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TITLE OF THE CD (English):

OIML R XX-4

Electric Vehicle Supply Equipment (EVSE)

Part 4: Evaluation report format

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Foreword

[To be added]

Explanatory Notes

Meaning of symbols used in this report

base m.p.e = base maximum permissible error

f_{nom} = nominal frequency

U_{nom} = nominal voltage

I_{max} = maximum current

I_{tr} = transitional current

I_{min} = minimum current

I_{st} = starting current

U_{min} = minimum voltage

U_{max} = maximum voltage

U_{range} = voltage range from U_{min} to U_{max}

PF = power factor

MMQ = minimum measured quantity

H1 = humidity class 1: enclosed locations where the EVSE is not subjected to condensed water, precipitation, or ice formations;

H2 = humidity class 2: enclosed locations where the EVSE may be subjected to condensed water, to water from sources other than rain and to ice formations;

H3 = humidity class 3: open locations with average climatic conditions.

1 Information

1.1 EVSE information

Manufacturer and type

EVSE manufacturer:	
EVSE type (model designation):	

Separate approved meter: ☐ No ☐ Yes

If Yes:

Meter manufacturer:	
Meter type (model designation):	
Approval number:	

1.2 EVSE specification

Accuracy and measurement quantities

Accuracy class: ☐ A / 2 ☐ B / 1 ☐ C / 0.5

Rate: ☐ No ☐ Yes, single ☐ Yes, multi-rate

EVSE current type: ☐ AC ☐ DC ☐ AC&DC

Electrical parameters

EVSE AC:

Nominal frequency, f_{nom} :		Hz
Nominal voltage, U_{nom} :		V
Maximum current, I_{max} :		A
Transitional current, I_{tr} :		A
Minimum current, I_{min} :		A
Starting current, I_{st} :		A
Minimum measured quantity, MMQ		kWh

EVSE DC:

Nominal input voltage, U_{nom} :		V
Nominal input frequency, f_{nom} :		Hz
Minimum voltage, U_{min} :		V
Maximum voltage, U_{max} :		V
Maximum current, I_{max} :		A
Transitional current, I_{tr} :		A
Minimum current, I_{min} :		A
Starting current, I_{st} :		A
Minimum measured quantity, MMQ		kWh

Environment

Lower specified temperature: ☐ -55 °C ☐ -40 °C ☐ -25 °C ☐ -10 °C ☐ +5 °C

Upper specified temperature: ☐ +30 °C ☐ +40 °C ☐ +55 °C ☐ +70 °C ☐ +85 °C

Humidity class: ☐ H1 ☐ H2 ☐ H3

For use: ☐ Outdoor ☐ Residential ☐ Commercial

Direction of energy flow

☐ Two-register, bidirectional ☐ Single-register, positive direction only

Hardware and software

Hardware version(s):		
Software version(s):		
Specified clock output frequencies:		<i>(include units of measurement)</i>

Remarks

2 Units and rated operating conditions

Requirements	Passed	Failed	Not applicable	Remarks
Units of measurement (OIML R XX-1, 3.1)				
Valid units for active energy: Wh, kWh, MWh, GWh				
Rated operating conditions (OIML R XX-1, 3.2; Table 1)				
Frequency ¹⁾				
Voltage				
Current				
Power factor ¹⁾				
Temperature				
Humidity and water				
Harmonics ¹⁾				
Load balance ¹⁾				
MMQ ³⁾				

¹⁾ Only applies to AC EVSE

²⁾ If no MMQ is marked, the maximum value shall be assumed.

