

V9.112 Side Note

with the System Validation Report V9.111 (for STM ATB V1.1001)

Colophon	
Document ID	V9.112
Version	4.0
Revision	794618
Author	WD
Reviewed	794618 ,STMA-84250
Approved	794618 ,STMA-84253
Archive	Side Note STM ATB V1.1001
Date:	2024/03/22 11:10

Authorisation

Compiled by: WD Signature/E-sign: 794618 ,STMA-84254	Date: 2024/03/22 11:19
Reviewed by: HRi Signature/E-sign: 794618 ,STMA-84250	Date: 2024/03/22 11:12
Approved by: BvB Signature/E-sign: 794618 ,STMA-84253	Date: 2024/03/22 11:17

CONTENT

1	Preface	5
1.1	Introduction	5
1.2	Purpose of this document	6
1.3	References	6
2	Impact and significance of the modifications	7
2.1	CR01-1 Resolve high temperature issue	7
2.1.1	Issue description	7
2.1.2	Root cause analysis	7
2.1.3	Solution	7
2.1.4	Impact	8
2.1.5	Significance	8
2.2	CR01-2 Resolve obsolescence issues	9
2.2.1	Issue description	9
2.2.2	Root cause analysis	9
2.2.3	Solution	9
2.2.4	Impact	9
2.2.5	Significance	10
2.3	CR01-3 Optimize PCB for manufacturing and testing	11
2.3.1	Issue description	11
2.3.2	Root cause analysis	11
2.3.3	Solution	11
2.3.4	Impact	12
2.3.5	Significance	12
2.4	CR02 Software bug - packet STM-15 order	13
2.4.1	Issue description	13
2.4.2	Root cause analysis	13
2.4.3	Solution	14
2.4.4	Impact	14
2.4.5	Significance	14
2.5	CR03 Software bug - diagnostic function coil recognition	15

2.5.1	Issue description	15
2.5.2	Root cause analysis	15
2.5.3	Solution	15
2.5.4	Impact	15
2.5.5	Significance	16
3	Validation	17
3.1	System configuration	17
3.1.1	Compatibility hardware revisions	17
3.2	Validation of V1.1001 hardware	17
3.2.1	Environmental temperature test	17
3.2.2	Hardware documentation review	18
3.2.3	EMC compliance	18
3.3	Software bug - DEV-3760 - packet STM-15 order	22
3.4	Software bug - DEV-3807 - ATB coil / diagnostic function	22
4	Non regression	22
4.1	Hardware modifications	22
4.2	Software modifications	23
4.3	Product end test	23
5	Conclusions	23
5.1	TSI CCS compliance	23
5.2	Compliance to ATB-EG requirements in RIS 2020	23
5.3	System Safety	24
5.4	System RAM	24
5.5	Compliance to environmental temperature requirements	24

1 Preface

1.1 Introduction

STMA-83653, T Text - STM ATB V1.1 (released in May, 2023) has been modified. After the release and formal certification of STM ATB V1.1, software and hardware modifications have been implemented in STM ATB V1.1 to:

- improve internal data communication at high ambient temperatures ($T_a > 60^{\circ}\text{C}$);
- resolve obsolescence issues;
- optimize PCBA manufacturing yield (adjust component footprints for reflow soldering);
- resolve a software bug in profibus packet ordering;
- resolve a minor software bug with respect to the diagnostic function (ATB antenna coil detection);

STMA-83926, T Text - The above modifications are implemented and tested resulting in STM ATB V1.1001. The impact of these modifications and their significance have been communicated and discussed with the assessment body.

STMA-83901, T Text - TSI CCS (EU/2023/1695), which entered into force on 10 August 2023, includes changes in subsets 035, -58, -59 and -074-2 for STM. These changes correct the name giving of an ETCS variable, but they do not entail any change of the STM functional or interface requirements, performance requirements or the test requirements. The legal framework for product development of STM ATB remains as it is, as there is currently no necessity to apply the updated TSI CCS.

STMA-83905, T Text - The modifications implemented in STM ATB V1.1001 result in a (partial) update of the STM ATB V1.1 compliance evidence, the assessment reports and type certificates for STM ATB V1.1001.


