E2E Protection Wrapper & E2Elib Profiles 1, 2, XOR and XORCRC8
Safety Case

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Approval

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Revision Chart

A revision is a new edition of the document and affects all sections of this document.

Version	Date	Responsible Person	Modification
1.0.0	2012-04-23	Carsten Weich	Creation
1.0.1	2012-05-25	Carsten Weich	Updated version numbers, added explanation of section ISO part 6-6 treatment.

Contents

1 Purpose of this Document

This document represents the safety case for the software units
- E2E Protection Wrapper
- E2Elib Profile-1
- E2Elib Profile-2
- E2Elib Profile-XOR and
- E2Elib Profile-XORCRC8

It references all relevant documents to provide evidence that the software units have been developed according to ISO/DIS 26262 requirements for an ASIL D software unit [ISODIS]. This document does not represent a safety case for the whole E2E communication protection – it only covers the development of the above listed software units. The creation of the safety case for the whole End-to-End communication protection is the responsibility of the integrator of the software units.

2 Software Safety Lifecycle Documentation

The software units represent SEooC units according to ISO/DIS 26262. The following software safety lifecycles were executed as part of the development process of the software units:
- 6-5: Initiation of product development at the software level
- 6-8: Software unit design and implementation
- 6-9: Software unit testing

6-6 deals with safety requirements, which are always defined on system level. For the development of the SEooC, we have made assumptions on the safety requirements, which are described in the corresponding SEooC safety manuals. The system integrator must verify that the SEooC fits to the actual system safety requirements.

The other software safety lifecycle phases described by ISO/DIS 26262 have to be executed by the system integrator.

The following subsections list the software safety lifecycle artifacts of the software units:

- Safety manuals as .pdf files,

- Source code delivered to customer as pointer to the code location,

- Requirement, design documentation, and test specification as references to the respective documents in the MKS repository. They are identified by MKS document id and the document version number,

- Test results as .doc or .pdf files

The customer delivery contains safety manuals and source code. All other artifacts can be audited by the customer on request – either on-site in TTTech Vienna development location, or via teleconference (e.g. Webex).

The verification and confirmation measures as required by ISO/DIS 26262 were part of the artifact peer reviews, as described in the Software Project Plan. The evidences for the execution of all verification and confirmation measures as required by ISO/DIS 26262 are version-controlled in the following directories:

E2E Protection Wrapper	<BASE>/e2epw/evidence/
E2Elib Profile-1	<BASE>/e2elib_p01/evidence/
E2Elib Profile-2	<BASE>/e2elib_p02/evidence/
E2Elib Profile-XOR	<BASE>/e2elib_pxor/evidence/
E2Elib Profile-XORCRC8	<BASE>/e2elib_pxorcrc8/evidence/

where <BASE> is http://tttechsvn.vie.at.tttech.ttt/trunk/projects/certification/sqa.

At the time this paper is written, all artefacts are available and reviewed. Formal confirmation of reviews is in progress. The current state of each artefact can be found in this document.

The conformity of the development processses software units with the ISO/DIS 26262 is demonstrated with a compliance matrix [COMPL].

The conformity of the development processes of the software units with ISO/DIS 26262 has been assessed in a process audit [AUDIT_E2EPW].
The conformity of the development processes of the software unit E2Elib Profile-2
with ISO/DIS 26262 was assessed in a functional safety audit [AUDIT_E2Elib]. The Profile-1 has been assessed outside the scope of this project. The Profiles XOR and XORCRC8 are used for backward compatibility, they have not been assessed within the scope of this project.

The remarks and findings during the audits that affect the artifacts of the software units have been solved within the project [AUDF].

2.1 Software Project Plan (SPP)

The SPP contains all planning activities for all software units. It also represents the "Safety Plan" as required by ISO/DIS 26262. Chapter IV of the SPP also contains the software tool qualification plan and software tool qualification report as required by ISO/DIS 26262 - 8 clause 11.