3 Metrological requirements

3.1 Accuracy requirements

The EVSE has been tested for accuracy requirements:

Accuracy requirements (OIML R XX-1, 3.3)	Passed	Failed	Not applicable	Remarks
General (OIML R XX-1, 3.3.1)				
The manufacturer shall specify the accuracy class of the EVSE to be one of A, B or C.				
The EVSE shall be designed and manufactured such that its error does not exceed the maximum permissible error for the specified class under rated operating conditions.				
Direction of energy flow (OIML R XX-1, 3.3.2)				
The polarity of energy flow shall be defined by the manufacturer's connection instructions for the EVSE.				
An EVSE shall fall into at least one of the following categories: <ul style="list-style-type: none"> two-register, bidirectional single-register, positive direction only 				
Where a manufacturer has specified that an EVSE is capable of bidirectional energy flow, the EVSE shall correctly handle both positive and negative mean energy flow and shall fulfil the requirement of this Guide for energy flow in both directions.				
Base maximum permissible errors (OIML R XX-1, 3.3.3; Table 2)				
The intrinsic error shall be within the base maximum permissible error for the specified current ranges when energy is at least MMQ and when the EVSE is otherwise operated at reference conditions.				

3.2 Influence factors

The EVSE has been tested for the allowed effects of influence factors:

Influence factors (OIML R XX-1, 3.3.4; Table 3, Table 4)	Passed	Failed	Not applicable	Remarks
Temperature; temperature dependence				
Self-heating				
Voltage variation ¹⁾				
Frequency variation of mains ¹⁾				
Harmonics in voltage and current circuits ¹⁾				
Reversed phase sequence (AC 3-phase only)				
Conducted disturbances, low frequency; 2-150 kHz				
Continuous (DC) magnetic induction of external origin; 200 mT				
Magnetic field (AC, power frequency) of external origin; 400 A/m				
Radiated, RF, electromagnetic fields; with current				
Conducted disturbances, induced by radio frequency fields				
Operation of ancillary devices				

¹⁾ Only applies to AC EVSE

3.3 Disturbances

The EVSE has been tested for the allowed effects of disturbances:

Disturbances (OIML R XX-1, 3.3.5)	Passed	Failed	Not applicable	Remarks
Electrical disturbances (OIML R XX-1, 3.3.5.2; Table 5)				
Electrostatic discharges				
Fast transients				
Voltage dips				
Voltage interruptions				
Surges on AC mains power lines				
Short-time overcurrent				
Environmental disturbances (OIML R XX-1, 3.3.5.3; Table 6)				
Protection against solar radiation				
Dry heat				
Cold				
Damp heat				
Mechanical disturbances (OIML R XX-1, 3.3.5.4; Table 7)				
Vibration				
Shock				

3.4 Durability

The EVSE has been tested for durability requirements:

Durability (OIML R XX-1, 3.4)	Passed	Failed	Not applicable	Remarks
The EVSE shall be designed to maintain an adequate stability of its metrological characteristics over its intended lifetime, provided it is properly installed, maintained, and used according to the manufacturer's instructions when in the environmental conditions for which it is intended.				
The EVSE shall be designed to reduce as far as possible the effect of a defect that would lead to an inaccurate measurement result.				
The maximum allowed error shift is 0.5 base MPE when tested according to the specifications provided in OIML R xx-2 section 7.5.9.				

4 Functional requirements

4.1 EVSE markings

EVSE markings (OIML R XX-1, 4.2)	Marked on EVSE?		Not applicable	Remarks
a) Approval mark				
b) Approval number/identifier				
c) Manufacturer				
d) Year of manufacture				
e) Manufacturer model				
f) Serial number				
g) Voltage ¹⁾				
h) Current characteristics ²⁾				
i) Nominal frequency ³⁾				
j) Temperature range				
k) Accuracy class				
l) MMQ				
	Passed	Failed	Not applicable	Remarks
The markings are indelible, distinct, and legible from outside the EVSE.				
The serial number is affixed in a position that is not readily disassociated from the EVSE.				
Symbols or their equivalent may be used where appropriate.				

1) U_{nom} for AC, output voltage range U_{min} to U_{max} for DC

2) I_{st} , I_{min} , I_{tr} and I_{max} for AC and DC. If current characteristics in negative direction are different from those in positive direction, these shall be marked separately.

3) For AC; in case of DC: the marking shall include “DC”.

