Document Title	Feature Specification of the Acceptance Tests
Document Owner	AUTOSAR
Document Responsibility	AUTOSAR
Document Identification No	607
Document Classification	Auxiliary

Document Status	Final
Part of AUTOSAR Standard	Acceptance Tests for Classic Platform
Part of Standard Release	1.2.0

Document Change History

Date	Release	Changed by	Change Description
2016-12-15	1.2.0	AUTOSAR Release Management	• Added ATR_ATF_00030 for GlobalTimeSync • RS_BRF requirements added for tested items of ATR_ATF_00011 and ATR_ATF_00014 • Reference RS_Main requirement instead of ATR_Main requirements
2015-10-31	1.1.0	AUTOSAR Release Management	• Added RS_BRF_01776 (Ethernet) and RS_BRF_01784 (TCP/IP) as tested items of ATR_ATF_00014. • Formal changes
2014-07-30	1.0.0	AUTOSAR Release Management	• Initial release

Disclaimer

Advice for users

AUTOSAR specifications may contain exemplary items (exemplary reference models, "use cases", and/or references to exemplary technical solutions, devices, processes or software).

Any such exemplary items are contained in the specifications for illustration purposes only, and they themselves are not part of the AUTOSAR Standard. Neither their presence in such specifications, nor any later documentation of AUTOSAR conformance of products actually implementing such exemplary items, imply that intellectual property rights covering such exemplary items are licensed under the same rules as applicable to the AUTOSAR Standard.

Table of Contents

1 Scope of Document

This document describes all features of the AUTOSAR Acceptance Tests.

The feature defines what is to be tested by AUTOSAR Acceptance Tests.

2 Conventions to be used

- The representation of requirements in AUTOSAR documents follows the table specified in [TPS_STDT_00078].
- In requirements, the following specific semantics shall be used (based on the Internet Engineering Task Force IETF).

  The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as:

  - SHALL: This word means that the definition is an absolute requirement of the specification.
  - SHALL NOT: This phrase means that the definition is an absolute prohibition of the specification.
  - MUST: This word means that the definition is an absolute requirement of the specification due to legal issues.
  - MUST NOT: This phrase means that the definition is an absolute prohibition of the specification due to legal constraints.
  - SHOULD: This word, or the adjective "RECOMMENDED", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
  - SHOULD NOT: This phrase, or the phrase "NOT RECOMMENDED" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
  - MAY: This word, or the adjective „OPTIONAL“, means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation, which does not include a particular option, MUST be prepared to interoperate with another implementation, which does include the option, though perhaps with reduced functionality. In the same vein an implementation, which does include a particular option, MUST be prepared to interoperate with another implementation, which does not include the option (except, of course, for the feature the option provides.)

3 Acronyms and Abbreviations

Except for the acronyms and abbreviations below, all acronyms and abbreviations used throughout this document are included in the official AUTOSAR glossary [Glossary]. For respective explanation please see there.

Acronym:	*Description:*
SUT	System Under Test

Abbreviation:	*Description:*

4 Main Features

4.1 [ATR_ATF_00027] AUTOSAR shall provide test cases to test application compatibility

⌈

Type:	valid
Description:	AUTOSAR shall provide test cases to test application compatibility.
Rationale:	To support the relocation of applications, software sharing, and reuse of applications in different ECUs, it is needed to ensure the compatibility of BSW stacks with respect to the features used by applications.
Use Case:	Reuse of applicative software components on different AUTOSAR stack implementations.
Dependencies:	--
Supporting Material:	--
Tested Items:	N/A

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4.2 [ATR_ATF_00028] AUTOSAR shall provide test cases to test bus compatibility

⌈

Type:	valid
Description:	AUTOSAR shall provide test cases to test bus compatibility: • Timing behavior • Bus wake-up/sleep behavior • Data layout • Etc.
Rationale:	To support the reuse of an ECU in different vehicles, the ECU needs to be compatible with the expectations of the different networks.
Use Case:	Integration of an AUTOSAR ECU in a bus.
Dependencies:	--
Supporting Material:	--
Tested Items:	N/A

⌋(RS_Main_00120)

4.3 [ATR_ATF_00007] The SUT shall be an integrated BSW stack

⌈

Type:	valid
Description:	The SUT is the output of the AUTOSAR generation process based on system description, ECU configuration description, and SW-C descriptions running on an ECU. The SUT includes the generated RTE.
Rationale:	• Market demands on ICC1 acceptance tests. • Acceptance test on a stack before integration of SW-C or integration in a vehicle network.
Use Case:	• Test the compatibility of the BSW stack with the applications • Test the compatibility of the BSW stack with respect to the buses where the ECU will be integrated. • Test the compatibility of the BSW stack with a system description, SW-C templates.
Dependencies:	--
Supporting Material:	AUTOSAR Methodology
Tested Items:	N/A

