

The Compliance Process  
from a Supplier's Point of View  
13th MOST Interconnectivity Conference Asia  
Seoul, November 15, 2012

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## Agenda

1. Motivation
2. Compliance Verification Process
3. Success Stories
4. Further possibilities
5. Conclusion

## Motivation

### Considerations of a supplier:

- What kind of tests are performed during a compliance verification?
- When is it a good time for a pretest?
- How do I apply for a test?
- What information has to be provided?
- What does the test report look like?
- Are there any further possibilities to ensure robustness of my systems?

## Motivation

### History: Compliance Verification at Ruetz System Solutions

1997 1999 2001 2003 2005 2007 2009 2011 2013

MOST Expertise since the very beginning

MOST25 Compliance

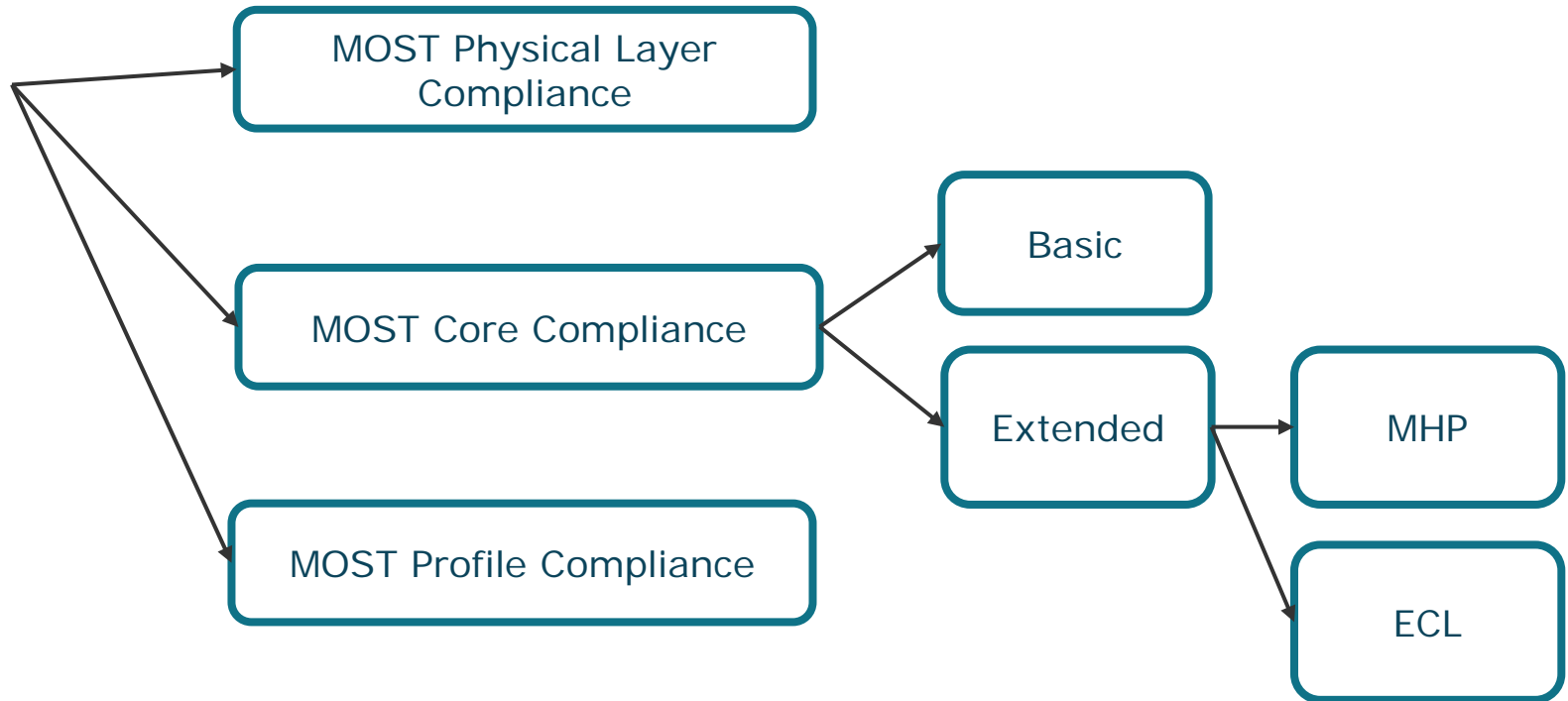
MOST50 ePhy Compliance

MOST150 Compliance

- Bundled experience of 15 years of compliance work
- Member of the MOST Compliance Technical Group since foundation
- Driving force for many technological and organizational backgrounds

## Motivation

### Test scopes at Ruetz System Solutions



- all necessary scopes for certification of a ECU
- all available MOST speed grades on the market

