

CharIN Umbrella Document for Charging System Extended DC EVSE

of Charging Interface Initiative e.V.

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Abbreviations

| | |
|--------|--|
| AC | Alternating current |
| BS | Basic Signaling |
| CCS | Combined Charging System |
| CCTS | CCS Conformance Test System |
| CP | Control Pilot |
| DC | Direct current |
| DIN | German Institute for Standardization |
| ECU | Electronic Control Unit |
| Ed | Edition |
| EIM | External Identification Means (External payment) |
| EV | Electric Vehicle |
| EVSE | Electric Vehicle Supply Equipment |
| FC | Fast Charging |
| HLC | High Level Communication |
| HPC | High Power Charging |
| IC-CPD | In-Cable Control and Protection Device |
| IEC | International Electrotechnical Commission |
| ISO | International Organization for Standardization |
| OEM | Original Equipment Manufacturer, here automotive manufacturers |
| PE | Protective Earth |
| PICS | Protocol Implementation Conformance Statement |
| PIXIT | Protocol Implementation Extra Information for Testing |
| PLC | Power Line Communication |
| PnC | Plug and Charge |
| PP | Proximity Pilot |
| PWM | Pulse Width Modulation |
| QAP | Quality Assurance Plan |
| RFID | Radio Frequency Identification |
| SAE | Society of Automotive Engineers |
| SECC | Supply Equipment Communication Controller |
| SUT | System under Test |
| US | United States of America |

1. Introduction

1.1. General

The Combined Charging System (CCS) is based on open and universal standards for EVs and EVSEs. CharIN is promoting the CCS as an internationally competitive system for DC and AC charging.

To ensure reliable, safe and robust charging with the CCS, CharIN has taken action to close gaps in existing charging standards by providing implementation guides, and, where considered necessary, to specify conformance and interoperability Test Cases for electric vehicles (EV) and electric vehicle supply equipment (EVSE) that implements CCS.

In addition, CharIN provides a hardware specification for Test Systems and is developing a qualification process for a CharIN CCS Test System (CCTS) that tests conformance of the charging behavior of an EV or an EVSE at the charging interface with the requirements in existing standards and related CharIN guides.

CharIN provides system implementation guides as well as testing guides related to the charging functions of Charging System Extended and to the CCS charging technology manual conductive charging. Within this step, the first focus is testing of DC Charging System Extended EVSE

1.2. Purpose and scope of this document

The current document provides a guideline for conformance testing of the charging functions of Charging System Extended DC EVSE that are used for manual conductive charging.

In the current edition of this umbrella document, the following charging functions of a Charging System Extended EVSE are in focus:

- proximity detection (PP) according to IEC 61851-1 Ed.3 and IEC 61851-23 Ed.2 (system C)
- basic signaling (BS) using pulse width modulation (PWM) on the control pilot (CP) line according to IEC 61851-1 Ed.3
- power line communication (PLC) according to the ISO 15118-2 Ed.1 and ISO 15118-3 Ed1
- DC power transfer sequences and performance of power transfer according to IEC 61851-23 Ed.2 (system C)

Test Cases for Charging System Extended DC EVSE are defined in the following documents:

- ISO 15118-4 Ed2:to be published
- ISO 15118-5 Ed1
- IEC 61851-23:2023 Ed2, Annex CC 7.5

In addition, CharIN has drafted the following Test Case documents:

- CharIN EVSE Test Cases for DC charging with system C according to IEC 61851-1 and IEC 61851-23, v.1.0.1
- CharIN DC CCS Power Classes, v7.3

The Test Case specifications referenced herein focus on the interoperability between EVs and EVSEs at the charging interface as well as the safety and reliability of the charging process. Furthermore, Test Cases related to the performance of the EVSE are provided (referring to the CharIN CCS DC Power Classes). Regarding EMC requirements, one Test Case is referenced that shall be fulfilled.

Conformance testing related to other EMC requirements or the charging cable of a Charging System Extended DC EVSE are out of scope of the current edition. Robustness and interoperability tests of CCS vehicle connectors and inlets are under consideration.

All herein referenced Test Cases (besides the EMC Test Case) are meant to be performed with a test system, such as the CCTS, which emulates the charging behavior of an EV at the charging interface and that can be used for (partially) automatized tests.

The addressees of this guide are manufacturers of such test systems and of CCS DC charging stations.

1.3. Validity of this document

Considerable effort is undertaken to transfer the changes to requirements that are proposed in the CharIN guides, as well as the CharIN Test Case specifications into the next editions of the respective standards. If documents referenced herein are substituted by new editions, a new edition of this guide may be provided, if required.

2. Requirements for Test System HW and SW

The following figure gives an example for a test system architecture.

In principle it can be divided into the Communication part and the power part.

