are described in the relevant documents concerning border transitions.
- 4.1.1.4 This master test concept is not a replacement for the detailed test concepts provided by the relevant bodies responsible for carrying out tests in the individual test areas.
- 4.1.1.5 The specific tests for the generic products and applications from the suppliers do not form part of this test concept. European specifications for such ETCS product tests can be found in [11].
- 4.1.1.6 The ETCS data channel tests of the GSM-R which are part of the OBU type approval process are not covered by this master test concept.
- 4.1.1.7 GSM-R devices needed to run data channel tests of this kind must be approved by SBB Telecom before being activated for the first time as part of the Swiss GSM-R network.

## 5 Structure of test areas

- 5.1.1.1 The content of safety cases is comprised of test findings, test measures and test results. Therefore, the structure of test areas matches the structure of safety cases in keeping with [2].
- 5.1.1.2 The table below shows the structure, the test subjects and the objectives of the test areas and includes some examples.
- 5.1.1.3 The Roman numerals (I) to (XII) assigned to the test areas correspond to the numbers in the safety case structure in [2].
- 5.1.1.4 In Figure 2, the blue boxes refer to tests for which the RIU or VK is responsible. The green boxes refer to tests for which suppliers are responsible.

|  |  |  |  |
|--|--|--|--|
| <p><b>(I)</b><br/><b>Overall system</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>- To convey an overall picture of the application, including, for example, the accumulated line and vehicle risks</li> <li>- Summary of safety cases II, V and IV (incl. associated test results)</li> <li>- No tests – successful test results must be shown in subordinate safety cases</li> </ul> | <p><b>(II)</b><br/><b>Operational vehicle tests</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>- Proof of compliance with the application conditions</li> <li>- Proof of behaviour in specific operational situations</li> <li>- Ability to apply the periodic maintenance and testing regulations from an operational perspective</li> <li>- Proof that the operating regulations are fit for purpose</li> </ul> | <p><b>(V)</b><br/><b>Network access tests</b></p> <p><b>Objective:</b></p> <p>Ideally no tests are needed except for the following:</p> <ul style="list-style-type: none"> <li>- Tests to be carried out at the discretion of the RIU in the case of doubt</li> <li>- Tests that may be ordered by the RIU for reasons of due diligence to demonstrate safe and reliable network access in connection with ETCS</li> <li>- Proof of the assumptions made in</li> </ul> | <p><b>(IV)</b><br/><b>Operational line tests/<br/>SIOP B line</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>- Proof of the fitness for service of the trackside operating processes and regulations</li> <li>- Fulfilment of the infrastructure operator's duty of care</li> </ul> |
|--|--|--|--|