## Motivation

### Benefits

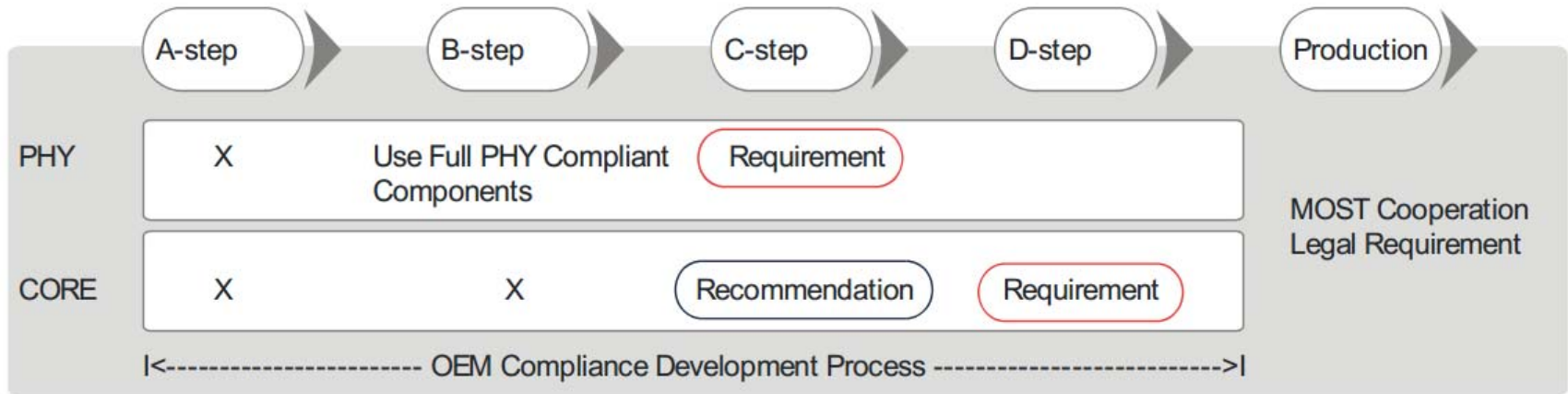
- Fulfilling the requirements of your OEM
- Legal aspects of MOST Cooperation
- Recommendations for improvement
- Your confidence in the functionality and conformity of your product
- Basis for interoperability and system integration
- Additional Services (Test House as a Service)
- All under one roof

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## Compliance Verification Process

### Compliance as part of the OEM's System Integration



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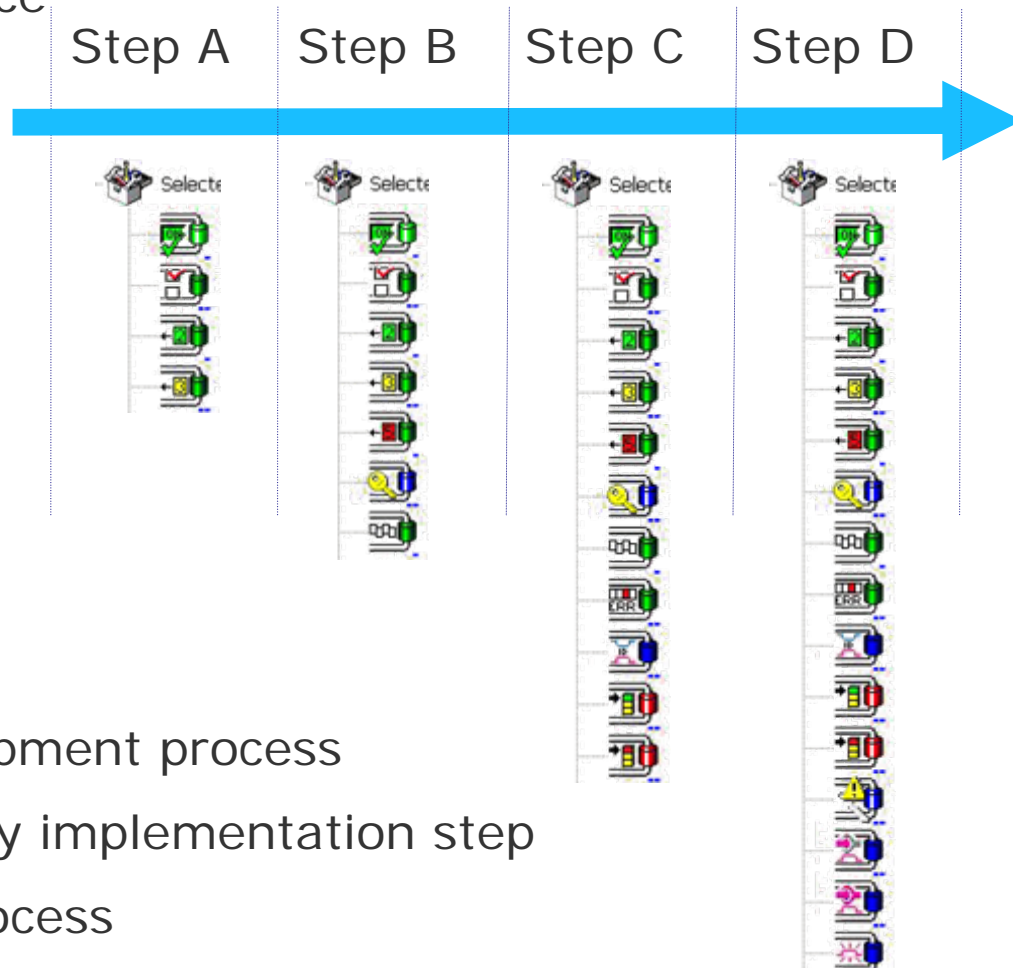
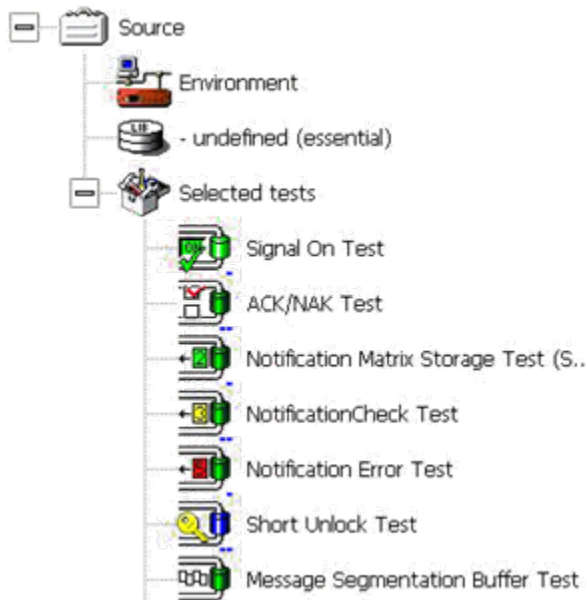
- MOST Physical Layer Test: When Hardware layout is fixed
- MOST Core Compliance Test: Shortly before Start of Production
- Pre-Testing
  - is absolutely essential
  - free of charge at RS (as part of a compliance verification order)



