ECLIPSEINA GMBH
CHARGING TEST SYSTEMS

Spring 2025

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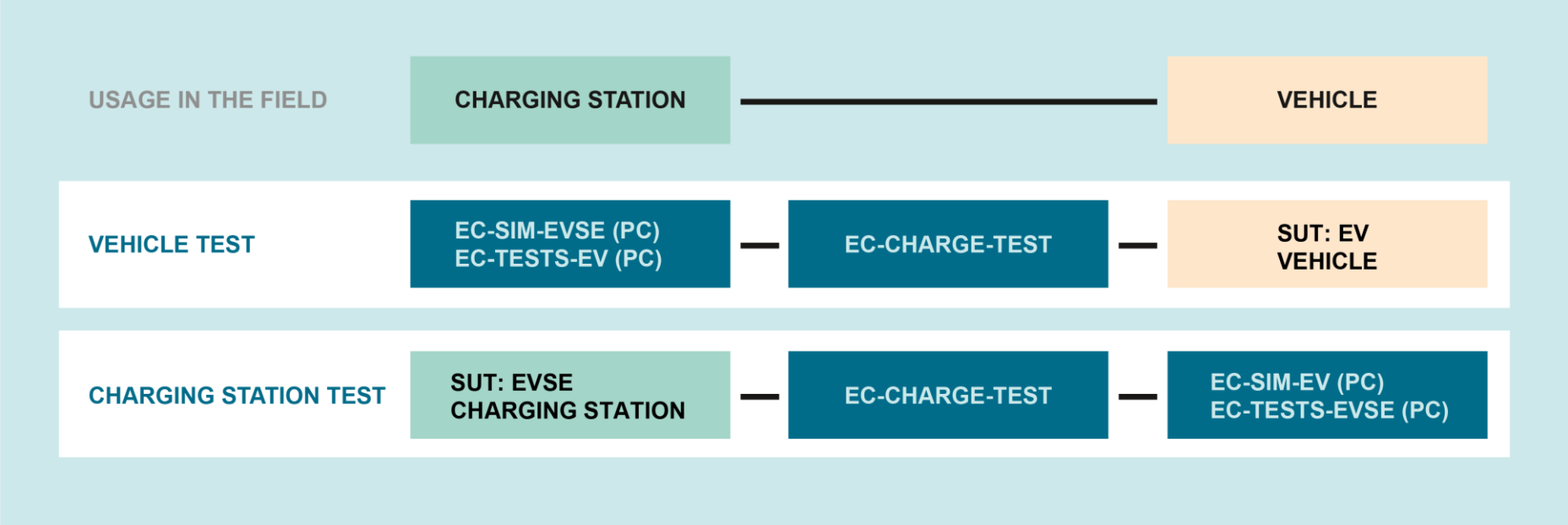
HIL - HARDWARE IN THE LOOP
USE CASES AND SOLUTION

CHARGING
TEST SYSTEMS



The solutions are based on the DIN 70121 and ISO 15118 charging standards for power line communication (PLC).

→ Test according to DIN 70122 resp. ISO 15118-4/-5
→ AC charging / DC charging
→ SLAC communication / high-level communication via V2G

HIL - HARDWARE IN THE LOOP
CONSISTS OF 3 MAIN PARTS

CHARGING
TEST SYSTEMS

EC-CHARGE-TEST

is the **hardware** for the test solution including the necessary firmware.

EC-CHARGE-TEST is a test solution for charging points with respect to DIN 70121 and ISO 15118 compliant signal transmission.

The hardware board is connected to the system under test via the standardized connections:

- CP, PE and PP for charging communication
- BNC connector for CP against PE
- banana jacks for CP, PE and PP

The hardware is supplemented by the corresponding firmware on the hardware board and a PC environment.

EC-HIL-EV / EVSE

is the **software** for simulating the behavior of electric car EV or charging station EVSE.

EC-HIL-EV/ EVSE offers a comprehensive software solution for the hardware EC-CHARGE-TEST. This software for charge point EVSE or electric vehicle EV simulation provides the environment for the integration of DIN 70121 and ISO 15118 compliant signal transmission tests.

Features:
- PLC communication via control pilot (CP) and protective earth (PE).
- PLC and PWM generation
- For AC and DC charging communication
- Standard compliant simulation software

EC-TESTS-EV / EVSE

The **test packages** complete the test solution for charging communication.