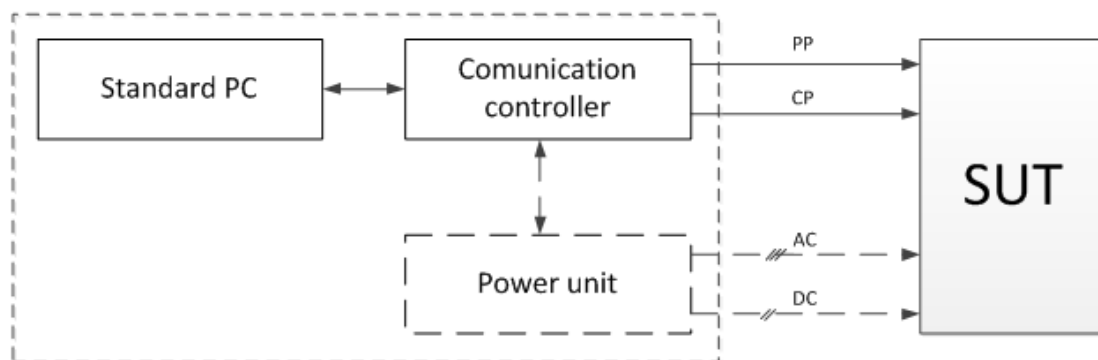


Figure 2 – Test System Architecture

The Test System used for Charging System EVSE Extended DC Conformance Testing must fulfill the requirements for DC EVSE tests given in the CharIN Function Set List in the

“CharIN Conformance Test Systems (CCTS) Specification v.1.1.1”.

This document is provided and maintained by CharIN Conformance Test Group vendor team and can be found on the CharIN SVN Server.

3. Conformance Test for Charging System Extended DC EVSE

Conformance Tests for Charging System Extended DC EVSE shall be done on

- System level with EVSE and power flow (no ECU only test)

CharIN is the core authority of the certification system for Testing houses and Test Systems to prove capability for DC Charging System EVSE Extended Conformance Testing. The main role of CharIN is to control, monitor, and surveil all entities, namely testing house and CCTS vendor, in the certification system.

CharIN provides labels like “Charging System EVSE Extended DC accredited Testing house” or “Charging System EVSE Extended DC accredited Conformance Test System”.

1.4. Conformance Test Revisioning

Conformance Tests for Charging System Extended DC EVSE will evolve over time. New Test Cases might be added. Others might be changed or deleted. To keep track on type of tests over time a revisioning system/history is applied for CharIN Charging System Extended DC EVSE Tests.

3.1.1. CharIN internal numbering of Test Case documents

The following documents apply for the CharIN Conformance Test Charging System Extended DC EVSE. The document versions/revisions might rise over time. In some document, they are not directly relevant but only the partial functionalities are referred so that the table shows them as “Ref.” instead of document number.

| Document Number | Version as of 07.07.2025 | Date of Document | Type of document | Document | Notes |
|-----------------|--------------------------|------------------|---------------------|----------------------|-----------------|
| #1 | 2.0.0 | - | Requirements Comm | ISO 15118-4 Ed2 | To be published |
| #2 | 1.0.0 | 2018 | Requirements Comm | ISO 15118-5 Ed1:2018 | |
| #3 | 2.0.0 | 2023 | Requirements System | IEC61851-23 Ed2:2023 | |

| | | | | | |
|------|-------|------|-------------------------------------|---|----------------------|
| #4 | 1.0.1 | 2022 | Test Cases CableCheck voltage | CharIN EVSE Test Cases for DC charging with system C according to IEC 61851-1 and IEC 61851-23 | |
| #5 | 3.0.0 | 2017 | Requirements System | IEC61851-1 Ed3:2017 | |
| Ref. | 1.0.0 | 2024 | Requirement System | ISO 5474-1 Ed1:2024 | Latching function |
| Ref. | 1.0.0 | 2024 | Requirement System | ISO 5474-3 Ed1:2024 | Latching function |

Table 3 – Test Case version numbering

For the CharIN Conformance Test Label the numbers reference a certain version of a document, Combo1 vs. Combo2 vehicle coupler and the Power Class of the charger.

Combo1 is the vehicle coupler IEC62196-3 Configuration EE

Combo2 is the vehicle coupler IEC62196-3 Configuration FF

CharIN Extended DC EVSE document version with “Coupler” and “PowerClass”

E.g.

“CharIN Extended DC EVSE v1.0 with Combo2 and FC50”

When new version of umbrella document gets published, hereafter, the number in the CharIN Conformance Test Label must be adjusted.

3.1.2. CharIN Conformance Test Label

For better readability a reduced numbering scheme based on certain baselines are used for public conformance test label.