Document Title	Software Project Plan E2E Protection Wrapper
Document Version	3.5
Document Number	D-MSP-P-70-001
Location	http://tttechsvn.vie.at.tttech.ttt/trunk/projects/customers/E2E-Protection-Wrapper-Pr/03_planning&risk-management/SPP.doc (rev-nr: 195123)

2.2 E2Elib Profile-1

2.2.1 Unit Design Document (UDD)

The UDD represents the software unit design specification as required by ISO/DIS 26262 – 6, clause 8. The UDD contains references to the input document [AUTOE2E321], which provides the

API and functional specification of the software unit. The UDD also describes which parts in [AUTOE2E321] are not implemented.

Document Title	E2Elib Profile-1 Unit Design Document
Document Version	1.0.2
Document Number	D-MSP-S-70-003
Location	MKS 68261

2.2.2   Source Code

The source code of the software unit is written in the C programming language. It is delivered as a .zip-Package.

Title	E2Elib Profile-1 Code
Version	1.3.0
Location	\\fileserver.vie.at.tttech.ttt\sw-development\software-releases\external\TTX\2011\msp-e2e_V1_3_0_20111221\ msp_e2e_V1_3_0.zip

The exact contents of the.zip-file and configuration management tags are described in [RAD130].

The HIS metrics and the MISRA rule check were performed with the tool QA-C.

The PWG code follows the guidelines in [CGLE2E].

The HIS metrics report can be found in the files SW_metrics_results_runtime.txt and SW_metrics_results_table.txt (configured for runtime- or table-approach of CRC calculation). All HIS metrics violations are justified in the respective source files

The results of the MISRA-check can be found in the folders qac_reports_runtime and qac_reports_table (configured for runtime- or table-approach of CRC calculation). All violations are justified. The justifications are provided as comments in the respective source files.

2.2.3   Unit Test Specification (UTS)

The UTS contains a detailed test specification of the software unit according to the requirements of ISO/DIS 26262 – 6, clause 9 . The UTS demonstrates 100% requirements coverage.

Document Title	E2Elib Profile-1 Unit Test Specification
Document Version	1.0.1
Document Number	D-100-V-70-020
Location	MKS 69293

2.2.4   Unit Test Report (UTR)

The UTR contains a detailed unit test report according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2Elib Profile-1 Unit Test Report
Document Version	1.0.3
Document Number	D-100-V-70-019
Location	http://tttechsvn.vie.at.tttech.ttt/trunk/SW/ttx-autosar/e2elib_p01/doc/utr/E2Elib_P01_UTR-D-100-V-70-019_V1.0.3.pdf (rev-nr: 196906)

The UTR has been generated for version 1.3.0 of the software unit.

2.2.5   Safety Manual (SM)

The Safety Manual (SM) contains the requirements for the integrator of the software unit. All requirements described in this document must be followed. In specific, the SM describes for which configuration (configuration parameters, used hardware, compiler and linker settings) the software unit has been tested according to ISO/DIS 26262 requirements. Moreover, the SM describes which SW safety lifecycle requirements and recommendations of ISO/DIS 26262 were not executed during the development of the software unit. These requirements and recommendations have to be considered by the integrator of the software unit.

Document Title	E2Elib Profile-1 Safety Manual
Document Version	1.1.8
Document Number	D-MSP-M-70-003
Locations	\\fileserver.vie.at.tttech.ttt\projects\certification\tttech-automotive\release\E2Elib_P01\SM\
Filename	E2Elib_P01_SM-D-MSP-M-70-003_V1.1.8.pdf

2.3   E2Elib Profile-2

2.3.1   Unit Design Document (UDD)

The UDD represents the software unit design specification as required by ISO/DIS 26262 – 6, clause 8. The UDD contains references to the input document [AUTOE2E401], which provides the API and functional specification of the software unit. The UDD also describes which parts in [AUTOE2E401] are not implemented. The UDD also contains references to the input documents [LAH11], [ANG_P02] which contain the safety requirements for end-to-end communication protection.

