

Vehicle type approval Charging Mode 2

September 2023 (V1.2)

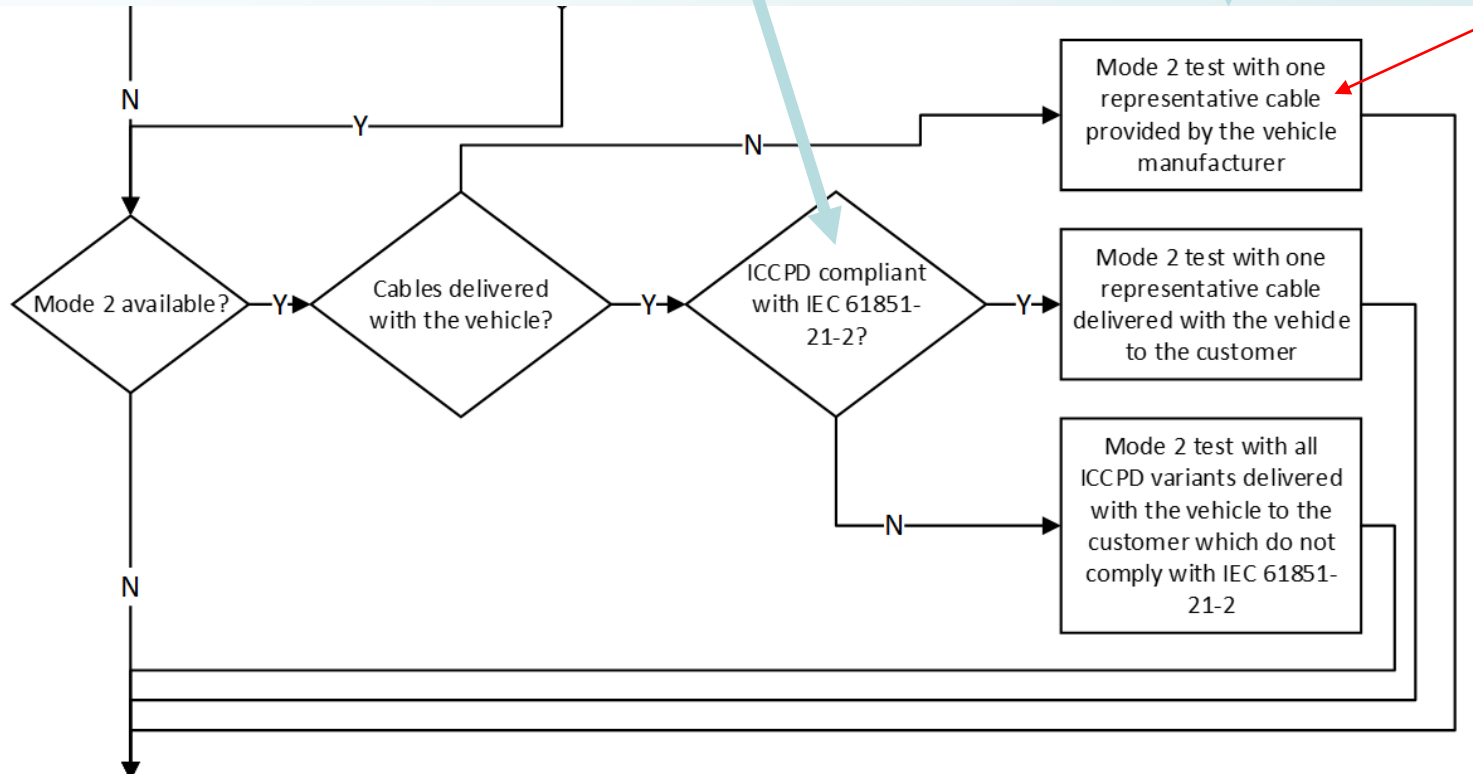


Test concept with ESA mindset

IEC 61851-21-2 ICCPD test:
Chapter 5 for immunity and
Chapter 6 for emission
= comparable to ESA test of R10

R10 Vehicle Test:
Paragraph 7 for immunity
and emission

If any cable is not delivered to the customer, at least one test shall be carried out in Mode 2, in order to test the vehicle interface including OBC.



R10 ESA test is not applicable for ICCPDs because test setup is not available in CISPR 25 and ISO 11452. Relevant product standard is IEC 61851-21-2.

Vehicle tests can be replaced by ICCPD component test, comparably to ESA type approval mindset.