E.g. a EVSE would get the following label:



Figure 3 – “Conformance Approved CharIN label”

3.1.3. Guideline for test verdict to obtain robust test results

Handling of “Inconclusive” test result:

In CharIN Conformance testing, an “Inconclusive” verdict is not allowed. An “Inconclusive” test result might be created when:

- Certain parameters of the Test Case implementation affect the test results, for instance, timing parameters of CP state changes. In that case, the Test Case implementation needs to be revised against the behavior of the specific SUT.
- There are issues with the set or measurement tolerance, accuracy, or uncertainty, for instance if a measured test parameter (such as timing, or duty cycle) is close to the boundary between a pass and fail value. In that case, the set/measurement tolerance of the test system might be adjusted, or the implementation of the SUT might be adjusted to be more robust against testing.
- The test configuration is incorrect, i.e. PIXIT, PICS

If testers take “Inconclusive” test result, deeper analysis is required and more test trials are allowed. After 3 trials, if the test result is still “Inconclusive”, it shall be treated as “Failed” verdict.

Regarding tolerance, accuracy, uncertainty issues, it shall be processed with QAP of testing houses, which has been certified by ISO 17025 or ISO 9001.

If testers find any test objective issue, they have the main duty to report it to the CharIN Focus Group Conformance test/Interoperability and support the activities to resolve the issue.

Handling of “Sporadic” errors (e.g. charging stop during reliability test):

Sporadic errors during Test Case execution may occur. Deeper analysis is allowed and Test Cases may be repeated 3 times to resolve sporadic issues.

If a Test Case fails the 3rd time (e.g. SUT still makes the sporadic charging stop) the whole test verdict shall be treated as “Failed” and a new HW/SW must be provided.

3.1.4. Guideline for power flow configuration of communication test

If there is no clear direction in Test Case for power flow configuration during CurrentDemand routine, testers should set as follows;

- Current: Mid value of Min. and Max. of SUT (in ChargeParameterDiscovery)
- Battery simulation voltage (V1): Mid value of Min. and Max. of SUT (in ChargeParameterDiscovery)

3.2. Conformance Test for Charging System Extended DC EVSEs

An EVSE supporting Charging System Extended DC **MUST PASS** the following mandatory and conditional Test Cases to gain a DC Charging System Extended EVSE compliance certificate.

The following Test Case lists contain Priority of Test Cases with Prio 1-3.

Prioritization of Test Cases is based on

- robustness (good case higher priority than error cases)
- criticality of error (e.g. safety has highest priority)
- possibility of occurrence in field

The following Test Case lists contain the parameter Mandatory (Mand) or Optional (Opt), Conditional (Cond):

Mandatory:

Test must be executed and passed to receive CharIN Charging System Extended Vxxx certificate for Charging System Extended DC EVSE (i.e. CharIN Charging System Extended DC Vxxx certificate).

Optional:

Test must be executed but the verdict has no influence on whether the CharIN Charging System Extended DC Vxxx certificate is provided or not (informative test).

Conditional:

Test must be executed under a certain implementation condition (e.g. a certain feature is either implemented or not), and passed to receive CharIN Charging System Extended Vxxx certificate for Charging System Extended DC EVSE (i.e. CharIN Charging System Extended DC Vxxx certificate).

3.2.1. Layer 3-7 HLC Test Cases regarding to ISO 15118-2

| TC Num. | Test Case Identifier (PICS, PIXIT for conditional test cases) | Test case selection | | Remark |
|---------|---|---------------------|-----|--------|
| | | EIM | PnC | |
| 1 | TC_SECC_CMN_VTB_V2GTPSessionSetup_001 | 0 | 0 | mand |
| 2 | TC_SECC_CMN_VTB_V2GTPSDP_001 | 0 | 0 | mand |
| 3 | TC_SECC_CMN_VTB_SDP_001 | 0 | | mand |
| 4 | TC_SECC_CMN_VTB_SDP_002 | 0 | | mand |
| 5 | TC_SECC_CMN_VTB_SDP_003 | | 0 | mand |
| 6 | TC_SECC_CMN_VTB_SDP_004 | 0 | | mand |
| 7 | TC_SECC_CMN_VTB_SDP_005 | 0 | | mand |
| 8 | TC_SECC_CMN_VTB_SDP_006 | | 0 | mand |
| 9 | TC_SECC_CMN_VTB_SDP_007 (PIXIT_SECC_CMN_TLS := false) | 0 | | cond |
| 10 | TC_SECC_CMN_VTB_SupportedAppProtocol_001 (PIXIT_SECC_CMN_TLS := true) | 0 | 0 | cond |
| 11 | TC_SECC_CMN_VTB_SupportedAppProtocol_002 | 0 | 0 | mand |
| 12 | TC_SECC_CMN_VTB_SupportedAppProtocol_004 (PIXIT_SECC_CMN_TLS := false) | 0 | | cond |
| 13 | TC_SECC_CMN_VTB_SupportedAppProtocol_005 | 0 | 0 | mand |
| 14 | TC_SECC_CMN_VTB_SupportedAppProtocol_006 | 0 | 0 | mand |
| 15 | TC_SECC_CMN_VTB_SessionSetup_001 | 0 | 0 | mand |
| 16 | TC_SECC_CMN_VTB_SessionSetup_004 | 0 | 0 | mand |
| 17 | TC_SECC_DC_VTB_SessionSetup_001 | 0 | 0 | mand |
| 18 | TC_SECC_DC_VTB_SessionSetup_002 | 0 | 0 | mand |
| 19 | TC_SECC_DC_VTB_SessionSetup_003 | 0 | 0 | mand |
| 20 | TC_SECC_DC_VTB_SessionSetup_004 | 0 | 0 | opt |