Document Title	E2Elib Profile-2 Unit Design Document
Document Version	2.0.3
Document Number	D-100-S-70-012
Location	MKS 32765

2.3.2   Source Code

The source code of the software unit is written in the C programming language. It is delivered as a .zip-Package.

Title	E2Elib Profile-2 Code

| Version | 1.3.0 |
| Location | \\fileserver.vie.at.tttech.ttt\sw-development\software-releases\external\TTX\2011\msp-e2e_V1_3_0_20111221\ msp_e2e_V1_3_0.zip |

The exact contents of the.zip-file and configuration management tags are described in [RAD_P01].

The HIS metrics and the MISRA rule check according to the coding guidelines [CGLE2E] was performed with the tool QA-C.

The HIS metrics report can be found in the files SW_metrics_results_runtime.txt and SW_metrics_results_table.txt (configured for runtime- or table-approach of CRC calculation). All HIS metrics violations are justified in the respective source files

The results of the MISRA-check can be found in the folders qac_reports_runtime and qac_reports_table (configured for runtime- or table-approach of CRC calculation). All violations are justified. The justifications are provided as comments in the respective source files.

2.3.3   Unit Test Specification (UTS)

The UTS contains a detailed test specification of the software unit according to the requirements of ISO/DIS 26262 – 6, clause 9 . The UTS demonstrates 100% requirements coverage.

Document Title	E2Elib Profile-2 Unit Test Specification
Document Version	1.3.2
Document Number	D-MSP-V-70-026
Location	MKS 36984

2.3.4   Unit Test Report (UTR)

The UTR contains a detailed unit test report according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2Elib Profile-2 Unit Test Report
Document Version	1.1.3
Document Number	D-100-V-70-014
Location	http://tttechsvn.vie.at.tttech.ttt/trunk/SW/ttx-autosar/e2elib_p02/doc/utr/E2Elib_P02_UTR-D-100-V-70-014_V1.1.3.pdf (rev-nr: 196906)

The UTR has been generated for version 1.3.0 of the software unit.

2.3.5 Safety Manual (SM)

The Safety Manual (SM) contains the requirements for the integrator of the software unit. All requirements described in this document must be followed. In specific, the SM describes for which configuration (configuration parameters, used hardware, compiler and linker settings) the software unit has been tested according to ISO/DIS 26262 requirements. Moreover, the SM describes which SW safety lifecycle requirements and recommendations of ISO/DIS 26262 were not executed during the development of the software unit. These requirements and recommendations have to be considered by the integrator of the software unit.

Document Title	E2Elib Profile-2 Safety Manual
Document Version	1.2.9
Document Number	D-001-M-70-001
Location	\\fileserver.vie.at.tttech.ttt\projects\certification\tttech-automotive\release\E2Elib_P02\SM\
Filename	E2Elib_P02_SM-D-001-M-70-001-V1.2.9.pdf

2.4 E2Elib Profile-XOR

2.4.1 Unit Design Document (UDD)

The UDD represents the software unit design specification as required by ISO/DIS 26262 – 6, clause 8. The UDD contains references to the input documents [AUTOE2E321] which provides the API and functional specification of the software unit. The UDD also describes which parts in [AUTOE2E321] are not implemented. The UDD also contains references to the input documents [LAH15] and [KOM] which contain the safety requirements for end-to-end communication protection.

Document Title	E2Elib Profile-XOR Unit Design Document
Document Version	1.0.2
Document Number	D-MSP-S-70-004
Location	MKS 153561

2.4.2 Source Code

The source code of the software unit is written in the C programming language. It is delivered as a .zip-Package.

Title	E2Elib Profile-XOR Code
Version	1.3.0
Location	\\fileserver.vie.at.tttech.ttt\sw-development\software-releases\external\TTX\2011\msp-e2e_V1_3_0_20111221\ msp_e2e_V1_3_0.zip

The exact contents of the.zip-file and configuration management tags are described in [RAD130].