|   |  |  |
|---|--|--|
| <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>- Correct braking in RV mode</li> <li>- Vehicle data displayed and evaluated on the appropriate level</li> <li>- Journey with the relevant ORs for the lines</li> <li>- Correct functioning of the control car with the possible vehicle types, multiple unit control of different vehicle types</li> <li>- Correct operational use of the neutral section</li> <li>- Processing the train data set</li> <li>- Managing the failure of the tilt system</li> </ul>  | <p>connection with the processing of the SRACs between the line and the vehicle, if necessary</p> <ul style="list-style-type: none"> <li>- Proof of the suitability of any new/special ORs generated for safety case V.</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>- Operating tests with the implemented brake curve parameterisation</li> <li>- Capacity/safety requirements with flat braking curves</li> </ul>  | <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>- Test of the operating processes</li> <li>- Repeat of the technical tests for safety case (VIII) as part of the duty of care</li> <li>- Integration into the existing rail infrastructure</li> <li>- SIOP B line</li> </ul>  |
| <p><b>(III) IOP OBU and RBC</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>- No tests, only a summary of the IOP Statement (VII) and IOP Notes (IX)</li> </ul>   |  |  |
| <p><b>(VI) Vehicle integration tests/ SIOP B vehicle</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>- Proof of the correct integration of the OBU into a specific vehicle type (class) by the vehicle integrator (including braking curve validation)</li> <li>- Proof of the correct activation of the brakes, including in the event of faults</li> <li>- Testing specific vehicle functions</li> <li>- Proof of the correct activation of ETCS modes SL and NL</li> <li>- Proof of the correct integration of SIL 0 ETCS peripheral systems</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>- Brake control when the vehicle power supply fails</li> <li>- Traction switched off when the train control and command system (TCCS) fails</li> <li>- OBU odometry in collaboration with the TCCS</li> <li>- Activating the SL/NL modes, depending on the vehicle configuration</li> <li>- Processing the direction of travel, depending on the driver's control panel</li> <li>- Correct technical use of the neutral section</li> <li>- Correct function of the control car with the possible vehicle types</li> <li>- Multiple-unit control of different vehicle types</li> <li>- Special vehicle functions: look-out, radio remote control</li> <li>- DMI-OBU integration</li> </ul> | <p><b>(VII) IOP tests</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>- The RBC supplier demonstrates the technical IOP of the OBU with the trackside ETCS components within the specific design of a line or the generic engineering rules</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>- All relevant technical scenarios in accordance with UNISIG requirements within the configurable range</li> <li>- Correct reception of an MA</li> <li>- Correct behaviour in the event of an incomplete MA</li> </ul> | <p><b>(VIII) Supplier (factory test)</b></p> <p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>- Proof of the correct integration of the RBC into the specific line by the line integrator</li> <li>- Interaction, correct functionality, correct data preparation and correct line construction</li> <li>- Proof of the correct integration of SIL 0 ETCS peripheral systems</li> </ul> <p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>- TRK FAT/SAT (terms used by SBB for factory tests in the lab and on the track), using the vehicle as a measuring instrument</li> <li>- MMI-RBC integration</li> </ul> |

| (X)<br>OBU tests   | (IX) IOP-CH statement  | (XII) RBC tests  |
|--|--|--|
| <b>Objective:</b> <ul style="list-style-type: none"> <li>- Proof of the correct function of the manufacturer's OBU in accordance with UNISIG requirements</li> </ul>                           | <b>Objective:</b> <ul style="list-style-type: none"> <li>- The OBU supplier demonstrates that the ETCS status, the implementation of the subsets and versions and the data configuration correspond with the specified values of the ETCS CH system manager and the trackside operators</li> </ul> | <b>Objective:</b> <ul style="list-style-type: none"> <li>- Proof of the correct function of the manufacturer's RBC in accordance with the UNISIG requirements</li> </ul>   |
| <b>Examples:</b> <ul style="list-style-type: none"> <li>- Reaction of the OBU to balises with implausible content</li> <li>- Reaction of the OBU to failure of an internal computer</li> </ul> | <b>Examples:</b> <ul style="list-style-type: none"> <li>- None</li> </ul>  | <b>Examples:</b> <ul style="list-style-type: none"> <li>- Factory test of the RBC in the lab (TRK V&amp;T, TRK data V&amp;T)</li> <li>- Testing on installation</li> </ul> |

