DOCKETED

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Empowering
the **next level**
of e-mobility

CharIN – Charging Interface Initiative e. V.

**Introduction on CharIN BPT Implementation
guide based on ISO 15118-20**
CEC workshop 13th May 2024, Xi Zhang, EcoG GmbH, xi@ecog.io

CharIN Interoperability Guide: Minimum Scope for Implementation of ISO 15118-20 DC Bidirectional Power Transfer in Dynamic Control Mode

Objective : to support and demonstrate interoperable ISO 15118-20 compliant bi-directional DC charging

- Market starting to demand for V2G functionality

- ISO 15118-20 at final stage for standard publication

- ISO 15118-20 has introduced multiple new features as compared to -2.

- An implementation guide focus on the functional basics sufficient to test and demonstrate DC_BPT

- Joint work on the Electrical system aspect on DC_BPT as supplement to IEC 61851-23

Process

First version:
- Kicked off July 2021
- Weekly meetings
- Published April 2022 for CharIN members

Testing period:
- CharIN Testival Arnhem 2023
- Mini Testival with DB BPT only Q3/2023
- CharIN Testival Valencia 2023

Second version:
➔ Fix gaps and issues identified from testing events
➔ Identify key requirements essential for conformance test specifications.

- Update kicked off Feb 2024
- Weekly meetings
- Comment resolution finished 8th May
- Aim to publish for general public

Scope

**Use case driven scope definition**

- DC

- Dynamic control mode

The following features are **not included** in the scope of this document.

- Service renegotiation
- Schedule renegotiation
- Schedule control mode
- Grid forming mode
- Multiplexed communication
- Pause and standby
- Plug and Charge
- Certificate revocation check for TLS (CLR, OCSP, Stapling)
- Set mobility needs by the SECC

Key parameter exchange between EV and EVSE

EVMaximumChargePower

EVMinimumChargePower

EVMaximumChargeCurrent

EVMaximumVoltage

EVMinimumVoltage

EVMaximumDischargePower

EVMinimumDischargePower

EVMaximumDischargeCurrent

DepartureTime (s)

EVTargetEnergyRequest

EVMaximumEnergyRequest

EVMinimumEnergyRequest
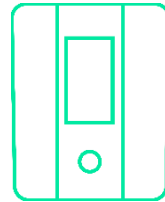
EVSEMaximumChargePower

EVSEMinimumChargePower

EVSEMaximumChargeCurrent

EVSEMaximumVoltage

EVSEMinimumVoltage

EVSEMaximumDischargePower

EVSEMinimumDischargePower

EVSEMaximumDischargeCurrent

```xml
<?xml version="1.0" encoding="UTF-8"?>
<p0:ScheduleExchangeReq xmlns:p0="urn:iso:std:iso:15118:-20:CommonMessages"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <p1:Header xmlns:p1="urn:iso:std:iso:15118:-20:CommonTypes">
        <p1:SessionID>3933323835363733</p1:SessionID>
        <p1:TimeStamp>1624366044</p1:TimeStamp>
    </p1:Header>
    <p0:MaximumSupportingPoints>12</p0:MaximumSupportingPoints>
    <p0:Dynamic_SEReqControlMode>
        <p0:DepartureTime>3600</p0:DepartureTime>
        <p0:EVTargetEnergyRequest>
            <p1:Exponent
xmlns:p1="urn:iso:std:iso:15118:-20:CommonTypes">3</p1:Exponent>
            <p1:Value xmlns:p1="urn:iso:std:iso:15118:-20:CommonTypes">60</p1:Value>
        </p0:EVTargetEnergyRequest>
        <p0:EVMaximumEnergyRequest>
            <p1:Exponent
xmlns:p1="urn:iso:std:iso:15118:-20:CommonTypes">3</p1:Exponent>
            <p1:Value xmlns:p1="urn:iso:std:iso:15118:-20:CommonTypes">67</p1:Value>
        </p0:EVMaximumEnergyRequest>
        <p0:EVMinimumEnergyRequest>
            <p1:Exponent
xmlns:p1="urn:iso:std:iso:15118:-20:CommonTypes">0</p1:Exponent>
            <p1:Value xmlns:p1="urn:iso:std:iso:15118:-20:CommonTypes">10</p1:Value>
        </p0:EVMinimumEnergyRequest>
    </p0:Dynamic_SEReqControlMode>
</p0:ScheduleExchangeReq>
```

Content examples

Name space:
ProtocolNamespace= urn:iso:std:iso:15118:-20:DC

Security requirements:
TLS 1.3 is required.

Error Handling, e.g.

[ChIN-BPT-022] If the limits communicated in the DC_chargeLoopReq are exceeded by the EVSE (for example, EVSEPresentCurrent > EVMaximumChargeCurrent), the EVSE may expect that the EV terminates the charging session.

[ChIN-BPT-023] If the EVMaximumEnergyLevel /EVMinimumEnergyLevel are not fulfilled at anytime during the charging session (except when the charging session is started outside of the range of EVMaximumEnergyLevel/EVMinimumEnergyLevel), the EVSE may expect that the EV terminates the charging session.

Filling the gaps:

- Charging end from EV -> how to reduce the current before stopping in dynamic control mode?

- How should EVSE behave during discharging of the EV when the minimum target energy of the EV is reached?

Conclusions

- CharIN guide is an easy first step.

- The scope of the guide can always be extended, e.g. description of usage of important optional parameters, support of additional use cases, etc.

- Active contribution is welcome.

Thank you for your kind attention!

Any questions?

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