The HIS metrics and the MISRA rule check according to the coding guidelines [CGLE2E] was performed with the tool QA-C.

The HIS metrics report can be found in the files SW_metrics_results.txt. All HIS metrics violations are justified in the respective source files

The results of the MISRA-check can be found in the folders qac_reports. All violations are justified. The justifications are provided as comments in the respective source files.

2.4.3   Unit Test Specification (UTS)

The UTS contains a detailed test specification of the software unit according to the requirements of ISO/DIS 26262 – 6, clause 9 . The UTS demonstrates 100% requirements coverage.

Document Title	E2Elib Profile-XOR Unit Test Specification
Document Version	1.0.2
Document Number	D-MSP-V-70-010
Location	MKS 175574

2.4.4   Unit Test Report (UTR)

The UTR contains a detailed unit test report according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2Elib Profile-XOR Unit Test Report
Document Version	1.0.1
Document Number	D-MSP-V-70-009
Locations	http://tttechsvn.vie.at.tttech.ttt/trunk/SW/ttx-autosar/e2elib_pxor/doc/utr/E2Elib_PXOR_UTR-D-MSP-V-70-009_V1.0.1.pdf (rev-nr: 196906)

The UTR has been generated for version 1.3.0 of the software unit.

2.4.5   Safety Manual (SM)

The Safety Manual (SM) contains the requirements for the integrator of the software unit. All requirements described in this document must be followed. In specific, the SM describes for which configuration (configuration parameters, used hardware, compiler and linker settings) the software unit has been tested according to ISO/DIS 26262 requirements. Moreover, the SM describes which SW safety lifecycle requirements and recommendations of ISO/DIS 26262 were not executed during the development of the software unit. These requirements and recommendations have to be considered by the integrator of the software unit.

Document Title	E2Elib Profile-XOR Safety Manual
Document Version	1.1.11
Document Number	D-MSP-M-70-004
Location	\\fileserver.vie.at.tttech.ttt\projects\certification\tttech-automotive\release\E2Elib_PXOR\SM\
Filename	E2Elib_PXOR_SM-D-MSP-M-70-004_V1.1.11.pdf

2.5 E2Elib Profile-XORCRC8

2.5.1 Unit Design Document (UDD)

The UDD represents the software unit design specification as required by ISO/DIS 26262 – 6, clause 8. The UDD contains references to the input documents [AUTOE2E321] which provides the API and functional specification of the software unit. The UDD also describes which parts in [AUTOE2E321] are not implemented. The UDD also contains references to the input documents [LAH15] and [KOM] which contain the safety requirements for end-to-end communication protection.

Document Title	E2Elib Profile-XORCRC8 Unit Design Document
Document Version	1.1.3
Document Number	D-MSP-S-70-002
Location	MKS 138837

2.5.2 Source Code

The source code of the software unit is written in the C programming language. It is delivered as a .zip-Package.

Title	E2Elib Profile-XORCRC8 Code
Version	1.3.0
Location	\\fileserver.vie.at.tttech.ttt\sw-development\software-releases\external\TTX\2011\msp-e2e_V1_3_0_20111221\ msp_e2e_V1_3_0.zip

The exact contents of the.zip-file and configuration management tags are described in [RAD130].

The HIS metrics and the MISRA rule check according to the coding guidelines [CGLE2E] was performed with the tool QA-C.

The HIS metrics report can be found in the files SW_metrics_results_runtime.txt and SW_metrics_results_table.txt (configurated for runtime- or table-approach of CRC calculation). All HIS metrics violations are justified in the respective source files

The results of the MISRA-check can be found in the folders qac_reports_runtime and qac_reports_table (configurated for runtime- or table-approach of CRC calculation). All violations are justified. The justifications are provided as comments in the respective source files.

2.5.3 Unit Test Specification (UTS)

The UTS contains a detailed test specification of the software unit according to the requirements of ISO/DIS 26262 – 6, clause 9 . The UTS demonstrates 100% requirements coverage.