Figure 2: Structure, themes and objectives of ETCS Level 2 tests

## 6 Overview of master test concept

| Test area no. | Reference to [2]               | Title                                    | Responsible for running tests and reporting | Responsible for commissioning | Responsible for test specifications   | Test specifications filed, reference from  | Results evaluated by                             | Test location                       | Test resources   | Comments   |
|---------------|--------------------------------|--|---|-------------------------------|---------------------------------------|--|--|-------------------------------------|--|--|
| (I)           | SC (I)<br>APS                  | Overall system                           | ----  | ----                          | ----                                  | ----   | ----   | ----                                | ----   | No tests required, only certificate in accordance with [2].  |
| (II)          | SC (II)<br>APS                 | Operational vehicle tests (vehicle type) | Applicant                                   | Applicant                     | Applicant                             | Applicant  | Applicant  | Vehicle or possibly vehicle on line | Vehicle: dependent on type<br>Vehicle on line: See Section 7 | None   |
| (III)         | IOP Certificate Overview (III) | IOP OBU-RBC                              | ----  | ----                          | ----                                  | ----   | ----   | ----                                | ----   | No tests required, only proof in accordance with [2].<br>Only applies to specific OBUs with specific RBCs.   |
| (IV)          | SC (IV)<br>APS                 | Operational line tests / SIOP B          | Infrastructure operator<br><br>SIOP B       | Infrastructure operator       | Infrastructure operator<br><br>SIOP B | Infrastructure operator<br><br>SIOP B  | Infrastructure operator's TET [13]<br><br>SIOP B | Line                                | Dependent on line, change/modification and OP                | Using the vehicle as a measuring instrument.<br>Test specifications as required (new operating processes).<br>SIOP B: Test specifications defined in SIOP for specific lines [12]. |
| (VI)          | SC (VI)                        | OBU - Vehicle integration tests          | Vehicle integrator                          | Vehicle integrator            | Vehicle integrator                    | Vehicle integrator   | Vehicle integrator                               | Vehicle type                        | Dependent on vehicle type                                    | None   |
| (VII)         | IOP Statement (VII)            | IOP-Statement (VII)                      | RBC supplier                                | OBU supplier                  | RBC supplier                          | RTR-MATA/SO (Alstom): [7]<br>LBS (BLS): [8]<br>GBL (Thales): [9]<br>PU-VIL (Thales): [9]<br>SIO-SIE (Siemens):[10] | RBC supplier                                     | OBU in lab (vehicle on line)        | Lab: dependent on supplier<br>Vehicle on line: See Section 7 | Currently the labs are specific to the lines and RBC suppliers.  |

| <i>Test area no.</i> | <i>Reference to [2]</i> | <i>Title</i>            | <i>Responsible for running tests and reporting</i> | <i>Responsible for commissioning</i> | <i>Responsible for test specifications</i> | <i>Test specifications filed, reference from</i> | <i>Results evaluated by</i> | <i>Test location</i>   | <i>Test resources</i>                | <i>Comments</i>  |
|----------------------|-------------------------|-------------------------|--|--------------------------------------|--|--|-----------------------------|------------------------|--------------------------------------|--|
| (VIII)               | SC (VIII)               | Factory test (supplier) | RBC supplier                                       | RBC supplier                         | RBC supplier                               | RBC supplier                                     | RBC supplier                | Lab/line               | Dependent on line                    | TRK FAT/SAT (terms used by SBB for factory tests in the lab and on the track).<br>If necessary, using the vehicle as a measuring instrument. |
| (IX)                 | IOP Notes (IX)          | IOP CH statement OBU    | ----   | ----                                 | ----                                       | ----   | ----                        | ----                   | ----                                 | No tests required, only proof in accordance with [2].  |
| (X)                  | SC (X)                  | OBUEVC tests            | OBUSupplier  | OBUSupplier                          | OBUSupplier                                | OBUSupplier                                      | OBUSupplier                 | OBU in lab             | Dependent on OBU supplier            | Dependent on vehicle, OBU type approval  |
| (V)                  | SC (V) APS vehicle type | Operational IOP tests   | Infrastructure operator                            | Railway undertaking                  | Infrastructure operator                    | Infrastructure operator                          | TET [13]                    | Vehicle on line or [6] | See Section 7                        | Operational IOP tests are listed in [6].   |
| (XII)                | SC (XII)                | RBC tests               | RBC supplier                                       | RBC supplier                         | RBC supplier                               | RBC supplier                                     | RBC supplier                | Lab, installation      | Dependent on line (data preparation) | Factory test of the RBC in the lab (TRK V&T, TRK data V&T).<br>Testing on installation.  |

Table 1: Overview of master test concept

## **7 Resource requirements for vehicle tests on an ETCS Level 2 line**

- 7.1.1.1 The resource requirements for tests with vehicles on an ETCS Level 2 line depend on the extent of testing required for TET vehicles [13]
- 7.1.1.2 It is not possible to estimate exactly the extent of testing nor the amount of resources required.
- 7.1.1.3 Contact SPOC RIU (etcs.fahrzeuge@sbb.ch) to find out the extent of testing required.