The modifications have been documented. The additional compliance evidences are included in this document.

1.2 Purpose of this document

STMA-83927, T Text - This document is a side note to the STM ATB V1.1 system validation report as minor modifications to STM ATB V1.1 were deemed necessary. It describes the modifications to STM ATB V1.1, the impact and significance of the modifications and the validation of system update.



1.3 References

STMA-83652, T Text - Reference documents



All the documents references used in this document can be found in the document  [P6.1](#)

[Bibliography](#) available in the Polarion folder  [Processes](#)

Abbreviations, definitions and terminology

An overview of the abbreviations, definitions and terminology used in this document can be found in document  [P6.2 List of abbreviations, definitions and terms](#) available in the Polarion folder  [Processes](#)

Requirement identification

The STM ATB project makes use of an automated requirement management system. In this system each requirement has been identified as a work item. Each work item has been automatically assigned with a unique ID, with the format "STMA-<number>". As a result requirement ID's are not in logical order. An overview of all the used STMA-numbers is given in document  [P6.3 Requirement Overview](#) available in the Polarion folder  [Processes](#)

2 Impact and significance of the modifications

STMA-83673, T Text - This chapter summarizes the Change Requests for STM ATB V1.1001 and contains an impact/significance analysis for the changes implemented in STM ATB V1.1001 compared to STM ATB V1.1.

STMA-83928, T Text - The modifications in STM ATB V1.1001 are considered as an addendum to STM ATB V1.1 and have been handled under the existing project plans for STM ATB V1.1, according to the change management procedure.

2.1 CR01-1 Resolve high temperature issue

2.1.1 Issue description

STMA-83674, T Text - During endurance tests at high ambient temperatures ($T_a > 60^{\circ}\text{C}$), communication errors on the Profibus interface were detected, causing the data connection to shut down. Onboard systems shall be able to operate at 70°C ambient temperature.

2.1.2 Root cause analysis

STMA-83664, T Text - The root-cause investigation revealed steep ramp currents at SPI lines at ambient temperatures above 60°C disrupting inter-processor communication with the Tiva processor. During the endurance tests local hot spot temperatures may exceed 85°C . The SPI line disturbance appears to be a poorly documented fault in the Tiva processor, hidden in the document Tiva™ C Series TM4C123x Microcontrollers, Silicon Revisions 6 and 7, Silicon Errata.

2.1.3 Solution

STMA-83914, T Text - The solution is:

- to review the BOM for the SAP, AIN, DIO/PSU and BPL boards for components to meet a minimum of 85 degrees celcius operating temperature;
- to replace components that do not meet the temperature requirements, by temperature, pin compatible, footprint compatible and functional compatible parts;
- to install R/C snubber circuits limiting dI/dt or dV/dt and shaping the load on the SPI lines to the Tiva Processor to keep it within the non-critical operating area.

2.1.4 Impact

STMA-83915, T Text - To achieve the specified environmental temperature range of STM ATB V1.1, all temperature critical components are to be replaced by functional identical components, with identical footprints. The SPI connections on the SAP board are to be modified with a R/C snubber circuit. The hardware dossier (schematic design, BOM, PCB layout) of the SAP board is to be updated. Compliance is to be demonstrated through review of the HW-design modifications, regression tests at high ambient temperatures in a suitable test laboratory under witness of the assessment body.

The resolution of the high temperature issue improves the STM ATB system availability and does not degrade System Functionality, Reliability, Maintainability and Safety.

The SAP boards up to and including revision I (i) are not suitable for use in high ambient temperatures, however the DIO/PS, AIN and BackPlane board already produced may be used in onboard applications. An overview of the valid system configurations is included in chapter 3.1.1 of this report.

2.1.5 Significance

STMA-83907, T Text - As the new components are selected for both pin and functional compatible, the overall system behavior is not impacted. The system functionality and interfaces do not change. The proposed changes are considered non significant as the changes do not impact compliance to RIS, TSI and safety requirements. Meanwhile the effects of the changes have been tested and the temperature issue is solved. The technical documentation is updated and require an update of the conformity assessment reports and type certificates.