| | | | | |
|----|--|---|---|------|
| 21 | TC_SECC_DC_VTB_SessionSetup_005 | 0 | 0 | opt |
| 22 | TC_SECC_DC_VTB_SessionSetup_006 | 0 | 0 | opt |
| 23 | TC_SECC_CMN_VTB_ServiceDiscovery_001 | 0 | 0 | mand |
| 24 | TC_SECC_CMN_VTB_ServiceDiscovery_002 | 0 | 0 | mand |
| 25 | TC_SECC_CMN_VTB_ServiceDiscovery_004 | 0 | 0 | mand |
| 26 | TC_SECC_DC_VTB_ServiceDiscovery_001 | 0 | 0 | mand |
| 27 | TC_SECC_DC_VTB_ServiceDiscovery_002 | 0 | 0 | opt |
| 28 | TC_SECC_CMN_VTB_ServiceDetail_001 (PIXIT_SECC_CMN_VAS := serviceDetail, PIXIT_SECC_CMN_InternetAccess := unknown) | 0 | | cond |
| 29 | TC_SECC_CMN_VTB_ServiceDetail_002 (PIXIT_SECC_CMN_VAS := serviceDetail, PIXIT_SECC_CMN_InternetAccess := unknown) | | 0 | cond |
| 30 | TC_SECC_CMN_VTB_ServiceDetail_003 (PIXIT_SECC_CMN_VAS := serviceDetail) | 0 | | cond |
| 31 | TC_SECC_CMN_VTB_ServiceDetail_004 (PIXIT_SECC_CMN_VAS := serviceDetail) | | 0 | cond |
| 32 | TC_SECC_CMN_VTB_ServiceDetail_007 (PIXIT_SECC_CMN_VAS := serviceDetail) | 0 | | cond |
| 33 | TC_SECC_CMN_VTB_ServiceDetail_008 (PIXIT_SECC_CMN_VAS := serviceDetail) | | 0 | cond |
| 34 | TC_SECC_CMN_VTB_ServiceDetail_009 (PIXIT_SECC_CMN_VAS := serviceDetail) | 0 | | cond |
| 35 | TC_SECC_CMN_VTB_ServiceDetail_010 (PIXIT_SECC_CMN_VAS := serviceDetail) | | 0 | cond |
| 36 | TC_SECC_CMN_VTB_ServiceDetail_011 (PIXIT_SECC_CMN_VAS := serviceDetail, PIXIT_SECC_CMN_InternetAccess := internetAccess) | 0 | | cond |

| | | | | |
|----|--|---|---|------|
| 37 | TC_SECC_CMN_VTB_ServiceDetail_012 (PIXIT_SECC_CMN_VAS := serviceDetail, PIXIT_SECC_CMN_InternetAccess := internetAccess) | | 0 | cond |
| 38 | TC_SECC_CMN_VTB_PaymentServiceSelection_001 (PIXIT_SECC_CMN_VAS := none_) | 0 | 0 | cond |
| 39 | TC_SECC_CMN_VTB_PaymentServiceSelection_002 (PIXIT_SECC_CMN_VAS := serviceDetail) | 0 | | cond |
| 40 | TC_SECC_CMN_VTB_PaymentServiceSelection_003 (PIXIT_SECC_CMN_VAS := serviceDetail) | | 0 | cond |
| 41 | TC_SECC_CMN_VTB_PaymentServiceSelection_004 | 0 | 0 | mand |
| 42 | TC_SECC_CMN_VTB_PaymentServiceSelection_006 | 0 | 0 | mand |
| 43 | TC_SECC_CMN_VTB_PaymentServiceSelection_007 | 0 | 0 | mand |
| 44 | TC_SECC_CMN_VTB_PaymentServiceSelection_008 | 0 | 0 | mand |
| 45 | TC_SECC_CMN_VTB_PaymentServiceSelection_009 (PIXIT_SECC_CMN_PaymentOption := externalPayment) | 0 | | cond |
| 46 | TC_SECC_CMN_VTB_PaymentServiceSelection_010 | | 0 | opt |
| 47 | TC_SECC_CMN_VTB_PaymentDetails_001 | | 0 | mand |
| 48 | TC_SECC_CMN_VTB_PaymentDetails_002 (PIXIT_SECC_CMN_CertificateHandling := certInstall) | | 0 | cond |
| 49 | TC_SECC_CMN_VTB_PaymentDetails_004 | | 0 | mand |
| 50 | TC_SECC_CMN_VTB_PaymentDetails_006 | | 0 | mand |
| 51 | TC_SECC_CMN_VTB_PaymentDetails_007 | | 0 | mand |
| 52 | TC_SECC_CMN_VTB_PaymentDetails_008 | | 0 | opt |
| 53 | TC_SECC_CMN_VTB_PaymentDetails_009 | | 0 | mand |
| 54 | TC_SECC_CMN_VTB_PaymentDetails_010 | | 0 | mand |
| 55 | TC_SECC_CMN_VTB_Authorization_001 | 0 | | mand |