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4.4 [ATR_ATF_00001] Acceptance tests shall reuse real production examples when available

⌈

Type:	valid
Description:	AUTOSAR acceptance test shall reuse real production examples when available.
Rationale:	• Real production examples are proven in use • Reuse of existing test cases enables fast ramp up and reduce development costs
Use Case:	--
Dependencies:	--
Supporting Material:	--
Tested Items:	N/A

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4.5 [ATR_ATF_00004] Application and bus compatibility test cases shall specify the required configurations

⌈

Type:	valid
Description:	Application and bus compatibility test cases shall specify requirements on the configuration files needed when test suites are implemented or executed.
Rationale:	• The AUTOSAR basic software and RTE is heavily dependent on the configuration for its interface to applications and behavior toward applications or buses. • The usage of acceptance tests in different contexts (e.g. implementation and execution by a stack vendor, implementation dedicated to one OEM, or implementation required to support multiple basic software implementation) needs flexibility in the actual configuration files used to generate the ECU where tests are executed.
Use Case:	• Consistency of test results • Support for different business models and usage in different environments
Dependencies:	--
Supporting Material:	--
Tested Items:	--

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4.6 [ATR_ATF_00009] Acceptance tests shall verify the correct processing of configuration artifacts

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Type:	valid
Description:	Acceptance tests shall verify the correct processing of configuration artefacts.
Rationale:	Configuration artefacts (e.g. SW-C description or Ecu Extract) are exchanged between partners. It needs to be ensured that a configuration leads to the expected behavior and provides the expected interfaces to applications.
Use Case:	mode disabling dependencies, TP configuration (support of configuration parameter and interpretation), …
Dependencies:	--
Supporting Material:	--
Tested Items:	--

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4.7 [ATR_ATF_00008] Acceptance Tests shall test BSW services

⌈

Type:	valid
Description:	AUTOSAR Acceptance Tests shall test all BSW services.
Rationale:	Software reuse is one of the major aims of AUTOSAR. The reuse of Software Components requires that the services of the BSW implementation are compatible
Use Case:	Reuse of a Software Component on different platforms
Dependencies:	
Supporting Material:	
Tested Items:	• RS_BRF_01408 AUTOSAR shall provide a service layer that is accessible from each basic software layer • RS_BRF_01424 AUTOSAR services shall support communication services • RS_BRF_01440AUTOSAR services shall support system diagnostic functionality • RS_BRF_01448 AUTOSAR services shall support mode and state management

⌋(RS_Main_00120)

4.8 [ATR_ATF_00011] Acceptance tests shall test RTE features

⌈

Type:	Valid
Description:	Acceptance tests shall test the RTE features available to applications or with impact on bus behaviors according to the AUTOSAR specifications.
Rationale:	Applications are using RTE APIs and rely on the RTE behavior. The reuse of applications requires that the RTE fulfils the applications' expectations.
Use Case:	Client server port, …
Dependencies:	--
Supporting Material:	--
Tested Items:	• RS_BRF_01304 AUTOSAR RTE shall support broadcast communication • RS_BRF_01312 AUTOSAR RTE shall support procedure-call communication • RS_BRF_01328 AUTOSAR RTE shall support scheduling of executable entities on defined events • RS_BRF_01352 AUTOSAR RTE shall offer direct read/write data access, and alternatively pre-read data before a runnable is called and post-write data after the runnable returns • RS_BRF_01360 AUTOSAR RTE shall support explicit protection mechanisms against concurrent access • RS_BRF_01376 AUTOSAR RTE shall support automatic re-scaling and conversion of port data elements • RS_BRF_01384 AUTOSAR RTE shall support automatic range checks of data • RS_BRF_01416 AUTOSAR services shall support standardized handling of non-volatile memory data • RS_BRF_01816 AUTOSAR non-volatile memory functionality shall organize persistent data based on logical memory blocks • RS_BRF_01824 AUTOSAR non-volatile memory functionality shall provide a mapping of non-volatile memory into random access memory • RS_BRF_01352 AUTOSAR RTE shall offer direct read/write data access, and alternatively pre-read data before a runnable is called and post-write data after the runnable returns

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4.9 [ATR_ATF_00013] Acceptance tests shall test AUTOSAR Libraries