The test packages cover all test cases from standards DIN 70122 and ISO 15118-4/-5:
EC-TESTS-EV contains the test cases for testing the charging communication with the EV electric vehicle
EC-TESTS-EVSE contains the test cases for the test of the communication with the charging station EVSE

In order to meet customer-specific needs, the test packages have been divided into the various sub-aspects and can be selected for electric vehicles EV and for charging stations EVSE based on the following criteria:

- Test according to DIN 70122 resp. ISO 15118-4/-5
- AC charging / DC charging
- SLAC communication / high-level communication via V2G

HIL FOR EV TESTING
VEHICLE TEST PRODUCT LIST

CHARGING
TEST SYSTEMS

Products			Description
Test Hardware	EC-CHARGE-TEST for EVSE Simulation		System for simulating and testing the charging communication between charging station and electric vehicle → Hardware modem for controlling the system under test via powerline communication
Test Software	EC-SIM-EVSE		Software for simulating the charging station behaviour: → Software including test environment for performing tests according to DIN 70122 and ISO 15118-4/-5
Test packages according to DIN 70122	EC-TESTS-EV → SLAC-TESTS for EV	DC	Package for testing the SLAC communication of electric vehicles
	EC-TESTS-EV → V2G-TESTS for EV	DC	Package for testing the high-level communication via V2GTP, SDP and V2G application messages of the electric vehicle with DC charging stations
Test packages according to ISO 15118-4/-5	EC-TESTS-EV → SLAC-TESTS for EV	COMMON	Common package for testing the SLAC communication of electric vehicles → Testing the SLAC communication for AC charging → Testing the SLAC communication for DC charging
	EC-TESTS-EV → V2G-TESTS for EV	COMMON	Basic package for testing high-level communication via V2GTP, SDP and V2G application messages of the electric vehicle
		AC	Extension package for testing the high-level communication via V2GTP, SDP and V2G application messages of the electric vehicle with AC charging stations
		DC	Extension package for testing the high-level communication via V2GTP, SDP and V2G application messages of the electric vehicle with DC charging stations

HIL FOR EVSE TESTING
CHARGING STATION TEST PRODUCT LIST

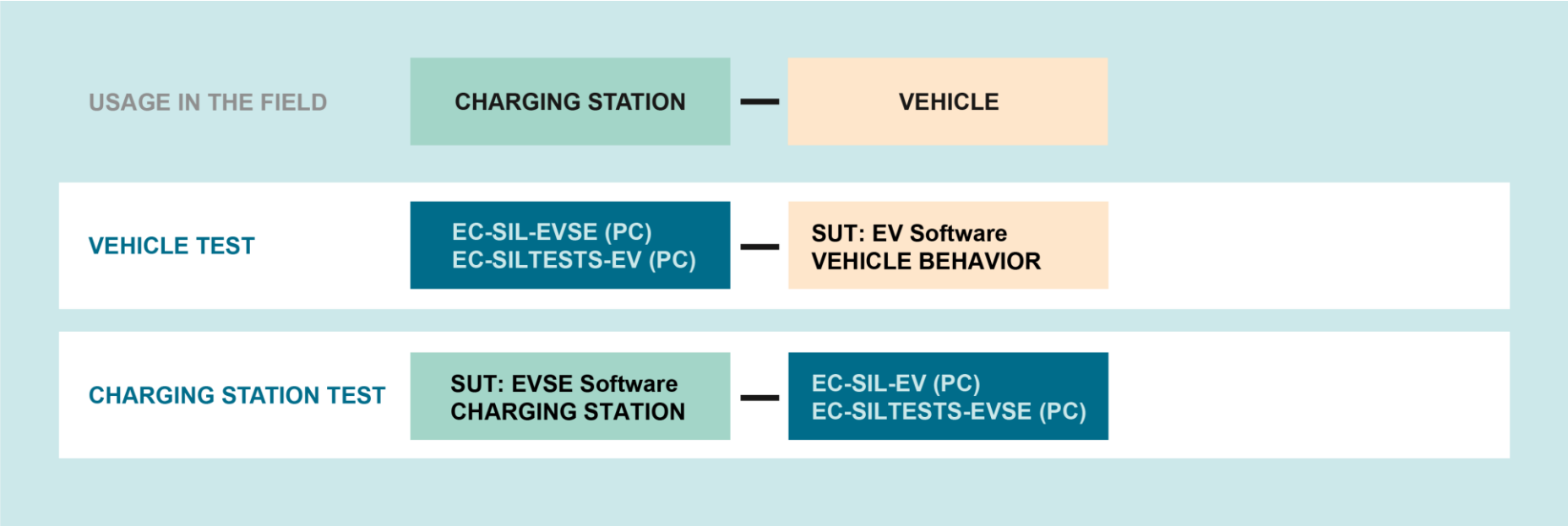
CHARGING
TEST SYSTEMS

Products			Description
Test Hardware	EC-CHARGE-TEST for EV Simulation		System for simulating and testing the charging communication between charging station and electric vehicle → Hardware modem for controlling the system under test via powerline communication
Test Software	EC-SIM-EV		Software for simulating the electric vehicle behavior: → Software including test environment for performing tests according to DIN 70122 and ISO 15118-4/-5
Test packages according to DIN 70122	EC-TESTS-EVSE → SLAC-Tests for EVSE	DC	Package for testing the SLAC communication of charging stations
	EC-TESTS-EVSE → V2G-Tests for EVSE	DC	Package for testing high-level communication via V2GTP, SDP and V2G application messages of the charging station during DC charging
Test packages according to ISO 15118-4/-5	EC-TESTS-EVSE → SLAC-TESTS for EVSE	COMMON	Common package for testing the SLAC communication of charging stations → Testing the SLAC communication for AC charging → Testing the SLAC communication for DC charging
	EC-TESTS-EVSE → V2G-TESTS for EVSE	COMMON	Basic package for testing high-level communication via V2GTP, SDP and V2G application messages of the charging station
		AC	Extension package for testing high-level communication via V2GTP, SDP and V2G application messages of the charging station during AC charging
		DC	Extension package for testing high-level communication via V2GTP, SDP and V2G application messages of the charging station during DC charging

SIL - SOFTWARE IN THE LOOP

USE CASES AND SOLUTION

CHARGING TEST SYSTEMS



The solutions are based on the DIN 70121 and ISO 15118 charging standards for power line communication (PLC).