| | | | | |
|----|--|---|---|------|
| 56 | TC_SECC_CMN_VTB_Authorization_002 | | 0 | mand |
| 57 | TC_SECC_CMN_VTB_Authorization_003 | 0 | | mand |
| 58 | TC_SECC_CMN_VTB_Authorization_004 | | 0 | mand |
| 59 | TC_SECC_CMN_VTB_Authorization_007 | | 0 | mand |
| 60 | TC_SECC_CMN_VTB_Authorization_008 | 0 | | mand |
| 61 | TC_SECC_CMN_VTB_Authorization_009 | | 0 | mand |
| 62 | TC_SECC_CMN_VTB_Authorization_010 | | 0 | mand |
| 63 | TC_SECC_CMN_VTB_Authorization_011 | | 0 | mand |
| 64 | TC_SECC_CMN_VTB_Authorization_012 (PIXIT_SECC_CMN_CertificateHandling := certInstall) | | 0 | cond |
| 65 | TC_SECC_CMN_VTB_Authorization_014 | 0 | | mand |
| 66 | TC_SECC_CMN_VTB_Authorization_015 | | 0 | opt |
| 67 | TC_SECC_CMN_VTB_Authorization_016 | | 0 | opt |
| 68 | TC_SECC_CMN_VTB_ChargeParameterDiscovery_001 | 0 | 0 | mand |
| 69 | TC_SECC_CMN_VTB_ChargeParameterDiscovery_002 | 0 | 0 | mand |
| 70 | TC_SECC_DC_VTB_ChargeParameterDiscovery_001 | 0 | 0 | mand |
| 71 | TC_SECC_DC_VTB_ChargeParameterDiscovery_003 | 0 | 0 | mand |
| 72 | TC_SECC_DC_VTB_ChargeParameterDiscovery_004 | 0 | 0 | mand |
| 73 | TC_SECC_DC_VTB_ChargeParameterDiscovery_006 | 0 | 0 | mand |
| 74 | TC_SECC_DC_VTB_ChargeParameterDiscovery_007 | 0 | 0 | opt |
| 75 | TC_SECC_DC_VTB_ChargeParameterDiscovery_008 (PIXIT_SECC_CMN_SalesTariff := salesTariff) | 0 | 0 | cond |
| 76 | TC_SECC_DC_VTB_ChargeParameterDiscovery_010 (PIXIT_SECC_CMN_SalesTariff := salesTariff) | 0 | 0 | cond |
| 77 | TC_SECC_DC_VTB_ChargeParameterDiscovery_011 | 0 | 0 | opt |
| 78 | TC_SECC_DC_VTB_ChargeParameterDiscovery_012 | 0 | 0 | mand |
| 79 | TC_SECC_DC_VTB_ChargeParameterDiscovery_013 | 0 | 0 | cond |