## 8 Contact details

| Infrastructure operators  | RBC suppliers  | Other  |
|---|--|--|
| <p><b>SBB lines</b></p> <p>SBB Infrastructure I-AT-SAZ<br/>Hilfikerstrasse 3<br/>CH-3000 Bern 65<br/>E-mail: <a href="mailto:etcs.fahrzeuge@sbb.ch">etcs.fahrzeuge@sbb.ch</a></p>   | <p><b>Alstom (RTR-MATA/SO)</b></p> <p>Alstom Transport Belgium<br/>Train Life Service<br/>ANTOINE Cedric<br/>Rue Cambier Dupret 50-52<br/>B-6001 Charleroi<br/>E-mail: <a href="mailto:cedric.antoine@transport.alstom.com">cedric.antoine@transport.alstom.com</a><br/>and <a href="mailto:tis-rw-sbb-ertms.be.transport@alstom.com">tis-rw-sbb-ertms.be.transport@alstom.com</a></p> | <p><b>System management ETCS CH</b></p> <p>SBB Infrastructure<br/>I-AT-SAZ-SNG-SF<br/>Hilfikerstrasse 3<br/>CH-3000 Bern 65<br/>E-mail: <a href="mailto:sf.etcs@sbb.ch">sf.etcs@sbb.ch</a></p> |
| <p><b>Lötschberg Base Line (LBL)</b></p> <p>BLS Netz AG<br/>Urs Guggisberg<br/>Genfergasse 11<br/>CH-3001 Bern<br/>Tel: +41 (0) 58 327 29 83<br/>E-mail: <a href="mailto:urs.guggisberg@bls.ch">urs.guggisberg@bls.ch</a></p> | <p><b>Thales (LBL, GBL, PU-VIL)</b></p> <p>Thales Rail Signalling Solutions AG<br/>Friesenbergstrasse 75<br/>CH-8036 Zurich<br/>Tel. +41 (0) 44 465 48 00<br/>E-mail: <a href="mailto:cs.rss-ch@thalesgroup.com">cs.rss-ch@thalesgroup.com</a></p>   | <p><b>SBB Telecom</b></p> <p>Tel.: +41 (0)51 220 11 82<br/>E-mail: <a href="mailto:tc@sbb.ch">tc@sbb.ch</a></p>  |
|   | <p><b>Siemens (SIO-SIE)</b></p> <p>Siemens Schweiz AG - Infrastructure &amp; Cities Sector<br/>Mobility and Logistics, MOL PH 5 1<br/>Gildo Paganini<br/>Belpstrasse 26, 3007 Bern, Switzerland<br/>Tel.: +41 (0)58 558 07 40<br/>E-mail: <a href="mailto:gildo.paganini@siemens.com">gildo.paganini@siemens.com</a></p>   |  |

Table 2: Contact addresses



## 9 Annex

### 9.1 Examples of information contained in network access tests [6]

| Topic   | Description  | Vehicle configuration<br>(ETCS BL) | Requirements   | Responsibility | Assistance             | Associated safety case |
|---|--|------------------------------------|--|----------------|------------------------|------------------------|
| Reverting from Level 2 to L0/L1LS             | There is a risk of reverting from Level 2 to L0/L1LS upon existing the LBL to Visp/Frutigen.   | 2.x.x<br>3.x.x                     | The change from Level 2 to Level 0 or Level 1 is possible.   | VK             | (Technical) integrator | VI                     |
| Freight trains with poorly functioning brakes | There is a risk that rapid freight trains with poorly functioning brakes are subject to a forced deceleration when entering ETCS Level 2 lines (with automatic signalling systems) as a result of the braking curves on the tracks. In such cases, ETCS vehicle equipment triggers the braking system without any apparent reason for the locomotive driver. | 2.x.x<br>3.x.x                     | Freight trains with poorly functioning brakes must not be braked on entry into ETCS Level 2 lines due to the braking curves on the tracks. | VK             | (Technical) integrator | VI                     |

Table 3: Examples of information contained in network access tests [6].