→ Test according to DIN 70122 resp. ISO 15118-4/-5
→ AC charging / DC charging
→ High-level communication via V2G (no SLAC communication)

SIL - SOFTWARE IN THE LOOP
CONSISTS OF 2 PARTS

CHARGING
TEST SYSTEMS

EC-SIL-EV / EVSE

is the environment and software for simulating the behavior of electric car or charging station.

The SIL software provides the environment for the integration of the DIN 70121 and ISO 15118 compliant signal transmission tests. The simulation software EC-SIL-EV or EC-SIL-EVSE consists of the user interface and is complemented by the SIL test packages.

This software in the loop test environment enables a test of the software solution at an early stage of development, e.g. when no hardware is available yet.

The own development software can thus be tested against a simulation environment. For this purpose, an interface description of the individual software functions is provided.

EC-SILTESTS-EV / EVSE

SIL test packages with test cases according to DIN 70122 and ISO 15118-4/-5.

The test packages are integrated into the SIL software environment and cover the V2G test cases from the test standards DIN 70122 and ISO 15118-4/-5.

In order to meet customer-specific requirements, the test packages have been divided into the various sub-aspects and can be selected for electric vehicles EV and for charging stations EVSE on the basis of the following criteria:

→ Test according to DIN 70122 resp. ISO 15118-4/-5
→ AC charging AC / DC charging DC

Since the SIL tests are performed exclusively on the PC, there is no low-level communication via PWM and also no physical powerline communication. For this reason, in contrast to the HIL test solution, only V2G test cases are available, but not SLAC test cases.

SIL FOR EV TESTING
VEHICLE TEST PRODUCT LIST

CHARGING
TEST SYSTEMS

Bezeichnung			Beschreibung
Test Software	EC-SIL-EVSE		Software including test environment for simulating the charging station behavior: → Software including test environment for performing tests according to DIN 70122 and ISO 15118-4/-5
Test packages according to DIN 70122	EC-SILTESTS-EV → V2G-TESTS for EV	DC	Package for testing the high-level communication via V2GTP, SDP and V2G application messages of the electric vehicle with DC charging stations
Test packages according to ISO 15118-4/-5	EC-SILTESTS-EV → V2G-TESTS for EV	COMMON	Basic package for testing high-level communication via V2GTP, SDP and V2G application messages of the electric vehicle
		AC	Extension package for testing the high-level communication via V2GTP, SDP and V2G application messages of the electric vehicle with AC charging stations
		DC	Extension package for testing the high-level communication via V2GTP, SDP and V2G application messages of the electric vehicle with DC charging stations

SIL FOR EVSE TESTING
CHARGING STATION TEST PRODUCT LIST

CHARGING
TEST SYSTEMS

Bezeichnung			Beschreibung
Test Software	EC-SIL-EV		Software including test environment for simulating the electric vehicle behavior: → Software including test environment for performing tests according to DIN 70122 and ISO 15118-4/-5
Test packages according to DIN 70122	EC-SILTESTS-EVSE → V2G-Tests for EVSE	DC	Package for testing high-level communication via V2GTP, SDP and V2G application messages of the charging station during DC charging
Test packages according to ISO 15118-4/-5	EC-SILTESTS-EVSE → V2G-TESTS for EVSE	COMMON	Basic package for testing high-level communication via V2GTP, SDP and V2G application messages of the charging station
		AC	Extension package for testing high-level communication via V2GTP, SDP and V2G application messages of the charging station during AC charging
		DC	Extension package for testing high-level communication via V2GTP, SDP and V2G application messages of the charging station during DC charging

SUPPORT AND TRAINING
FOR CHARGING COMMUNICATION

CHARGING
TEST SYSTEMS

Execution of charging communication tests
We support you with the test definition, the test execution and the interpretation of the test results. We are happy to take over the complete test of the charging communication for charging station and electric vehicle for you.

Test case development for charging communication tests
Do you have more extensive testing needs? Our subject matter experts create customer-specific test cases that go beyond the content specified in the standard.

Expert consulting
Our consulting services in the field of charging systems are carried out by experienced technical experts with many years of experience.

Seminars and workshops on charging communication
You need individual customized training for knowledge building or knowledge expansion within your test team? We are happy to offer you workshops and in-house seminars that are customized to your needs.

E-Learning "EV Charging"
The Embedded Academy E-Learning “EV Charging” offers a comprehensive introduction to electric charging in the context of electromobility.

CONTACT

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