2.2 CR01-2 Resolve obsolescence issues

2.2.1 Issue description

STMA-83916, T Text - During the Design for Logistics phase for series production of STM ATB V1.1, the hardware manufacturer reported obsolescence or end-of-life warnings for specific components. Some component manufacturers have changed part names or ordering information for administrative purposes, while the part specifications remain the same.

2.2.2 Root cause analysis

STMA-83680, T Text - Obsolescence, end-of-life warnings, administrative changes initiated by component manufacturers.

2.2.3 Solution

STMA-83917, T Text - Investigate replacement of obsolete/EOL parts by pin / functional / technical compatible parts.

Design out critical parts or place a (final) purchase order to secure part supply for series production.

Update the Bill of Materials.

While (minor) PCB modifications are deemed necessary, the PCB version numbering is also to be revised to (better) reflect significance of the modifications and to allow parallel existence of compatible PCBs in a system configuration.

2.2.4 Impact

STMA-83918, T Text - Obsolete/EOL parts are to be identified and pin/functional compatible replacement parts are to be acquired.

For this purpose the BOM of the SAP, AIN, DIO/PS and BP board are updated. As the new components are both pin and functionally compatible, the system behaviour and system RAMS are not likely to be impacted. This is demonstrated through review of the hardware modifications, regression tests (T9.0.6.2) and a product-end-test.

The technical documentation is updated, therefor these updates are to be processed in the conformity assessment reports and type certificates, which are pending at the time of writing.

2.2.5 Significance

STMA-83908, T Text - The proposed changes concern component replacements by alternative components (BOM change).

The system and interface requirements remain the same. The system behaviour is not impacted by the parts replacement. The schematic designs are not changed, but the BOMs and the version/revision numbering are updated. The component changes are considered not significant.

2.3 CR01-3 Optimize PCB for manufacturing and testing

2.3.1 Issue description

STMA-83676, T Text - During the Design for Manufacturing phase of STM ATB V1.1, the hardware manufacturer suggested to adapt the footprint and/or placement for various components in order to optimize the layout for reflow soldering and thermal relief. These modifications were implemented in SAP R1.20, however during the Design for Testing phase of STM ATB V1.1 additional test pads were requested, for manufacturing tests. These modifications have been reworked in SAP R1.21 and SAP R1.22. The characteristics of the PCBs will not change. Although the original production input data (STM ATB V1.1) is sufficient to produce compliant STM ATB, there are minor remarks for improvement of the production dossiers (TPDs) in STM ATB V1.1001.

2.3.2 Root cause analysis

STMA-83919, T Text - Small differences due to difference in design styles and design libraries for SAP vs. DIO/AIN/BP.

A minor PCB change to allow for full coverage automated manufacturing test.

2.3.3 Solution

STMA-83672, T Text - Correct (minor) issues in the hardware manufacturing documentation (TPDs);

Introduction of single schematic/PCB design library for the STM ATB project;

Adaption of the soldering footprints for various components;

Adding an extra test pin for manufacturing tests.

Update version and revision numbering of the hardware design documentation and PCBs:

- First digit: schematic change, including functionally or for availability different component.
- Second digit: layout changes.
- Third digit: component replaced by identical alternative.

(The detailed numbering guidelines are being included in an update of Q2.9, the configuration management procedure)

2.3.4 Impact

STMA-84154, T Text - The modifications on the PCBs are minor and concern the repositioning of a limited number of parts. The use of a single schematic/PCB design library and component footprints improve consistency, maintainability of the hardware designs and manufacturing yield. It will also allow for the parallel existence (exchangeability) of board versions. The TPDs are updated.

The additional test pads and the changes in de manufacturing documentation and modified footprint library do not affect system functionality and interfaces or degrade the RAMS properties of STM ATB.

2.3.5 Significance

STMA-83909, T Text - The introduction of a single schematic/PCB design library and component footprints, the additional test pin and the documentation issues do not affect the behaviour of the STM ATB and its interfaces. Therefore the changes are not significant. Since the technical documentation is updated, these updates require an update of the conformity assessment reports and type certificates.