| | | | | |
|-----|--|---|---|------|
| | (PIXIT_SECC_CMN_SalesTariff := salesTariff) | | | |
| 80 | TC_SECC_DC_VTB_ChargeParameterDiscovery_014 | 0 | 0 | opt |
| 81 | TC_SECC_DC_VTB_ChargeParameterDiscovery_015 (PIXIT_SECC_CMN_SalesTariff := salesTariff) | 0 | 0 | cond |
| 82 | TC_SECC_DC_VTB_ChargeParameterDiscovery_016 | 0 | 0 | mand |
| 83 | TC_SECC_DC_VTB_ChargeParameterDiscovery_017 | 0 | 0 | opt |
| 84 | TC_SECC_DC_VTB_ChargeParameterDiscovery_018 | 0 | 0 | opt |
| 85 | TC_SECC_DC_VTB_ChargeParameterDiscovery_019 | 0 | 0 | opt |
| 86 | TC_SECC_DC_VTB_ChargeParameterDiscovery_020 | 0 | 0 | opt |
| 87 | TC_SECC_DC_VTB_ChargeParameterDiscovery_021 | 0 | 0 | opt |
| 88 | TC_SECC_DC_VTB_ChargeParameterDiscovery_022 (PICS_SECC_CMN_Pause := true, PIXIT_CMN_CMN_WakeUp >PICS_CMN_CMN_WakeUp) | 0 | 0 | mand |
| 89 | TC_SECC_DC_VTB_ChargeParameterDiscovery_029 | 0 | 0 | opt |
| 90 | TC_SECC_DC_VTB_ChargeParameterDiscovery_030 | 0 | 0 | opt |
| 91 | TC_SECC_DC_VTB_ChargeParameterDiscovery_031 | 0 | 0 | opt |
| 92 | TC_SECC_DC_VTB_ChargeParameterDiscovery_032 | 0 | 0 | opt |
| 93 | TC_SECC_DC_VTB_ChargeParameterDiscovery_033 | 0 | 0 | opt |
| 94 | TC_SECC_DC_VTB_ChargeParameterDiscovery_034 | 0 | 0 | opt |
| 95 | TC_SECC_DC_VTB_ChargeParameterDiscovery_035 | 0 | 0 | opt |
| 96 | TC_SECC_DC_VTB_ChargeParameterDiscovery_036 | 0 | 0 | opt |
| 97 | TC_SECC_DC_VTB_PowerDelivery_001 | 0 | 0 | mand |
| 98 | TC_SECC_DC_VTB_PowerDelivery_002 | 0 | 0 | mand |
| 99 | TC_SECC_DC_VTB_PowerDelivery_003 | 0 | 0 | mand |
| 100 | TC_SECC_DC_VTB_PowerDelivery_004 | 0 | 0 | mand |
| 101 | TC_SECC_DC_VTB_PowerDelivery_007 | 0 | 0 | mand |
| 102 | TC_SECC_DC_VTB_PowerDelivery_008 | 0 | 0 | mand |

| | | | | |
|-----|--|---|---|------|
| 103 | TC_SECC_DC_VTB_PowerDelivery_009 | 0 | 0 | mand |
| 104 | TC_SECC_DC_VTB_PowerDelivery_010 | 0 | 0 | mand |
| 105 | TC_SECC_DC_VTB_PowerDelivery_014 | 0 | 0 | mand |
| 106 | TC_SECC_DC_VTB_PowerDelivery_015 | 0 | 0 | mand |
| 107 | TC_SECC_DC_VTB_PowerDelivery_016 | 0 | 0 | mand |
| 108 | TC_SECC_DC_VTB_PowerDelivery_017 | 0 | 0 | mand |
| 109 | TC_SECC_DC_VTB_PowerDelivery_018 | 0 | 0 | mand |
| 110 | TC_SECC_DC_VTB_PowerDelivery_019 | 0 | 0 | mand |
| 111 | TC_SECC_DC_VTB_PowerDelivery_020 | 0 | 0 | mand |
| 112 | TC_SECC_DC_VTB_PowerDelivery_021 | 0 | 0 | mand |
| 113 | TC_SECC_CMN_VTB_CertificateInstallation_001 (PICS_CertificateHandling := certInstall) | | 0 | cond |
| 114 | TC_SECC_CMN_VTB_CertificateInstallation_002 (PICS_CertificateHandling := certInstall) | | 0 | cond |
| 115 | TC_SECC_CMN_VTB_CertificateInstallation_004 (PICS_CertificateHandling := certInstall) | | 0 | cond |
| 116 | TC_SECC_CMN_VTB_CertificateInstallation_005 (PICS_CertificateHandling := certInstall) | | 0 | cond |
| 117 | TC_SECC_CMN_VTB_CertificateInstallation_006 (PICS_CertificateHandling := certInstall) | | 0 | cond |
| 118 | TC_SECC_CMN_VTB_CertificateInstallation_007 (PICS_CertificateHandling := certInstall) | | 0 | cond |
| 119 | TC_SECC_CMN_VTB_CertificateInstallation_008 | | 0 | opt |
| 120 | TC_SECC_DC_VTB_SessionStop_001 | 0 | 0 | mand |
| 121 | TC_SECC_DC_VTB_SessionStop_002 | 0 | 0 | mand |
| 122 | TC_SECC_DC_VTB_SessionStop_003 | 0 | 0 | mand |
| 123 | TC_SECC_DC_VTB_SessionStop_005 | 0 | 0 | mand |