4.2 Suitability for use

Suitability requirements (OIML R XX-1, 4.3)	Passed	Failed	Not applicable	Remarks
General requirements (OIML R XX-1, 4.3.1 – 4.3.4)				
Accuracy shall be determined at the connection point to the vehicle.				
If applicable, cable assemblies shall comply with the requirements in OIML R XX-1 section 4.3.2.				
The EVSE shall have no means to allow measured energy to be diverted between the point of measurement and the EV.				
If an EVSE is capable of receiving and measuring electrical energy from the vehicle, then it shall comply with the requirements in OIML R XX-1 section 4.3.4.				
Transaction requirements (OIML R XX-1, 4.3.5)				
Ad hoc public transactions comply with the requirements in OIML R XX-1 section 4.3.5.1.1.				
Contractual public transactions comply with the requirements in OIML R XX-1 section 4.3.5.1.2.				
Contractual private transactions comply with the requirements in OIML R XX-1 section 4.3.5.1.3.				
Legally relevant data referenced in OIML R XX-1 section 4.3.5.1 shall be accessible to the end user through the client interface or be made available to the end user afterwards through an external backend.				
Means shall be provided to automatically terminate charging and complete the transaction in the event of a break in the connection with the vehicle.				
Multiple rates (OIML R XX-1, 4.3.6)				
If an EVSE can apply multiple rates during an energy transfer session it shall comply with the requirements in OIML R XX-1 section 4.3.6.				
Multiple rates shall not be applied unless the customer has agreed to variable pricing through interaction with the EVSE or a contractual agreement.				
Power outage (OIML R XX-1, 4.3.7)				
The transaction shall be paused at the time of the supply power outage.				
Once the power is restored it shall comply with the requirements in OIML R XX-1 section 4.3.7 point 2.				

4.3 Access to data

Describe the indicating device(s), all relevant measurement data displayed, display format, and instructions on how to use it.

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Requirements for access to data (OIML R XX-1, 4.4)	Passed	Failed	Not applicable	Remarks
Readability of the result (OIML R XX-1, 4.4.1)				
An EVSE shall make the legally relevant transaction data accessible to the end user through the client interface by OIML R XX-1 section 4.4.1.1 and/or OIML R XX-1 section 4.4.1.2.				
Client interfaces (OIML R XX-1, 4.4.2)				
Client interfaces shall be able to display all legally relevant transaction data in an easily readable form.				
Client interfaces shall display the energy being transferred, either continuously or on demand.				
Client interfaces shall provide facilities to allow any user input relevant to a transaction.				
For multi-rate devices, the data for each rate applied shall be displayed.				
Any decimal fractions shall be clearly indicated.				
Client interfaces shall not be significantly affected by exposure to normal operating conditions over the maximum duration of the EVSE lifetime.				
Registers (OIML R XX-1, 4.4.3)				
Electronic registers shall be non-volatile so that they retain stored values upon loss of power. This applies to all registers relevant for billing including positive and negative flow registers for bidirectional EVSE and rate registers for multi-rate EVSE.				
Stored values shall not be overwritten and shall be capable of being retrieved upon restoration of power. This applies to all registers relevant for billing including positive and negative flow registers for bidirectional EVSE and rate registers for multi-rate EVSE.				
The register shall be capable of storing and displaying an amount of energy sufficient to ensure that no roll over will occur during a transaction. This applies to all registers relevant for billing including positive and negative flow registers for bidirectional EVSE and rate registers for multi-rate EVSE.				
In the case of electronic registers, the minimum retention time is until the transaction is finalised or cancelled.				
If electronic indicating devices have segments, then the EVSE shall be provided with a display test that switches all the display segments on then off for the purpose of				