2.4 CR02 Software bug - packet STM-15 order

2.4.1 Issue description

STMA-83921, T Text - During system integration with ETCS-onboard systems, an anomaly in the order of packet STM-15 was found, causing the STM controller to shut down the data connection.

2.4.2 Root cause analysis

STMA-83659, T Text - The STM Layer creates packets. These are stored on the packet queue. The application layer packs the packets into messages in activity “APL Messages to Packets”. Each message is required to include a packet STM-15. Packet STM-15 indicates the current STM state of the STM ATB.

If there is no packet STM-15 on the packets queue, the application layer will generate a packet STM-15.

In order to do this, the application layer needs to know the current STM state of the STM ATB.

This information is communicated by the scheduler using a call to

```
STML_GetPacket15Data(modstate);
```

and

```
APL_SetPacket15Data(modstate, varlist->stml_output.packet15_data);
```

This call to STML_GetPacket15Data() needs to be done after each main activity of the STM Layer.

The STM Layer has four main activities:

1. STM Prepare
2. STM Translate
3. STM Process Incoming Packet
4. STM Update State Machines

The call to STML_GetPacket15Data() was missing from the last 3 activities.

If any of these three activities changed the STM state, then a call to “APL Messages to Packets” following this uses a wrong, i.e. an old, STM state. Because the first activity is executed every 10ms this condition lasts at most 10ms. However for one packet type this resulted in a situation where the packet was sent together with an outdated packet STM-15 causing the EVC to order the STM ATB to FA and resulting in a lower overall onboard availability.

2.4.3 Solution

STMA-83660, T Text - A software fix by adding a call to `STML_GetPacket15Data()` at the end of each of the three activities where it was missing.

2.4.4 Impact

STMA-84153, T Text - This fix only impacts the content of packet STM-15. All other packets are left untouched. The overall availability of the onboard system will improve, once the software fix is implemented. The technical documentation and software modules (scheduler and application layer module) are to be updated and regression testing is to be repeated to demonstrate compliance. The updated documentation is to be assessed and approved from the assessment body. Assessment reports and type-certificates are to be updated.

2.4.5 Significance

STMA-83910, T Text - The issue found during system integration testing could have an impact the overall availability of the onboard system while operating in level-NTC. The CR02 change corrects the bug. Since the technical documentation is updated, these updates require an update of the conformity assessment reports and type certificates of STM ATB.

2.5 CR03 Software bug - diagnostic function coil recognition

2.5.1 Issue description

STMA-83655, T Text - At the end of the start-up statemachine the STM ATB tests the antenna inputs whether ATB antenna coils (2 x 2) are present and valid. When the onboard application only uses one set of ATB antenna coils (1 x 2), the STM ATB startup time exceeds 60s, which is not optimal.

2.5.2 Root cause analysis

STMA-83656, T Text - The conditions for validity are specified by requirement STMA-40634 that states:

Coil type shall be considered valid if Coil type of cabin A or B is not “Unknown” and:

- Coil type of cabin A and B are equal and not “No Coil”
- Coil type of cabin A is “No Coil” and Coil type of cabin B is not “No coil”
- Coil type of cabin A is not “No Coil” and Coil type of cabin B is “No coil”

During implementation into code this requirement was interpreted as the coils are valid when:

- the coils for cabin A and cabin B are the same or
- they are unknown for one of the cabins but they are not unknown for both cabins.

When only one set of coils is attached, this bug causes the STM ATB to remain in the start-up state for more than a minute. This is because the STM ATB will retry the coil detection 60 times, when no valid coils are found. This delays STM ATB system startup. In addition before retrying the test signals were not switched off.

2.5.3 Solution

STMA-83682, T Text - A software fix of the coil diagnostic function (which also reduces STM ATB system startup time).

2.5.4 Impact

STMA-83912, T Text - The impact of this modification is that if only one set of coils is attached, the STM ATB now performs its diagnostic tests on the two connected antenna coils, ignoring the inputs with no antenna coils attached and reducing startup time. The behaviour for other cases remains the same. The technical documentation and software module is to be updated and tested.