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Type:	valid
Description:	Acceptance tests shall test AUTOSAR Libraries.
Rationale:	Application are using routines from the AUTOSAR Libraries. The reuse of applications requires that they fulfil the applications' expectations.
Use Case:	• Crypto library (algorithms definition) • mathematical library • E2E library • behavior and availability of APIs (algorithms, interpolation, arithmetic expressions, overflow), …
Dependencies:	--
Supporting Material:	
Tested Items:	• RS_BRF_02104 AUTOSAR shall provide end-to-end protection support as a library

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4.10 [ATR_ATF_00014] Acceptance tests shall test bus interoperability between different ECUs

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Type:	valid
Description:	Acceptance tests shall test bus interoperability between different ECUs with basic software from one or more supplier, with the same or different releases.
Rationale:	The development of ECUs in a vehicle has different life cycles. It needs to be ensured that the features used in different ECUs are interoperable on buses.
Use Case:	Startup behavior, sending empty IO frames, on NM, TP, …
Dependencies:	--
Supporting Material:	
Tested Items:	• RS_BRF_01544 AUTOSAR Communication shall define transmission and reception of communication data • RS_BRF_01560 AUTOSAR communication shall support mapping of signals into transferrable protocol data units • RS_BRF_01592 AUTOSAR communication shall offer data transfer on user request, time based, and requested via the underlying bus • RS_BRF_01664 AUTOSAR communication shall support a state management of buses • RS_BRF_01680 AUTOSAR communication shall support mechanism to keep a bus awake, and to be kept awake by a bus • RS_BRF_01104 AUTOSAR shall support sleep and wake-up of ECUs and buses • RS_BRF_01688 AUTOSAR communication shall support to put buses synchronously to sleep • RS_BRF_01704 AUTOSAR communication shall support the CAN communication bus • [RS_BRF_01776] AUTOSAR communication shall support Ethernet • [RS_BRF_01784] AUTOSAR communication shall support the IP protocol stack • RS_BRF_01649 AUTOSAR communication shall support communication of large and dynamic data in a dedicated optimized module

⌋(RS_Main_00120)

4.11 [ATR_ATF_00018] Acceptance tests shall test the signal and PDU gateway features

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Type:	valid
Description:	Acceptance tests shall test the signal and PDU gateway features.
Rationale:	When a gateway uses an AUTOSAR BSW implementation, it needs to be ensured that it behaves correctly on the different buses it is connected and that it performs correctly its gateway roles.
Use Case:	• Communication between ECUs not connected to the same bus • Signal and Pdu gateway • Support for the timings of different buses. • Stress one of the buses
Dependencies:	--
Supporting Material:	--
Tested Items:	• RS_BRF_01576 AUTOSAR communication shall support a signal gateway • RS_BRF_01584 AUTOSAR communication shall support an IPDU gateway

⌋(RS_Main_00120)

4.12 [ATR_ATF_00030] Acceptance Tests shall test Global Time Synchronization Features

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Type:	valid
Description:	AUTOSAR Acceptance Tests shall test all Global Time Synchronization features.
Rationale:	SWC in different ECUs in a Domain, needs a Synchronized Time Base Information.
Use Case:	Maintaining the common time base, transmission and reception of time over a time domain.
Dependencies:	--
Supporting Material:	--
Tested Items:	RS_BRF_01660

⌋(RS_Main_00120)

4.13 [ATR_ATF_99999] Not applicable AUTOSAR features for acceptance tests

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Type:	Valid
Description:	The following AUTOSAR features are not supported by acceptance tests • Because they are not testable • Because they do not have impact from an ICC1 point of view on the integrated BSW stack
Rationale:	Features added for traceability purpose
Use Case:	
Dependencies:	--
Supporting Material:	--