## Compliance Verification Process

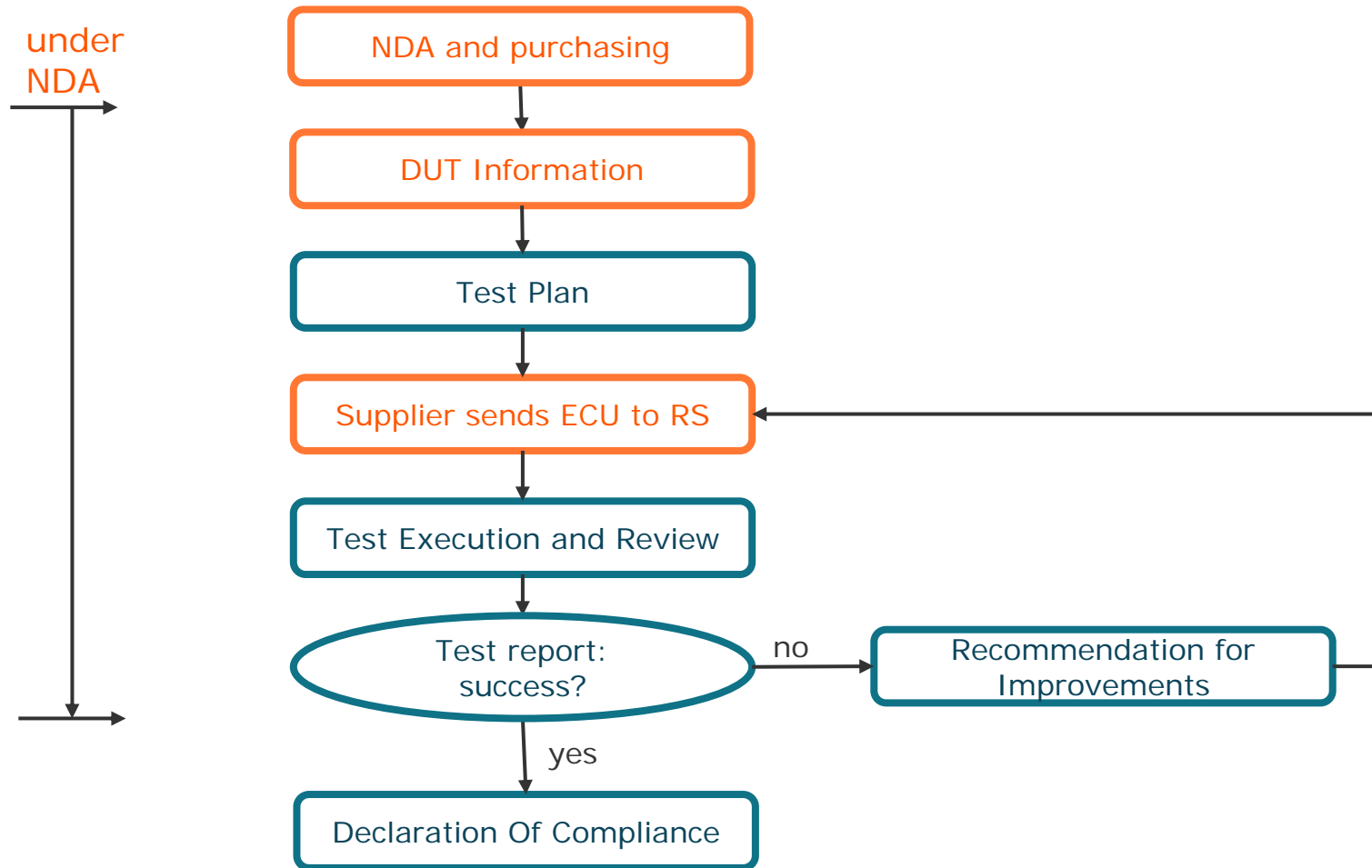
### Benefits of in-house pretests

- Example: MOST Core Compliance



- Quality feedback during development process
- Increase test depth within every implementation step
- Ready for MOST compliance process

# Compliance Verification Process



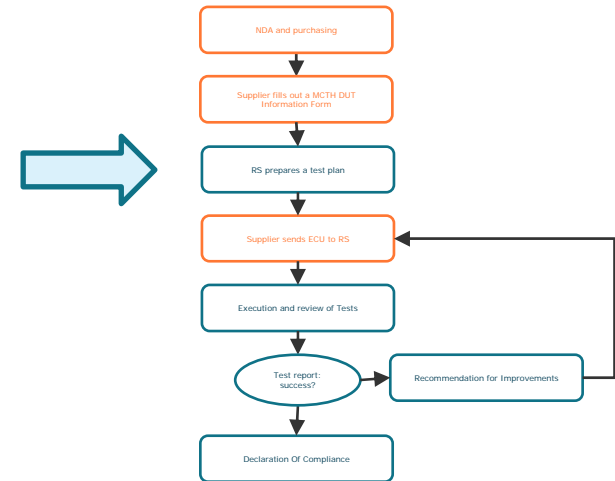
# Compliance Verification Process

## Test Plan:

| Applied Tests            | Test Case Number | Test Name                              | Test Result |
|--------------------------|------------------|--|-------------|
|                          |                  | <b>Static FBlock behavior</b>          |             |
| <input type="checkbox"/> | 2.1.0-1          | Generic FBlock Property test           |             |
| <input type="checkbox"/> | 2.1.0-2          | Generic FBlock Method test             |             |
|                          |                  | <b>Wake Up</b>                         |             |
|                          |                  | <b>Wake-Up – General</b>               |             |
| <input type="checkbox"/> | 2.1.1-1          | Signal On Test                         |             |
| <input type="checkbox"/> | 2.1.1-5          | Bypass Test (All-Bypass)               |             |
| <input type="checkbox"/> | 2.1.2-6          | Signal Off Test                        |             |
| <input type="checkbox"/> | 2.1.1-6a         | System Lock Flag Test (a)              |             |
| <input type="checkbox"/> | 2.1.1-6b         | System Lock Flag Test (b)              |             |
|                          |                  | <b>Wake Up – Timing Master</b>         |             |
| <input type="checkbox"/> | 2.1.1-2          | SBC Register Test                      |             |
| <input type="checkbox"/> | 2.1.1-4          | Wake Up / Shutdown Test                |             |