determining whether all the display segments are working.				
The EVSE shall have one or more registers for the energy delivered to the electrical vehicle for a transaction, which shall be reset to zero at the beginning of a new transaction.				
The reset to zero function shall be disabled while a charging event is ongoing.				
Testability (OIML R XX-1, 4.4.4)				
The EVSE shall readily provide legally relevant energy data to the evaluator with the resolution specified in OIML R XX-1 section 4.4.4.1.1 or OIML R XX-1 section 4.4.4.1.2 or better, where the least significant digit increments by 1, without any additional means. (OIML R XX-1, 4.4.4.1)				
For ad hoc transactions the EVSE shall provide the price per unit of measurement and the total money value of the transaction. (OIML R XX-1, 4.4.4.2)				
The primary mode of testing shall be based on the energy displayed on the client interface of the EVSE. (OIML R XX-1, 4.4.4.3)				
Transaction data should be read directly from the client interface or from the cryptographic secured data-package of the legally relevant data, via a communication interface. (OIML R XX-1, 4.4.4.3)				
The dedicated pulse output shall comply with the requirements in OIML R XX-1 section 4.4.4.3.				

4.4 Requirements for software-controlled components and EVSE

Describe the software and indicate the version of the software present at the time of testing, and how to identify the software version.

Requirements for software controlled EVSE (OIML R XX-1, 4.4)	Validation Description	Passed	Failed	Not applicable
Software identification (OIML R XX-1, 5.2)				
Audit trail (OIML R XX-1, 5.3)				
Detection of significant defects (OIML R XX-1, 5.4)				
Time stamps (OIML R XX-1, 5.5)				
Software update (OIML R XX-1, 5.6)				
Remote verification update capabilities (OIML R XX-1, 5.7)				
Software (OIML R XX-1, 5.8)				
Compatibility of operating system and hardware (OIML R XX-1, 5.9)				
Parameters (OIML R XX-1, 5.10)				
Protection of transaction data (OIML R XX-1, 5.11)				
Client and verification interface (OIML R XX-1, 5.12)				
Communication interface (OIML R XX-1, 5.13)				
Separation of electronic devices and components (OIML R XX-1, 5.14)				
Separation of modules (OIML R XX-1, 5.15)				
Storage of data (OIML R XX-1, 5.16)				
Transmission of measurement data (OIML R XX-1, 5.17)				

5 Type approval

5.1 Documentation type approval

Documents type approval provided (OIML R XX-2, 6.1)	Yes	No	Not applicable	Remarks
Application for type approval				
Identification of the type				
Metrological characteristics of the EVSE				
The technical specification for the EVSE				
User manual				
Installation manual				
Description of the checking facility for critical faults				
Software documentation				
Description of the legally relevant software and how the requirements are met.				
Description of security means of the operating system				
Description of the (software) sealing method(s)				
Overview of the system hardware, e.g. topology block diagram, type of computer(s), type of network, etc.				
Where a hardware component is deemed legally relevant or where it performs legally relevant functions, this should also be identified.				
Description of the accuracy of the algorithms (e.g. filtering of A/D conversion results, price calculation, rounding algorithms, etc.)				
Description of the user interface, menus, and dialogues				
Software identification and instructions for obtaining it from an instrument in use.				
List of commands of each hardware interface of the measuring instrument / electronic device / sub-assembly including a statement of completeness.				
List of durability errors that are detected by the software and if necessary for understanding, a description of the detecting algorithms.				
Description of data sets stored or transmitted				
If fault detection is realised in the software, list of faults that are detected and a description of the detecting algorithm.				
Operating manual				
Existing type test documentation				
The application for type approval shall be accompanied by type test documents or other evidence that supports the assertion that the design and characteristics of the measuring instrument comply with the requirements of this Guide.				

5.2 Type definition

Specimens type testing (OIML R XX-2, 6.3)	Passed	Failed	Not applicable	Remarks
The manufacturer shall provide at least as many specimens of the EVSE as are required by the national authority.				
The type test shall be made on one or more specimens of the EVSE, selected by the test laboratory, to establish				

its specific characteristics and to prove its conformity with the requirements of this Guide.				
In the case of modifications to the EVSE made after or during the type test and affecting only part of the EVSE, the authority responsible for type evaluation may deem it sufficient to perform limited tests on the characteristics that may be affected by the modifications.				