| | | | | |
|-----|--|---|---|------|
| 124 | TC_SECC_DC_VTB_SessionStop_006 | 0 | 0 | mand |
| 125 | TC_SECC_DC_VTB_SessionStop_007 | 0 | 0 | mand |
| 126 | TC_SECC_DC_VTB_MeteringReceipt_001 (PIXIT_SECC_CMN_ReceiptRequired := true) | | 0 | cond |
| 127 | TC_SECC_DC_VTB_MeteringReceipt_002 (PIXIT_SECC_CMN_ReceiptRequired := true) | | 0 | cond |
| 128 | TC_SECC_DC_VTB_MeteringReceipt_004 (PIXIT_SECC_CMN_ReceiptRequired := true) | | 0 | cond |
| 129 | TC_SECC_DC_VTB_MeteringReceipt_005 (PIXIT_SECC_CMN_ReceiptRequired := true) | | 0 | cond |
| 130 | TC_SECC_DC_VTB_MeteringReceipt_006 (PIXIT_SECC_CMN_ReceiptRequired := true) | | 0 | cond |
| 131 | TC_SECC_DC_VTB_MeteringReceipt_007 (PIXIT_SECC_CMN_ReceiptRequired := true) | | 0 | cond |
| 132 | TC_SECC_DC_VTB_CableCheck_001 | 0 | 0 | mand |
| 133 | TC_SECC_DC_VTB_CableCheck_002 | 0 | 0 | mand |
| 134 | TC_SECC_DC_VTB_CableCheck_003 | 0 | 0 | mand |
| 135 | TC_SECC_DC_VTB_CableCheck_005 | 0 | 0 | mand |
| 136 | TC_SECC_DC_VTB_CableCheck_006 | 0 | 0 | mand |
| 137 | TC_SECC_DC_VTB_CableCheck_007 | 0 | 0 | mand |
| 138 | TC_SECC_DC_VTB_PreCharge_001 | 0 | 0 | mand |
| 139 | TC_SECC_DC_VTB_PreCharge_002 | 0 | 0 | mand |
| 140 | TC_SECC_DC_VTB_PreCharge_004 | 0 | 0 | mand |
| 141 | TC_SECC_DC_VTB_CurrentDemand_001 (PIXIT_SECC_CMN_ReceiptREquired := false) | 0 | 0 | cond |
| 142 | TC_SECC_DC_VTB_CurrentDemand_003 | 0 | 0 | mand |
| 143 | TC_SECC_DC_VTB_CurrentDemand_005 | 0 | 0 | mand |

| | | | | |
|-----|--|---|---|------|
| 144 | TC_SECC_DC_VTB_CurrentDemand_007 (PIXIT_SECC_CMN_ReceiptREquired := true, PIXIT_SECC_CMN_MeterInfo := meterInfo) | | 0 | cond |
| 145 | TC_SECC_DC_VTB_CurrentDemand_010 | | 0 | mand |
| 146 | TC_SECC_DC_VTB_WeldingDetection_001 | 0 | 0 | mand |
| 147 | TC_SECC_DC_VTB_WeldingDetection_002 | 0 | 0 | mand |
| 148 | TC_SECC_DC_VTB_WeldingDetection_004 | 0 | 0 | mand |
| 149 | TC_SECC_DC_VTB_WeldingDetection_005 | 0 | 0 | mand |
| 150 | TC_SECC_DC_VTB_Reliability_001 | 0 | 0 | mand |
| 151 | TC_SECC_DC_VTB_Reliability_002 | 0 | 0 | mand |
| 152 | TC_SECC_DC_VTB_Reliability_003 | 0 | 0 | mand |

3.2.2. Layer 1-2 HLC Test Cases regarding to ISO 15118-3

| TC Num. | Test Case Identifier (PICS, PIXIT for conditional test cases) | Remark |
|---------|--|--------|
| 1 | TC_SECC_CMN_VTB_CmSlacParm_001 | mand |
| 2 | TC_SECC_CMN_VTB_CmSlacParm_002 | mand |
| 3 | TC_SECC_CMN_VTB_CmSlacParm_003 | opt |
| 4 | TC_SECC_CMN_VTB_CmSlacParm_008 | opt |
| 5 | TC_SECC_CMN_VTB_CmSlacParm_009 | opt |
| 6 | TC_SECC_CMN_VTB_AttenuationCharacterization_001 | mand |
| 7 | TC_SECC_CMN_VTB_AttenuationCharacterization_002 | mand |
| 8 | TC_SECC_CMN_VTB_AttenuationCharacterization_003 | mand |
| 9 | TC_SECC_CMN_VTB_AttenuationCharacterization_004 | opt |
| 10 | TC_SECC_CMN_VTB_AttenuationCharacterization_020 | mand |
| 11 | TC_SECC_CMN_VTB_CmValidate_001 (PIXIT_SECC_CMN_CmValidate := cmValidate) | cond |
| 12 | TC_SECC_CMN_VTB_CmValidate_002 (PIXIT_SECC_CMN_CmValidate := cmValidate) | cond |
| 13 | TC_SECC_CMN_VTB_CmValidate_003 (PIXIT_SECC_CMN_CmValidate := cmValidate) | cond |
| 14 | TC_SECC_CMN_VTB_CmValidate_010 (PIXIT_SECC_CMN_CmValidate := none_) | cond |
| 15 | TC_SECC_CMN_VTB_CmValidate_012 (PIXIT_SECC_CMN_CmValidate := cmValidate, PIXIT_SECC_CMN_ArchitectureValidationNotRequired := true) | cond |
| 16 | TC_SECC_CMN_VTB_CmSlacMatch_001 | mand |
| 17 | TC_SECC_CMN_VTB_CmSlacMatch_002 | mand |