|                          |                  | <b>Wake Up – Timing Slave</b>          |             |
| <input type="checkbox"/> | 2.1.2-4          | SBC Register Check Test                |             |
| <input type="checkbox"/> | 2.1.2-5          | Slave Lock Detection Test              |             |
| <input type="checkbox"/> | 2.1.3-1          | Slave Wake Up                          |             |
| <input type="checkbox"/> | 2.1.3-4          | Waking Slave Timeout                   |             |
|                          |                  | <b>Normal Operation</b>                |             |
|                          |                  | <b>Normal Operation - Unlock</b>       |             |
| <input type="checkbox"/> | 2.2.1-3          | Short Unlock Test                      |             |
| <input type="checkbox"/> | 2.2.1-4          | Accumulated Short Unlock Test          |             |
| <input type="checkbox"/> | 2.2.1-5          | Critical Unlock Test                   |             |
| <input type="checkbox"/> | 2.2.1-6          | Sudden Signal Off Test                 |             |
| <input type="checkbox"/> | 2.2.1-7          | Shutdown Flag Present Test             |             |
|                          |                  | <b>Power Management</b>                |             |
|                          |                  | <b>Power Management - Power Master</b> |             |
| <input type="checkbox"/> | 2.3.1-3          | Timeout Execute / Suspend              |             |
| <input type="checkbox"/> | 2.3.1-6          | Timeout Suspend                        |             |
| <input type="checkbox"/> | 2.3.3-5          | Temperature ShutDown Reaction Test     |             |
|                          |                  | <b>Power Management – Power Slave</b>  |             |
| <input type="checkbox"/> | 2.3.2-2          | Shutdown.Start(Query) Test             |             |