Document Title	E2Elib Profile-XORCRC8 Unit Test Specification

Document Version	1.0.2
Document Number	D-MSP-V-70-018
Location	MKS 173981

2.5.4 Unit Test Report (UTR)

The UTR contains a detailed unit test report according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2Elib Profile-XORCRC8 Unit Test Report
Document Version	1.0.1
Document Number	D-MSP-V-70-008
Location	http://tttechsvn.vie.at.tttech.ttt/trunk/SW/ttx-autosar/e2elib_pxorcrc8/doc/utr/E2Elib_PXORCRC8_UTR-D-MSP-V-70-008_V1.0.1.pdf (rev-nr: 196906)

The UTR has been generated for version 1.3.0 of the software unit.

2.5.5 Safety Manual (SM)

The Safety Manual (SM) contains the requirements for the integrator of the software unit. All requirements described in this document must be followed. In specific, the SM describes for which configuration (configuration parameters, used hardware, compiler and linker settings) the software unit has been tested according to ISO/DIS 26262 requirements. Moreover, the SM describes which SW safety lifecycle requirements and recommendations of ISO/DIS 26262 were not executed during the development of the software unit. These requirements and recommendations have to be considered by the integrator of the software unit.

Document Title	E2Elib Profile-XORCRC8 Safety Manual
Document Version	1.2.9
Document Number	D-MSP-M-70-005
Location	\\fileserver.vie.at.tttech.ttt\projects\certification\tttech-automotive\release\E2Elib_PXORCRC8\SM\
File Name	E2Elib_PXORCRC8_SM-D-MSP-M-70-005_V1.2.9.pdf

2.6 E2E Protection Wrapper

2.6.1 SW Requirements Document (SRD)

The SRD represents the software unit high-level requirements as required by ISO/DIS 26262 – 6, clause 6. The SRD contains references to the input document [AUTOE2E321], which provides the API and functional specification of the software unit. The UDD also describes which parts in [AUTOE2E321] are not implemented. The SRD also contains references to the input documents [LAH15], [KOM] which contain the safety requirements for end-to-end communication protection. The SRD also refers requirements to [ASAM].

Document Title	E2E Protection Wrapper SRD E2Elib PWG
Document Version	1.0.8
Document Number	D-MSP-S-70-005
Location	MKS 50122

2.6.2 SW Architecture Document (SAD)

The SAD represents high-level requirements of the SW architecture as required by ISO/DIS 26262 – 6, clause 7. The SAD contains references to the input document [AUTOE2E321], which provides the API and functional specification of the software unit. The UDD also describes which parts in [AUTOE2E321] are not implemented. The SRD also contains references to the input documents [LAH15], [KOM] and SRD which contain the safety requirements for end-to-end communication protection. The SRD also refers requirements to [ASAM].

Document Title	E2E Protection Wrapper SAD E2Elib PWG
Document Version	1.0.6
Document Number	D-MSP-S-70-007
Location	MKS 51853

2.6.3 Source Code

The source code of the software unit is written in the C programming language. The compiled executable is delivered.as a .zip-Package.

Title	E2E Protection Wrapper Code
Version	1.3.1
Location	All c- and h-files in the folders common, e2epw_autosar_rte, e2epw_can1939 and e2epw_com.

The location of the folders is
http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUDI/SW/msp-e2epw for the AUDI variant and
http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUDI/SW/msp-e2epw for the AUTOSAR variant.

The configuration management tags are described in [RAD132].

The HIS metrics and the MISRA rule check according to the coding guidelines [CGLE2E] was performed with the tool QA-C.

The HIS metrics report can be found in qac_gcc/PWG/qac_reports_P02_PXOR_PXORCRC8 files SW_metrics_results_P02_PXOR_PXORCRC8.txt (AUDI release) and qac_gcc/PWG/qac_reports_P01_P02SW_metrics_results_P01_P02.txt (AUTOSAR release). All HIS metrics violations are justified in the respective source files

The results of the MISRA-check can be found in the folders qac_reports_P02_PXOR_PXORCRC8 (AUDI release) and qac_reports_P01_P02 (AUTOSAR release). All violations are justified. The justifications are provided as comments in the respective source files.