| | | |
|----|-----------------------------------|------|
| 18 | TC_SECC_CMN_VTB_PLCLinkStatus_001 | mand |
| 19 | TC_SECC_CMN_VTB_PLCLinkStatus_002 | mand |
| 20 | TC_SECC_DC_VTB_PLCLinkStatus_001 | mand |
| 21 | TC_SECC_DC_VTB_PLCLinkStatus_002 | opt |
| 22 | TC_SECC_DC_VTB_PLCLinkStatus_003 | mand |
| 23 | TC_SECC_DC_VTB_PLCLinkStatus_004 | opt |
| 24 | TC_SECC_DC_VTB_PLCLinkStatus_006 | mand |

3.2.3. Test Cases for system C regarding to IEC 61851-1 Ed.3

| TC Number | Test Case Identifier | Remark |
|-----------|---|--------|
| 1000 | EVSE_DC_state_detection_C_upper_tolerance | Mand |
| 1001 | EVSE_DC_state_detection_C_lower_tolerance | Mand |
| 1002 | EVSE_DC_CP+PP_check_OutputLow_StateC | Mand |
| 1003 | EVSE_DC_CP+PP_check_OutputHigh_StateC | Mand |
| 1004 | EVSE_DC_no_stateF_by_BCB-state-change | Opt |
| 1005 | EVSE_DC_CP_circuit_state_C_OutputHigh | Mand |
| 1006 | EVSE_DC_CP_circuit_state_C_OutputLow | Mand |
| 1007 | EVSE_DC_min-max_CP-state_tolerances | Mand |

3.2.4. Test Cases for system C regarding to IEC 61851-23 Ed. 2

| TC Num. | Test Case Identifier (Test condition) | Remark |
|------------|---|--------|
| CC.7.5.1 | Compatibility check | mand |
| CC.7.5.3 | Wake up of EV supply equipment by EV | mand |
| CC.7.5.4 | Loss of electrical continuity of the control pilot conductor | mand |
| CC.7.5.6 | Rated EV supply equipment values at side B Ignore current accuracy relevant verdicts for less than 5 A TPs | mand |
| CC.7.5.7.1 | Emergency shutdown caused by an overvoltage | mand |
| CC.7.5.7.2 | Error shutdown caused by an overvoltage | mand |
| CC.7.5.7.3 | Temporary overvoltage | mand |
| CC.7.5.7.4 | Error shutdown caused by an overvoltage | mand |
| CC.7.5.8 | Emergency shutdown in case of proximity pilot disconnection | mand |
| CC.7.5.9 | Load Dump (Measurement requirement in CCTS: A/D sampling \geq 100k sampling/s, Data in application \geq 1 kHz) | mand |
| CC.7.5.11 | Side B current regulation in CCM including static deviation and ripple (Ignore current accuracy relevant verdicts for "IEV_Target \leq 5 A" TPs and skip ripple test) | mand |
| CC.7.5.12 | 0 A mode during energy transfer (Ignore current accuracy relevant verdicts for "IEV_Target \leq 5 A" TPs) | mand |
| CC.7.5.13 | Side B voltage regulation in CVM during pre-charge | mand |
| CC.7.5.14 | Control delay of present current at side B in CCM (Ignore current accuracy relevant verdicts for "IEV_Target \leq 5 A" TPs and skip ripple test) | mand |
| CC.7.5.15 | Insulation resistance check before pre-charge (cable-check) | mand |
| CC.7.5.16 | Insulation resistance check to detect fault state during energy transfer | mand |
| CC.7.5.17 | Short-circuit between CP and PE | mand |

| | | |
|----------------|---|------|
| CC.7.5.19 | Test of measured voltage values during welding detection | mand |
| CC.7.5.20 | Normal shutdown by EV supply equipment | mand |
| CC.7.5.21 | Normal Shutdown by EV | mand |
| CharIN 7.29 | CharIN test case for test voltage levels during cable check | mand |

3.2.5. Test Case for EMC regarding to IEC 61851-21-2

| TC Num. | Test Case Identifier (Test condition) | Remark |
|-----------------------|--|--------|
| IEC 61851-21-2, 6.3.3 | Conducted disurbances, DC CPT port(150 kHz to 30 Mhz) | mand |



1.5. Requirements for Test Systems (CCTS)

To ensure comparable test results over different Test Systems (CCTS) CharIN has set up a Qualification Process for Test Systems. For details see CharIN “Quality Assurance Plan (QAP) for CharIN Conformance testing of Charging System”.

1.6. Requirements for Testing houses

To ensure comparable test results over different Testing houses CharIN set up a Qualification Process for Testing houses. For details see CharIN “Quality Assurance Plan (QAP) for CharIN Conformance testing of Charging System”.



4. Reference

This document was created by the FG Conformance Test & IOP of the CharIN association.