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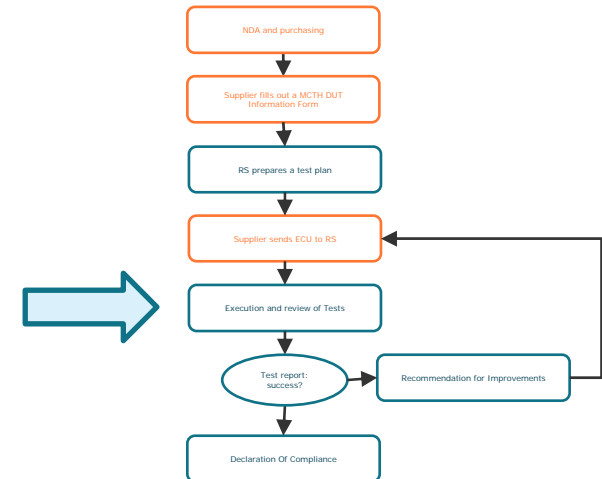
PNA 5\_A-201  
A 14.03.2016 10:00:00



# Compliance Verification Process

## Test Report:

|  |   |  |
|--|---|--|
| <b>RUETZ<br/>SYSTEM SOLUTIONS</b>  | <b>Test Report<br/>Core Compliance</b><br>Test Report Number: YYYYXXX | <br>Deutsche<br>Akkreditierungsstelle<br>D-Pl: 12079-01-01 |
| <b>Device under Test:</b>  |   |  |
| <b>Manufacturer:</b>   |   |  |
| <b>Serial number:</b>  |   |  |
| <b>Test Specification:</b>   | MOST Core Compliance<br>Test Specification 3V0                        |  |
| <b>Customer:</b>   |   |  |
| <b>Customer Address:</b>   |   |  |
| <b>Order No.:</b>  |   |  |
| <b>Date of Receipt:</b>  |   |  |
| <b>Date of Testing:</b>  |   |  |
| <b>Number of pages in Test Report:</b>   | 14  |  |
| <b>Overall result</b>  | passed  |  |
| <small>This test report must only be distributed in its entirety and without any amendments. Extracts or amendments require permission by RUETZ System Solutions GmbH. Test reports which do not bear a company stamp and signature are not valid.</small> |   |  |
| <b>Seal</b>  | <b>Location/Date</b>  |  |
|  | München, DD.MM.YYYY   |  |
|  | <b>Head of test<br/>Laboratory</b>                                    | <b>Person in charge</b>  |
|  | Titze   | Name   |



## Compliance Verification Process

### Test report attachment example: MOST Core Compliance MHP

14:42:59.045 Warning: MD2\_Enabled (Optolyzer) not set to true. ResetDUT not applicable!

14:42:59.045 **call** configFBBlock

14:42:59.045 pET → pET[0]

14:42:59.045 t\_WaitAfterStartup(5.0)

14:43:04.048 t\_WaitAfterStartup

14:43:04.048 Warning: MD2\_Enabled (Optolyzer) not set to true. Network Watchdog not applicable!

14:43:04.064 **call** configFBBlockMhpBcv

14:43:04.064 pMHP

14:43:04.064 t\_Wa

14:43:09.068 t\_Wa

14:43:09.068 pET **send D**

14:43:09.068 t\_De

14:43:09.194 pMHP **match** any

14:43:39.097 t\_De

14:43:39.097 **fail** "DU

14:43:39.097 **fail** "DU

**Test Report**

provided by TTworkbench Professional 1.1.12.201107281311P

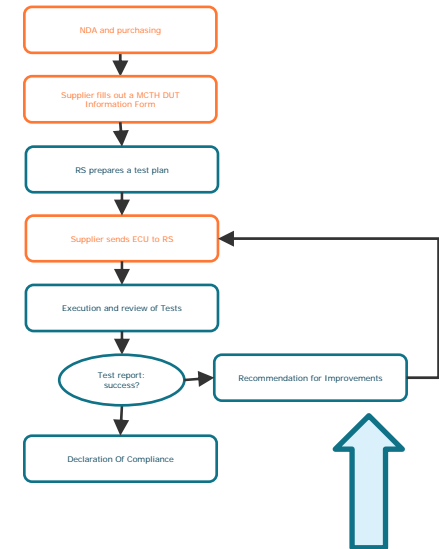
|                         |   |
|-------------------------|---|
| Report Number           |   |
| Report Date             |   |
| Company Name            |   |
| Test Lab                | Ruetz System Solutions GmbH<br>Walter-Gropius-Str.17<br>D-80807 München |
| System Under Test (SUT) |   |
| Release                 |   |

|                      |    |
|----------------------|----|
| Number of Test Cases | 24 |
| Pass                 | 16 |
| Fail                 | 8  |
| Inconclusive         | 0  |
| Error                | 0  |
| None                 | 0  |