2.6.4   Unit Design Document (UDD) - Importer

The UDD represents the software unit design specification of the PWG Importer module as required by ISO/DIS 26262 – 6, clause 8. The UDD contains references to the SRD and SAD documents.

Document Title	E2E Protection Wrapper UDD E2Elib PWG - Importer
Document Version	1.0.2
Document Number	D-MSP-D-70-001
Location	MKS 54009

2.6.5   Unit Design Document (UDD) - Verifier

The UDD represents the software unit design specification of the PWG Verifier module as required by ISO/DIS 26262 – 6, clause 8. The UDD contains references to the SRD, SAD and UDD - Importer.

Document Title	E2E Protection Wrapper UDD E2Elib PWG - Verifier
Document Version	1.0.5
Document Number	D-MSP-D-70-002
Location	MKS 54012

2.6.6   Unit Design Document (UDD) - Marshal Code Generator

The UDD represents the software unit design specification of the PWG Marshal Code Generator module as required by ISO/DIS 26262 – 6, clause 8. The UDD contains references to the SRD, SAD and UDD - Importer. the UDD also contains references to requirements in [SWSCOM400], [OSEK303] and [ASAM].

Document Title	E2E Protection Wrapper UDD E2Elib PWG - Marshal Code Generator
Document Version	1.0.3
Document Number	D-MSP-D-70-003
Location	MKS 54015

2.6.7   Unit Design Document (UDD) - Main & Rx/Tx Wrapper

The UDD represents the software unit design specification of the PWG Main and the PWG Rx/Tx Wrapper modules as required by ISO/DIS 26262 – 6, clause 8. The UDD contains references to the SRD, SAD and UDD - Importer and UDD - Verifier. The UDD also contains references to requirements in [AUTOE2E321] and [LAH15].

Document Title	E2E Protection Wrapper UDD E2Elib PWG - Main & Rx/Tx Wrapper
Document Version	1.0.3
Document Number	D-MSP-S-70-006
Location	MKS 51052

2.6.8   Unit Test Specification (UTS) - Importer

The UTS contains a detailed test specification of the PWG Importer module according to the requirements of ISO/DIS 26262 – 6, clause 9 . The UTS demonstrates 100% requirements coverage.

Document Title	E2E Protection Wrapper UTS E2Elib PWG - Importer
Document Version	1.0.2
Document Number	D-MSP-V-70-002
Location	MKS 70987

2.6.9   Unit Test Specification (UTS) - Verifier

The UTS contains a detailed test specification of the PWG Verifier module according to the requirements of ISO/DIS 26262 – 6, clause 9 . The UTS demonstrates 100% requirements coverage.

Document Title	E2E Protection Wrapper UTS E2Elib PWG - Verifier
Document Version	1.0.2
Document Number	D-MSP-V-70-003
Location	MKS 75177

2.6.10   Unit Test Specification (UTS) - Marshal Code Generator

The UTS contains a detailed test specification of the PWG Marshal Code Generator module according to the requirements of ISO/DIS 26262 – 6, clause 9 . The UTS demonstrates 100% requirements coverage.

Document Title	E2E Protection Wrapper UTS E2Elib PWG - Marshal Code Generator
Document Version	1.0.1
Document Number	D-MSP-V-70-001
Location	MKS 70749

2.6.11   Unit Test Specification (UTS) - Main & Rx/Tx Wrapper

The UTS contains a detailed test specification of the PWG Main and the PWG Rx/Tx Wrapper modules according to the requirements of ISO/DIS 26262 – 6, clause 9 . The UTS demonstrates 100% requirements coverage.