Tested Items:	• RS_BRF_01208 – AUTOSAR OS shall support to start lists of tasks regularly • RS_BRF_01216 – AUTOSAR OS shall support to synchronize ScheduleTables to an outside time source • RS_BRF_01256 – AUTOSAR OS shall offer support to switch off cores • RS_BRF_01264 – AUTOSAR OS shall support multi-core deadlock free mutual exclusion • RS_BRF_01272 – AUTOSAR OS shall offer functionality to allow Software Components time measurement • RS_BRF_01504 – AUTOSAR shall handle memory corruption resulting from ECU sleep • RS_BRF_01280 – AUTOSAR RTE shall offer the external interfaces between Software Components and between Software Components and BSW • RS_BRF_01288 – AUTOSAR RTE interfaces shall be independent of the addressee • RS_BRF_01336 – AUTOSAR RTE shall only run software component runnables inside tasks • RS_BRF_01400 – AUTOSAR RTE shall offer configurable test hooks • RS_BRF_01408 – AUTOSAR shall provide a service layer that is accessible from each basic software layer • RS_BRF_01800 – AUTOSAR non-volatile memory functionality shall be divided into a hardware dependent and independent layer • RS_BRF_01808 – AUTOSAR non-volatile memory handling shall support different kinds of memory hardware • RS_BRF_01816 – AUTOSAR non-volatile memory functionality shall organize persistent data based on logical memory blocks • RS_BRF_01824 – AUTOSAR non-volatile memory functionality shall provide a mapping of non-volatile memory into random access memory • RS_BRF_01832 – AUTOSAR non-volatile memory shall handle logical memory blocks independent of its physical address • RS_BRF_01840 – AUTOSAR non-volatile memory functionality shall secure integrity of memory blocks • RS_BRF_01848 – AUTOSAR non-volatile memory functionality shall provide mechanisms to enhance hardware reliability • RS_BRF_01856 – AUTOSAR microcontroller abstraction shall provide access to internal MCU configuration • RS_BRF_01864 – AUTOSAR microcontroller abstraction shall provide mapping of I/O signals to digital I/O ports • RS_BRF_01872 – AUTOSAR microcontroller abstraction shall provide mapping of I/O signals to analog/digital converter ports • RS_BRF_01880 – AUTOSAR microcontroller abstraction shall provide mapping of I/O signals to pulse-width modulation controlled ports • RS_BRF_01888 – AUTOSAR microcontroller abstraction shall provide mapping of I/O signals to an output compare unit • RS_BRF_01896 – AUTOSAR microcontroller abstraction shall provide mapping of I/O signals to input capture units • RS_BRF_01904 – AUTOSAR microcontroller abstraction shall provide access to hardware timers • RS_BRF_01912 – AUTOSAR microcontroller abstraction shall provide access to SPI • RS_BRF_01920 – AUTOSAR microcontroller abstraction shall provide access to communication bus controllers • RS_BRF_01928 – AUTOSAR microcontroller abstraction shall provide access to non-volatile memory hardware • RS_BRF_01936 – AUTOSAR microcontroller abstraction shall provide access to MCU internal and external hardware watchdogs • RS_BRF_01944 – AUTOSAR microcontroller abstraction shall provide access to communication bus watchdog hardware • RS_BRF_01952 – AUTOSAR IO Hardware Abstraction shall support

	standardized modes for connected I/O devices • RS_BRF_01960 – AUTOSAR IO Hardware Abstraction shall provide mapping of I/O signals between domain specific and hardware specific units • RS_BRF_01968 – AUTOSAR IO Hardware Abstraction shall support edge triggered I/O signals • RS_BRF_01976 – AUTOSAR IO Hardware Abstraction shall support level triggered I/O signals • RS_BRF_01984 – AUTOSAR IO Hardware Abstraction shall support time domain I/O signals • RS_BRF_01992 – AUTOSAR IO Hardware Abstraction shall support frequency domain I/O signals • RS_BRF_02000 – AUTOSAR IO Hardware Abstraction shall protect hardware against illegal operation • RS_BRF_02040 – AUTOSAR BSW and RTE shall ensure data consistency • RS_BRF_02048 – AUTOSAR shall support usage of hardware memory protection features to enhance safety • RS_BRF_02064 – AUTOSAR shall use hardware communication data integrity mechanisms • RS_BRF_00241 – AUTOSAR shall support redundant multiple communication links • RS_BRF_02080 – AUTOSAR libraries shall use C interfaces • RS_BRF_02088 – AUTOSAR library functionality shall be reentrant • RS_BRF_01792 – AUTOSAR shall support SPI • RS_BRF_01552 – AUTOSAR communication shall separate bus independent functionality from bus dependent functionality • RS_BRF_01640 – AUTOSAR communication shall support transmit and receive cancelation • RS_BRF_02192 – AUTOSAR diagnostic management shall be bus independent • RS_BRF_02224 – AUTOSAR shall support run-time hardware tests • RS_BRF_02232 – AUTOSAR shall support development with run-time assertion checks • RS_BRF_02240 – AUTOSAR debugging shall provide relevant internal data of Basic Software to the developer • RS_BRF_02248 – AUTOSAR debugging shall offer methods to influence behavior of a Basic Software Module • RS_BRF_02256 – AUTOSAR debugging shall support runtime and post mortem debugging • RS_BRF_02264 – AUTOSAR shall support XCP for setting measurement and calibration data • RS_BRF_02272 – AUTOSAR shall offer tracing of application software behavior • RS_BRF_02280 – AUTOSAR shall support non-AUTOSAR BSW modules • RS_BRF_02288 – Generic interfaces in AUTOSAR shall support Complex Drivers

](RS_Main_00120)