66,67%


33,33%

|  |
|--|
| <span style="color: green;">■</span> Pass          |
| <span style="color: red;">■</span> Fail            |
| <span style="color: yellow;">■</span> Inconclusive |
| <span style="color: magenta;">■</span> Error       |
| <span style="color: gray;">■</span> None           |



## Compliance Verification Process

### Declaration Of Compliance



### Declaration of Compliance

Version 1.1-00

| Member information |  |
|--------------------|--|
| Name               |  |
| Contact Name       |  |
| Address            |  |
| Phone Number       |  |
| E-mail             |  |

| Product information                                  |           |
|--|-----------|
| Product name   |           |
| Product ID   |           |
| Product Description                                  | Amplifier |
| Hardware Version                                     |           |
| Software Version                                     |           |
| Product Type [Device   Component   Subsystem   Tool] | Device    |
| MOST speed grade [MOST25   MOST50 ]                  | MOST150   |
| MOST physical layer [oPhy   ePhy]                    | oPhy      |
| Sampling Rate  | 48 kHz    |

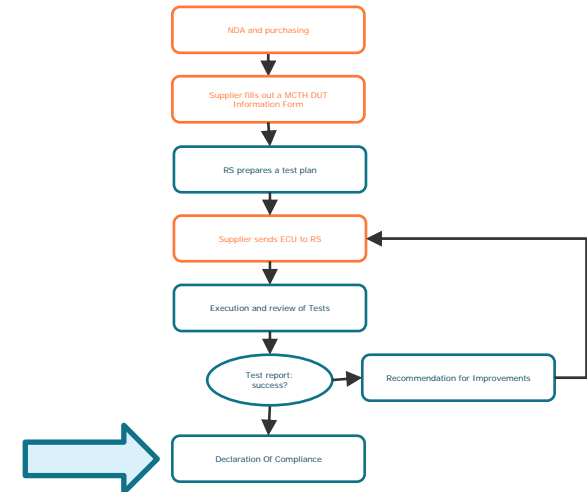
| Applied Core Functions:                        |       |
|--|-------|
| Master Functionalities [TM NWM PM CM]          | -     |
| Active Wakeup supported [Y/N]                  | N     |
| Wakeable via MOST Signal                       | Y     |
| Compliant Sources [FBlockID InstID Sourcencr.] | 22.01 |
| Compliant Sinks [FBlockID InstID Sinknr.]      | 22.01 |
| Allocate Mechanism supported                   | Y     |
| Source Connect Mechanism supported             | N     |
| Source Activity supported                      | Y     |
| MostHigh implemented [y/n]                     | Y     |

| MCTH information |  |
|------------------|--|
| Name             | RUETZ System Solutions GmbH              |
| Address          | Walter-Gropius-Str. 17, D- 80807 München |
| Phone Number     | ++49 89 2000413-0                        |
| E-mail           |  |

| Declaration                           |          |
|---------------------------------------|----------|
| Scope of Compliance including version | Core 3V0 |



## Compliance Verification Process

### MOST Compliance Product List:

#### ▶ MOST Intranet

Members

MOST Brand Book and

MOST Logos

Specifications

Templates

Working Groups

**Compliance Verification**

Compliance Product  
List

Compliance Test

Houses

Compliance

Verification Process

MOST Tutorial

#### ▶ MOST Internet

#### ▶ **MOST Compliance Verification**

You have entered the MOST Compliance Verifica

This page will inform you how you can take a prc

MOST Compliance Verification is the certification

The normative reference for the product certifi

See the [Product Compliance Verification Proces](#)