2.5.5 Significance

STMA-83913, T Text - The change corrects a bug in the diagnostic function, reducing startup time. It is considered not a significant change. Since the technical documentation is updated, an update of the conformity assessment reports and type certificates is required.

3 Validation

3.1 System configuration

STMA-83937, T Text - The STM ATB hardware- and software configuration of STM ATB V1.1001 is described in the system validation report for STM ATB V1.1 (V9.111). The details of the hardware- and software changes implemented in STM ATB V1.1001 are described in the release notes.

3.1.1 Compatibility hardware revisions

STMA-83943, T Text - Manufacturing optimisation of the PCBs lead to compatible hardware revisions in the STM ATB V1.1001 system configuration.

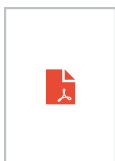
PCB	Compatible revisions
SAP board	R1.2x
AIN board	R1.12 and R1.2x
DIO/PS board	R1.2x (x>2)
BP board	R1.14 and R1.2x

SAP revision <R1.2.0 shall not be used in onboard applications. SAP R1.23 is identical to SAP R1.22 except for some headers that are used for diagnostics (not during operation) and not placed in R1.23.

3.2 Validation of V1.1001 hardware

3.2.1 Environmental temperature test

STMA-84152, T Text - The hardware modifications as described in CR01-1 have been implemented. To demonstrate that the temperature issues have been resolved, STM ATB was subjected to dry heat tests according to EN50155. The tests were witnessed by the assessment body. The tests were successful, demonstrating STM ATB complies with the environmental temperature requirements.



STM ATB V1.1001 Environmental temperature type test report

3.2.2 Hardware documentation review

STMA-83941, T Text - The obsolescence and end-of-life issues reported during Design-For-Logistics and Design-For-Manufacturing have been resolved. The obsolete/End-of-Life components have been replaced by alternative components in STM ATB V1.1001, together with the temperature critical components, which have also been replaced. The hardware modifications concern component replacements and minor PCB modifications, which have been subject to a review.



STM ATB V1.001 hardware documentation review report

3.2.3 EMC compliance

STMA-83893, T Text - Compared to STM ATB V1.1, in V1.1001 changes have been made to increase the environmental temperature range to 70 degrees Celsius, to replace obsolete components and to improve the manufacturability and testability of the PCBAs.

The majority of the changes were made at the SAP board between revision “I” and R1.20.

An STM ATB with updated SAP version R1.20 and the STM ATB V1.1 versions for the AIN, DIO and backplane board was tested for EMC compliance and passed the tests. The results are reported in Bicon report “NED-20231023-E1”.

STM ATB configuration used for these EMC tests:

The STM ATB system ID: 20231011019NS,

PCB QR-codes:

- SAP: 602254 (R1.20)
- AIN: 425710 (R1.12)
- DIO: 427930 (R1.23)
- Backplane: 408353 (R1.14)
- Software : STM ATB version EMC-TEST2 (git label)

STM controller system ID: 103

- software version: controller version EMC-TEST2 (git label)



EMC test report NED-20231023-E1

STMA-84161, T Text - Further hardware changes to the EMC tested configuration are described below.

The changes mainly concern:

- changes of passive components because of obsolescence
 - footprint changes to reduce the risk for soldering faults (improve manufacturing yield)
 - moving components (mostly a few 100um) to ease accessibility of other components for repairs
- or
- optimize distances between soldering pads

These changes reside from a second Design for Obsolescence/Design-for-Manufacturing/Design-for-Test cycle. Two of the proposed hardware modifications have been investigated in more detail, but the conclusion is none of the changes require an EMC retest as these changes will not affect the EM behavior of the system.

- A 5VDC to 3.3VDC LDO

As voltage convertors could cause disturbances, the component change is analyzed in more detail. However it is the same component only the packaging differs

- The capacitors for the analogue (coil) inputs and the 110VDC power supply have a bigger tolerance (2,5% instead of 1%).

The consequences are analyzed, however for the analogue inputs the variation is negligible compared to other tolerances, and for the power supply inputs the capacitor value is arbitrary. The increased tolerance will not affect the EM behavior.