Draft for discussion

Discussion between Spanish CP and OICA (8 September 2023):

- Spain expressed their concern about responsibility of the type approval authority for mode 2 cables which had not been tested during type approval.
- OICA proposes to exclude charging cables from the type approval:

Paragraph 7.1.3., amend to read:

"7.1.3. A vehicle in configuration "REESS charging mode coupled to the power grid" should be tested with the charging harness delivered by the manufacturer **in line with flow charts provided in Annexes 4, 6, 11, 12, 13, 15 and 16.** ~~In this case, the cable shall be type approved as part of the vehicle.~~ **Charging cables are considered as after-market equipment and not included in the vehicle type approval.**



Backup

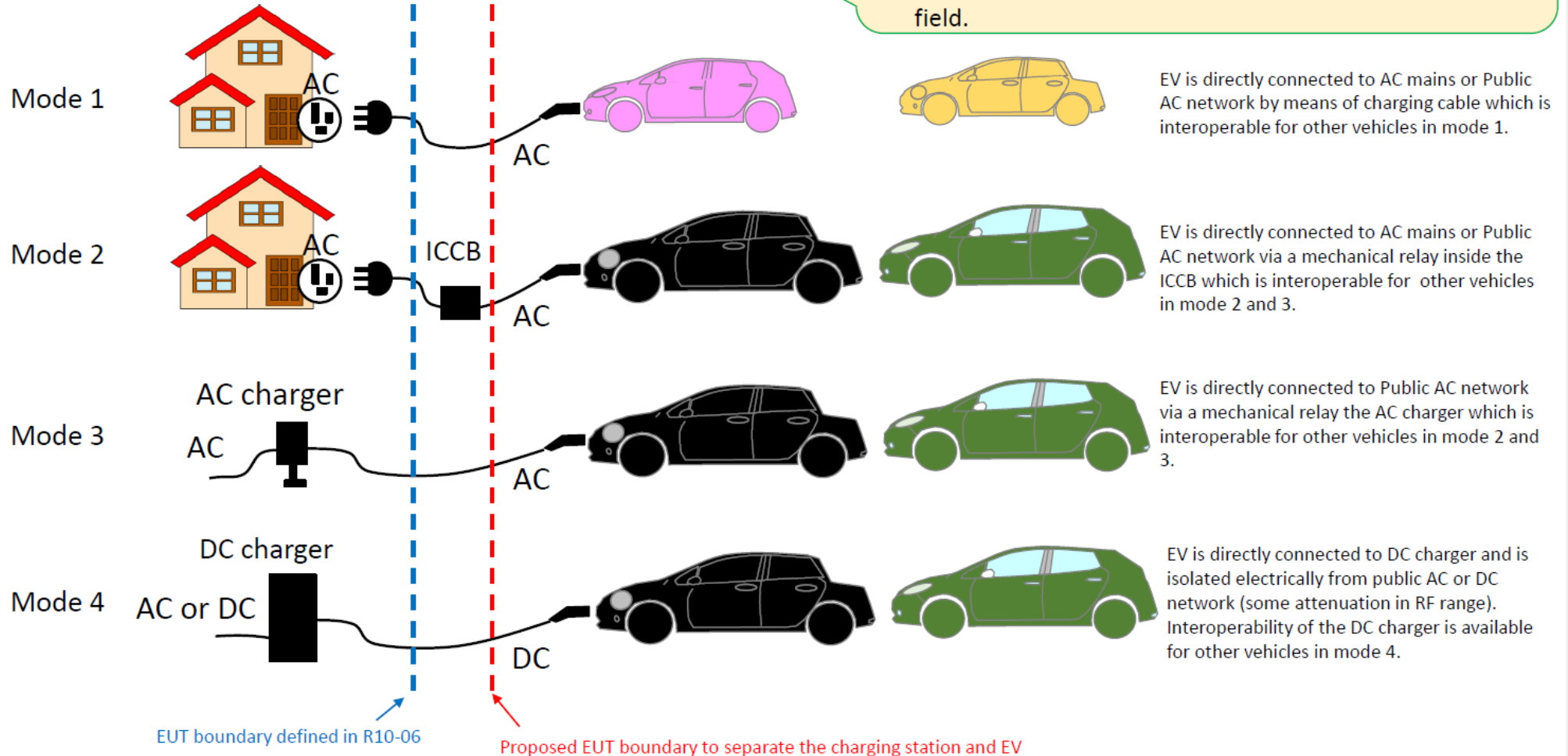
- The following slides were provided for earlier discussions in GRE IWG EMC



Mindset

Charging modes defined in IEC61851-1 and classification

- Test is performed on product by product basis.
- It is necessary to define the EUT boundary separate charger and vehicle.
- Interoperability of product shall be considered in EMC field.