The rules for using the MOST Trademark can be

All licensed MOST End Products and Componer

By listing a product in the [MCPL](#), the product is g

#### Organization

**LEGISLATURE**  
MOST Cooperation



| Short product description                  | Name of MCTH         | Listin      | Scope             | Integra ted Listed MOST       | C P D L |
|--|----------------------|-------------|-------------------|-------------------------------|---------|
| MOST Interface Box                         | RMCTech              | 1. July 05  | Lim. Phyr.        | -                             | -       |
| MOSTFOT                                    | RMCTech              | 3. July 05  | Full Phyr.        | -                             | -       |
| MOSTFOT                                    | -                    | 16. Dec. 08 | Full Phyr.        | -                             | -       |
| DVDPlayer4MOST                             | RUETZ<br>Technolnir. | 4. Aug. 05  | Lim. Phyr.        | -                             | -       |
| DVDPlayer4MOST                             | RUETZ<br>Technolnir. | 4. Aug. 05  | Core<br>991(2007) | -                             | -       |
| MOSTFOT                                    | RMCTech              | 5. Aug. 05  | Full Phyr.        | -                             | -       |
| MOSTFOT                                    | -                    | 3. Feb. 06  | Full Phyr.        | -                             | -       |
| MOST Connector 2+0                         | RMCTech              | 30. Sep. 05 | Full Phyr.        | -                             | -       |
| MOST Connector 2+0                         | -                    | 11. Sep. 07 | Full Phyr.        | -                             | -       |
| MOST Connector 2+0                         | RMCTech              | 1. Okt. 05  | Full Phyr.        | -                             | -       |
| MOSTFOT                                    | RMCTech              | 6. Dec. 05  | Full Phyr.        | -                             | -       |
| MOST Connector 2+4 with<br>Homom-ctur-FOT  | RMCTech              | 1. Jan. 06  | Full Phyr.        | Entry No. 8                   | -       |
| MOST Connector<br>2+0, 2+4, 2+12           | RMCTech              | 1. Feb. 06  | Full Phyr.        | Entry No. 5,<br>5-1           | -       |
| MOST Connector 2+20                        | RELNETX              | 31. Okt. 06 | Full Phyr.        | Entry No. 5,<br>Entry No. 5-1 | -       |
| MOST Connector 2+0, 2+4, 2+12,<br>2+20     | RELNETX              | 30. Mra. 07 | Full Phyr.        | Entry No. 29                  | -       |
| MOST Connector 2+0, 2+4, 2+12,<br>2+20     | -                    | 7. Apr. 09  | Full Phyr.        | Entry No. 29                  | -       |
| MOST Connector 2+0, 2+4, 2+12,<br>2+20     | -                    | 16. Mai. 11 | Full Phyr.        | Entry No. 29                  | -       |
| MOST Connector 2+12 with<br>Homom-ctur-FOT | RMCTech              | 1. Feb. 06  | Full Phyr.        | Entry No. 8                   | -       |

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## Success Stories

### Statistics

|                                       | Core Compliance | Phy Compliance |
|---------------------------------------|-----------------|----------------|
| ECUs tested for Compliance            | 83              | 97             |
| ECUs tested at Ruetz System Solutions | 59              | 48             |
| ECUs needing test repetition          | 48              | 34             |

81%



70%



## Success Stories

### Detected Physical Layer issues

- Inadmissible Hardware Layouts
  - twisted cable connection, asymmetric LVDS lines
  - Disregarded Application Notes (e.g. wrong vias, headers , termination resistors)
- Unsufficient Signal Quality
  - in normal operation (e.g. caused by optimization of HF TV signal)
  - in worst case scenarios
- Streaming interoperability problems
- Component Quality loss caused by modifications of a production line

## Detected Network Layer issues

- Unneeded Busload caused by
  - wrong Addressing
  - wrong failure tolerance mechanisms
- Wrong Implementation of Network Master
- Unregistered Services (FBlocks, Sources and Sinks)
- Initialisation at Startup exceeds timing constraints
- Audio Management Interoperability Problems
- Inconsistent Buffer settings

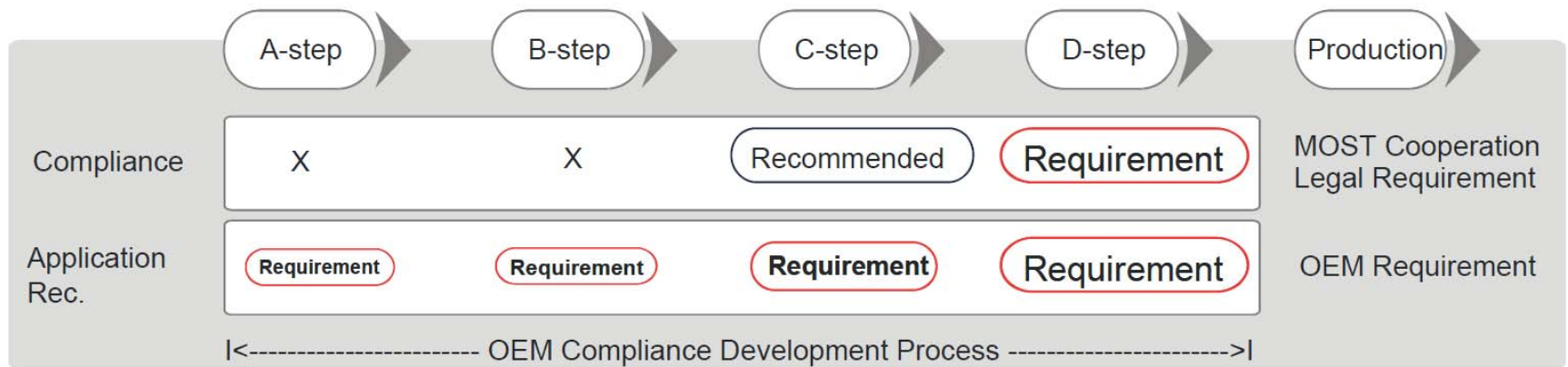
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Further possibilities