STMA-84162, T Text - SAP board changes (R1.20 to R1.22)

- LD1501 = LY T67K-J2M1-26-Z

Obsolete LED replaced

- LD1600 = LS T676-R1S1-1-Z

Obsolete LED replaced

- Do Place: R1500, R1503

Those resistors were not placed in V1.20, but those resistors are necessary for programming the netX

During operation the resistors do not affect the system.

For programming V1.20 the resistors were added by hand

- C428: C1206C107M9PAC

Obsolete 100u capacitor changed for a type with the same footprint

- U211, U901: converter REF3033AIDBZRG4 replaced by converter REF3033AIDBZR

Obsolete converter replaced by the same type (same specifications) with different order code

- C257: EEE-FK1H151P

Obsolete (not for new designs) 150u capacitor EEFC1V101P replaced by comparable capacitor EEE-FK1H151P

- Header placement for complete access (X101, X102, X103, X400, X901, X1200, X1500)

Jumpers and headers are removed to ease coating and to improve accessibility of surrounding components

V1.22 is produced by CIMAR, thus for manual programming and coating.

Therefore all headers are placed (will be removed in future versions to be produced)

SAP PCB layout changes:

- Added: TP296

- Two extra testpoints requested

- Added: extra testpoints: TP1580, TP1581, TP1582, TP1583, TP996, TP997, TP998, TP1297.

- 2-nd DFM items fixed [see release note]

- Close via's for better coating
 - change size of, or distance between solder pads in the same potential plane (no galvanic isolations) to

reduce the risk on shorts after soldering.

STMA-84163, Text - AIN board changes from V1.12 to V1.20:

Production manufacturing improvements:

- PCB improvements for DFM

footprints changed to improve soldering and thermal characteristics

components moved to improve accessibility from adjacent components

- M610, -11, -12, -13 added

This concerns the mounting screws which were missing in the BOM and in the enclosure BOM.

C) Production testing improvements:

- Bottom testpoints added for DFT

In the DFT it was advised to add as many test points as possible

D) Component and circuit improvements:

- C119, C319 upgraded to 2kV. (was 1kV)

Capacitors replaced with types fit for higher voltages, no change in capacitance, footprint etc.

- C102, C110, C302, C310: R79IC3100DQ40H (100nF/2.5%)

Capacitor Vishay MKP1837410161G is replaced by Kemet R79IC3100DQ40H

The tolerance of the capacitor increases from 1% to 2,5%.

These capacitors are placed parallel to the onboard ATB antenna cables with a length between 0 and

200m, causing a tolerance between 1 to 20nF (= 20%).

Therefore also 2,5% is negligible compared to the spread on the cable capacitance.

- R146, R149, R152, R346, R349, R352

Order code has changed to ERA8ARB103V, so no technical change

- D111, D112, D311, D312:

SMBJ60CA, Supplier changed from Fairchild to Littelfuse, no technical change.

- C207, C211, C407, C411, C209, C216, C409, C416, I103, I303:

Capacitor changed from obsolete GRM188R71E105KA12D to GCM188R71C105KA64D with the same characteristics

- I500, I501: C3216X5R1V226M160AC

Order code has changed, so no technical change

- 26x 10u/2010: C1210X106K3RACTU

Order code has changed, so no technical change

- BAV199, BC857, LP2981A

Order code has changed, so no technical change

- LP2981-50, TPS72301

Order code has changed, so no technical change

STMA-84167, **T** Text - DIO/PS board changes from V1.23 to V1.24:

Production manufacturing improvements:

PCB improvements for DFM

footprints changed to improve soldering and thermal characteristics

components moved to improve accessibility from adjacent components and

components moved to improve soldering with selective wave

Coating better described with coating drawing layer

Component and circuit improvements:

- C106, C107, C212, C213, C312, C313 order code changed to C1812X103KGRACAUTO.

Only a changed order code, no technical change

- C112, C115:

Vishay MKP1837410161G (100nF/1%) replaced by R79IC3100DQ40H (100nF/2.5%)

The value is not critical for this capacitor used in the power supply input circuit.

- L102, L06 order code changed to BNX003-11.