Document Title	E2E Protection Wrapper UTS E2Elib PWG - Main & Rx/Tx Wrapper
Document Version	1.0.3
Document Number	D-MSP-V-70-004
Location	MKS 53579

2.6.12   Unit Test Specification (UTS) - Generated Wrapper Code

The UTS contains a detailed test specification of the PWG by testing generated code according to the requirements of ISO/DIS 26262 – 6, clause 9 . The UTS demonstrates 100% requirements coverage.

Document Title	E2E Protection Wrapper UTS E2Elib PWG - Generated Wrapper Code
Document Version	1.0.1
Document Number	D-MSP-V-70-005
Location	MKS 50646

The HIS metrics and the MISRA rule check of the generated code were performed with the tool QA-C.
The generated code follows the guidelines in [AUTOGGL].

The HIS metrics report can be found in the files SW_metrics_results_P02_PXOR_PXORCRC8.txt (AUDI release) and SW_metrics_results_P01_P02.txt (AUTOSAR release). All HIS metrics violations are justified in the respective source files

The results of the MISRA-check can be found in the folders qac_reports_P02_PXOR_PXORCRC8 (AUDI release) and qac_reports_P01_P02 (AUTOSAR release). All violations are justified. The justifications are provided as comments in the respective source files.

2.6.13 Unit Test Reports - AUDI Release

2.6.13.1 Unit Test Report (UTR) - Importer
The UTR contains a detailed unit test report of the PWG Importer module according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR E2Elib PWG-Importer - P02, PXOR and PXORCRC8
Document Version	1.3.0
Document Number	D-MSP-V-70-014
Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUDI/SW/msp-e2epw/utr/utr_gencode/E2EPW_UTR_IMP_D-MSP-V-70-014_V_1_3.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.13.2 Unit Test Report (UTR) - Verifier
The UTR contains a detailed unit test report of the PWG Verifier module according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR E2Elib PWG-Verifier - P02, PXOR and PXORCRC8
Document Version	1.3.0
Document Number	D-MSP-V-70-016

Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUDI/SW/msp-e2epw/utr/utr_gencode/E2EPW_UTR_VER_D-MSP-V-70-016_V_1_3.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.13.3 Unit Test Report (UTR) - Marshaling Code Generator

The UTR contains a detailed unit test report of the PWG Marshaling Code Generator module according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR E2Elib PWG- Marshaling Code Generator - P02, PXOR and PXORCRC8
Document Version	1.3.0
Document Number	D-MSP-V-70-015
Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUDI/SW/msp-e2epw/utr/utr_gencode/E2EPW_UTR_MAR_D-MSP-V-70-015_V_1_3.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.13.4 Unit Test Report (UTR) - Main & Rx/Tx Wrapper

The UTR contains a detailed unit test report of the PWG Main and the PWG Rx/Tx Wrapper modules according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR E2Elib PWG Main & Rx/Tx-Wrapper Generator - P02, PXOR and PXORCRC8
Document Version	1.3.0
Document Number	D-MSP-V-70-020
Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUDI/SW/msp-e2epw/utr/utr_gencode/E2EPW_UTR_MAIN_RxTx_D-MSP-V-70-020_V_1_3.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.13.5 Unit Test Report (UTR) - Generated Wrapper Code

The UTR contains a detailed unit test report of the code that is generated by the PWG according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR Generated Wrapper Code

Document Version	1.0.0
Document Number	D-MSP-V-70-017
Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUDI/SW/msp-e2epw/utr/utr_gencode/ E2EPW_UTR_GENCODE_D-MSP-V-70-017_V1.0.0.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.14 Unit Test Reports - AUTOSAR Release