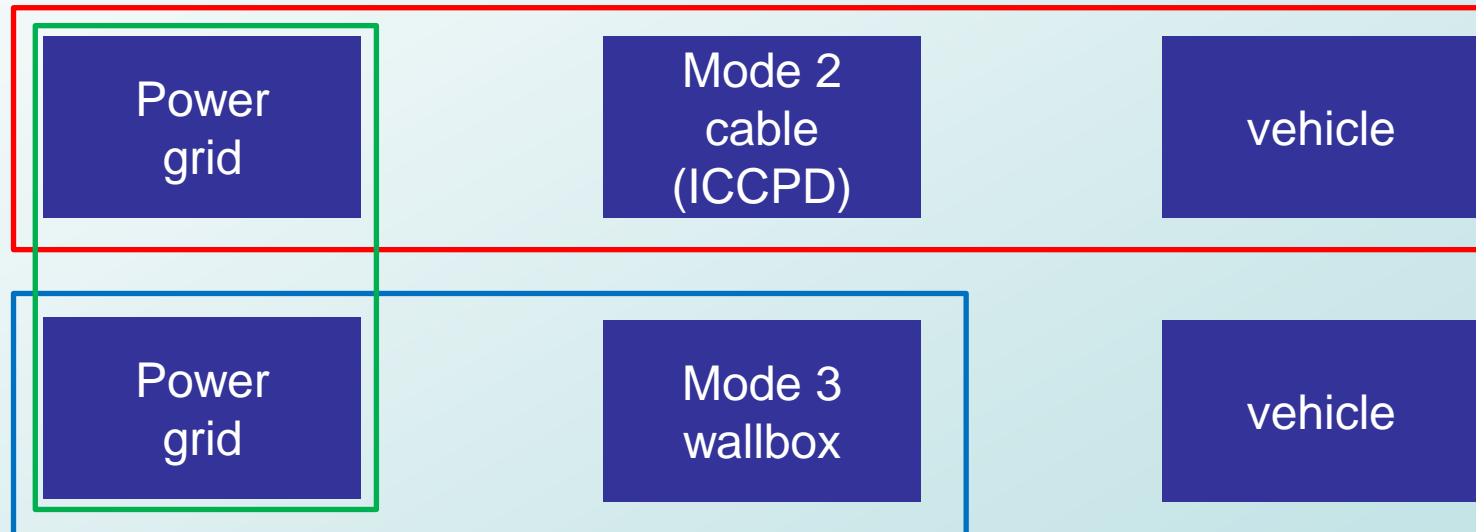
Mobile charging cables

➤ ESA test not applicable for mobile REESS charging cables

- A test setup for charging cables is defined neither in CISPR 25 nor in ISO 11452-2
- However, IEC 61851-21-2 provides a proper setup as it is intended to cover the designated use case of a vehicle charging cable connected to the power grid

Devices attached to the power grid usually require a (national) type approval, e.g. CE within the EU.

For the purpose of type approval, testing acc. to international standards or national equivalents is required.



As the mode 2 cable is attached to the power grid, compliance with IEC standards or national equivalents (e.g. ENs or EN IECs) is already required.

The mode 2 cable shall not be considered to be an ESA to avoid double certification.

➤ **Clarification and update of flow chart is necessary!**

The mode 3 wallbox is not considered to be an ESA; it is only tested according to IEC standards



Conclusion (1)

➤ Mode 1:

- If the cable is fixed at the vehicle: **type approval with vehicle** (this is clear because no other cable can be used)
- Mobile cable → normally passive cable → **ESA test not applicable**

➤ Mode 2:

- IEC 61851-21-2:2018 covers ESA test from R10.06 in most cases
- IEC radiated emission method is different with other, yet stricter limits; wider frequency range depending on the highest internal frequency; measurement distance of 3m reasonable for foreseeable use case of charging in residential environment for the protection of off-board receivers; 1m in CISPR 25 refers to the protection of on-board receivers which is in the responsibility of the VM.
- IEC radiated immunity test does **not** cover ESA immunity test, but
 - based on vehicle failure criteria in R10.06:
 - vehicle sets in motion
 - unexpected release of the parking brake
 - loss of Parking position for automatic transmission,

Mode 2 cable can not technically cause any of the failures above. Testing in mode 3 allows the same disturbance to be coupled to the vehicle.

ESA test not applicable: testing the mode 2 charging cable according to IEC 61851-21-2 or national equivalent is sufficient. ESA type approval or type approval of every kind of VM mode 2 charging cable in combination with the vehicle does not provide added value. By changing the mindset regarding the mode 2 interface regulatory burden will be reduced (see TF-EMC-25-03e).



Conclusion (2)

➤ **Mode 3:**

- Mobile cable: normally passive cable: ***ESA test not applicable***
- Wallbox: usually requires (national) type approval due to the direct connection to the power grid
 - ***E.g. for the purpose of CE marking, the European equivalent of IEC 61851-21-2, EN IEC 61851-21-2, is used***

➤ **Mode 4:**

- Cable is fixed at charging station: normally passive cable: ***ESA test not applicable***
- DC charging station: usually requires (national) type approval due to the direct connection to the power grid
 - ***E.g. for the purpose of CE marking, the European equivalent of IEC 61851-21-2, EN IEC 61851-21-2, is used***