Only a changed order code, no technical change

- I200, I201, I300, I301, I302, I303, I304, I305, I306, I307: GCM188R71C105KA64D

Only a changed order code, no technical change

- PNS4001, BAV23C, BZX84, PBHV8140Z.

Only a changed order code, no technical change

3.3 Software bug - DEV-3760 - packet STM-15 order

STMA-83950, T Text - Software bug (Jira issue DEV-3760) in the scheduler module is resolved. The modified source code has been reviewed. The test results demonstrating correct functioning are documented in T9.0.6.2, chapter 4.2. All tests passed.

3.4 Software bug - DEV-3807 - ATB coil / diagnostic function

STMA-83884, T Text - This software bug was causing excessive startup time of STM ATB in case only two ATB antenna coils are installed. The diagnostic function was modified: the 145Hz test signal is switched off, to check if the track signal is clean.

To avoid further unnecessary diagnostic measures selecting a cabin with no coil or a cabin with coil unknown is handled equally, The concerning conversion factors have been adapted and no extensive coil testing is done if a cabin with no coils is selected (STMA-40487). The modified source code has been reviewed. The test results demonstrating correct functioning are documented in T9.0.6.2, chapter 4.1.

4 Non regression

4.1 Hardware modifications

STMA-84150, T Text - The hardware modifications from the first Design-for-Logistics, the Design-for-Manufacturing and the Design-for-Test cycle have been incorporated in the manufacturing designs. An EMC test in a test laboratory was successful and demonstrated compliance. An additional EMC tests after the second DfL, DfM and DfT cycle is not deemed necessary. The hardware modifications in STM ATB V1.1001 have been reviewed and approved.

4.2 Software modifications

STMA-84151, T Text - A regression test plan has been set up to test the modified modules and the software integration (T9.0.6.0).

The test results are documented and analysed in T9.0.6.2, demonstrating no regression for STM ATB V1.1001.

All non-conclusive test results have been analysed and justified.

4.3 Product end test

STMA-83944, T Text - The modified hardware and software of STM ATB V1.1001 have passed the product-end-test, demonstrating manufacturing conformity.



Product-end-test report STM ATB V1.1001 (STM ATB V1.1001 / SN:20231801002NS)

5 Conclusions

5.1 TSI CCS compliance

STMA-83951, T Text - The modifications in STM ATB V1.1001 have no negative impact on TSI CCS compliance of the STM interface. The issue with packet STM-15 order has been resolved. Non regression has been demonstrated in T9.0.6.2 and the product-end-test.

5.2 Compliance to ATB-EG requirements in RIS 2020

STMA-84168, T Text - The modifications in STM ATB V1.1001 have no negative impact on ATB-EG compliance. Also the non-mandatory ATBVv functionality is not affected by the hardware and software modifications in STM ATB V1.1001.

Non regression has been demonstrated in T9.0.6.2 and the product-end-test report (see STMA-83944).

5.3 System Safety

STMA-84165, T Text - The modifications in STM ATB V1.1001 have no effect the safety critical functions of STM ATB.

Non regression has been demonstrated through EMC tests, in T9.0.6.2 and the product-end-test (see STMA-83944).

The product safety case includes a hyperlink to the System Version Description, see STMA-78266

.
The hyperlink erroneously referred to the outdated SVD v1.1, where it should refer to SVD v1.1001.

This has been corrected in S9.1, however the version and revision numbers of the modified S9.1 have not been updated in the System Validation Report V9.111.

5.4 System RAM

STMA-84166, T Text - The hardware modifications residing from DFL and DFM analysis have been implemented in STM ATB V1.1001. These modifications have shown no adverse effect for RAM performance. The automated product-end-test on two modified SAP boards provided positive results. The modifications in STM ATB V1.1001 have also resolved high-temperature issues in the internal data communication (SAP-board). This has been demonstrated during environmental temperature tests (see STMA-83944).

5.5 Compliance to environmental temperature requirements

STMA-84164, T Text - STM ATB was modified to resolve an issue with Profibus communication at high environmental temperature > 60°C.

Based on environmental temperature tests in a climate chamber STM ATB V1.1001 is found compliant with the environmental temperature requirements as defined in EN50155.