Application Recommendation for MOST Core Functionality

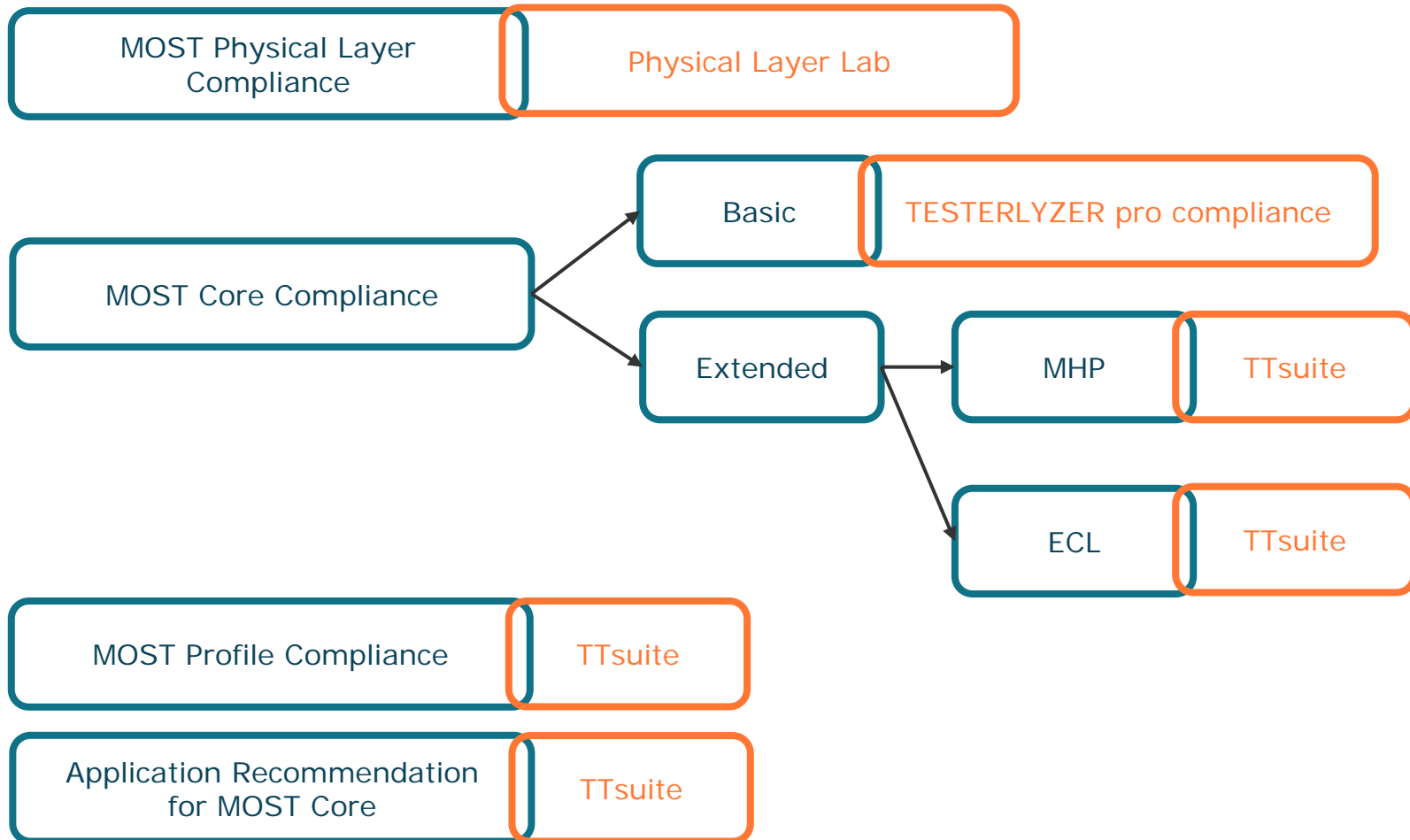
- Ensures quality and robustness of your product
- Requested by car manufacturer to ensure automotive capability
- Includes much more content in quality testing
- Should be started from the very beginning with increasing test content



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## Further possibilities

Ready to use, fully automated test systems



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## Conclusion

Compliance Verification Process at Ruetz System Solution includes:

- Easy preparation for the test
- Pretest at RS is free of charge
- Transparency:
  - Executable Test Specifications
  - Detailed Test Reports



## Conclusion

Support for in-house Tests at Supplier:

- TestLab equipment, Tools and Processes are available
- High Degree of Test Automation
- According to MOSTCO state of the art
- Professional Training, Support and Maintenance

Partners:



Thank you for your attention!

Dr.-Ing. Terezia Toth

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