2.6.14.1 Unit Test Report (UTR) - Importer
The UTR contains a detailed unit test report of the PWG Importer module according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR E2Elib PWG-Importer - P01, P02
Document Version	1.3.0
Document Number	D-MSP-V-70-011
Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUTOSAR/SW/msp-e2epw/utr/utr_gencode/E2EPW_UTR_IMP_D-MSP-V-70-011_V_1_3.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.14.2 Unit Test Report (UTR) - Verifier
The UTR contains a detailed unit test report of the PWG Verifier module according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR E2Elib PWG-Verifier - P01, P02
Document Version	1.3.0
Document Number	D-MSP-V-70-013
Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUTOSAR/SW/msp-e2epw/utr/utr_gencode/E2EPW_UTR_VER_D-MSP-V-70-013_V_1_3.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.14.3 Unit Test Report (UTR) - Marshaling Code Generator
The UTR contains a detailed unit test report of the PWG Marshaling Code Generator module according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all

tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR E2Elib PWG- Marshaling Code Generator - P01, P02
Document Version	1.3.0
Document Number	D-MSP-V-70-012
Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUTOSAR/SW/msp-e2epw/utr/utr_gencode/E2EPW_UTR_MAR_D-MSP-V-70-012_V_1_3.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.14.4 Unit Test Report (UTR) - Main & Rx/Tx Wrapper

The UTR contains a detailed unit test report of the PWG Main and the PWG Rx/Tx Wrapper modules according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR E2Elib PWG Main & Rx/Tx-Wrapper Generator - P01, P02
Document Version	1.3.0
Document Number	D-MSP-V-70-019
Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUTOSAR/SW/msp-e2epw/utr/utr_gencode/E2EPW_UTR_MAIN_RxTx_D-MSP-V-70-019_V_1_3.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.14.5 Unit Test Report (UTR) - Generated Wrapper Code

The UTR contains a detailed unit test report of the code that is generated by the PWG according to the requirements of ISO/DIS 26262 – 6, clauses 8 and 9. The UTR shows that all tests and review procedures specified in the UTS pass and that 100% MC/DC coverage is achieved.

Document Title	E2E Protection Wrapper UTR Generated Wrapper Code
Document Version	1.0.0
Document Number	D-MSP-V-70-017
Location	http://tttechsvn.vie.at.tttech.ttt/branches/For_E2EPW_Module_Release_1_3_2_AUTOSAR/SW/msp-e2epw/utr/utr_gencode/E2EPW_UTR_GENCODE_D-MSP-V-70-017_V1.0.0.doc

The UTR has been generated for version 1.3.1 of the software unit (in release 1.3.2).

2.6.15 Safety Manual (SM)

The Safety Manual (SM) contains the requirements for the integrator of the software unit. All requirements described in this document must be followed. In specific, the SM describes for which configuration (configuration parameters, used hardware, compiler and linker settings) the software unit has been tested according to ISO/DIS 26262 requirements. Moreover, the SM describes which SW safety lifecycle requirements and recommendations of ISO/DIS 26262 were not executed during the development of the software unit. These requirements and recommendations have to be considered by the integrator of the software unit.

Document Title	E2E Protection Wrapper Safety Manual
Document Version	1.2.9
Document Number	D-MSP-M-70-002
File Name	E2EPW_SM-D-MSP-M-70-002_V1.2.9.pdf

3   Summary

The evidence in section 2 shows that the software units have been developed according to the requirements of ISO/DIS 26262 for ASIL D software. It is safe to integrate the software units into safety-related systems developed according to ISO/DIS 26262 if the requirements described in the Safety Manuals of the respective software units are fulfilled by the system integrator.

4   Abbreviations and Glossary

Acronym / Term	Meaning
API	Application Programmer Interface
ASIL	Automotive Safety Integrity Level
DIS	Draft International Standard
E2EPW	E2E Protection Wrapper (the project)
HIS	Herstellerinitiative Software
MC/DC	Modified Condition/Decision Coverage
MISRA	Motor Industry Software Reliability Association
P01	E2Elib Profile-1
P02	E2Elib Profile-2
PWG	Protection Wrapper Generator (the software)
PXOR	E2Elib Profile-XOR
PXORCRC8	E2Elib Profile-XORCRC8
SEooC	Safety Element out of Context according to ISO/DIS 26262-10
SW	Software Specification

5   References

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