



Feasibility analysis and development of on-road charging solutions for future electric vehicles

## Standardisation framework on Wireless Power Transfer systems

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# General overview

A joint project ISO/IEC has recently started for the development of a specific standard dedicated to Interoperability and Safety in the wireless magnetic interaction vehicle - infrastructure, with the contribution of ISO TC22/SC21 and IEC TC 69 and participation of SAE

Two meetings have been held:

- in Berlin on February 7<sup>th</sup> 2014 (Kick off Meeting)

- in Tokyo on March 13<sup>th</sup> and 14<sup>th</sup> 2014

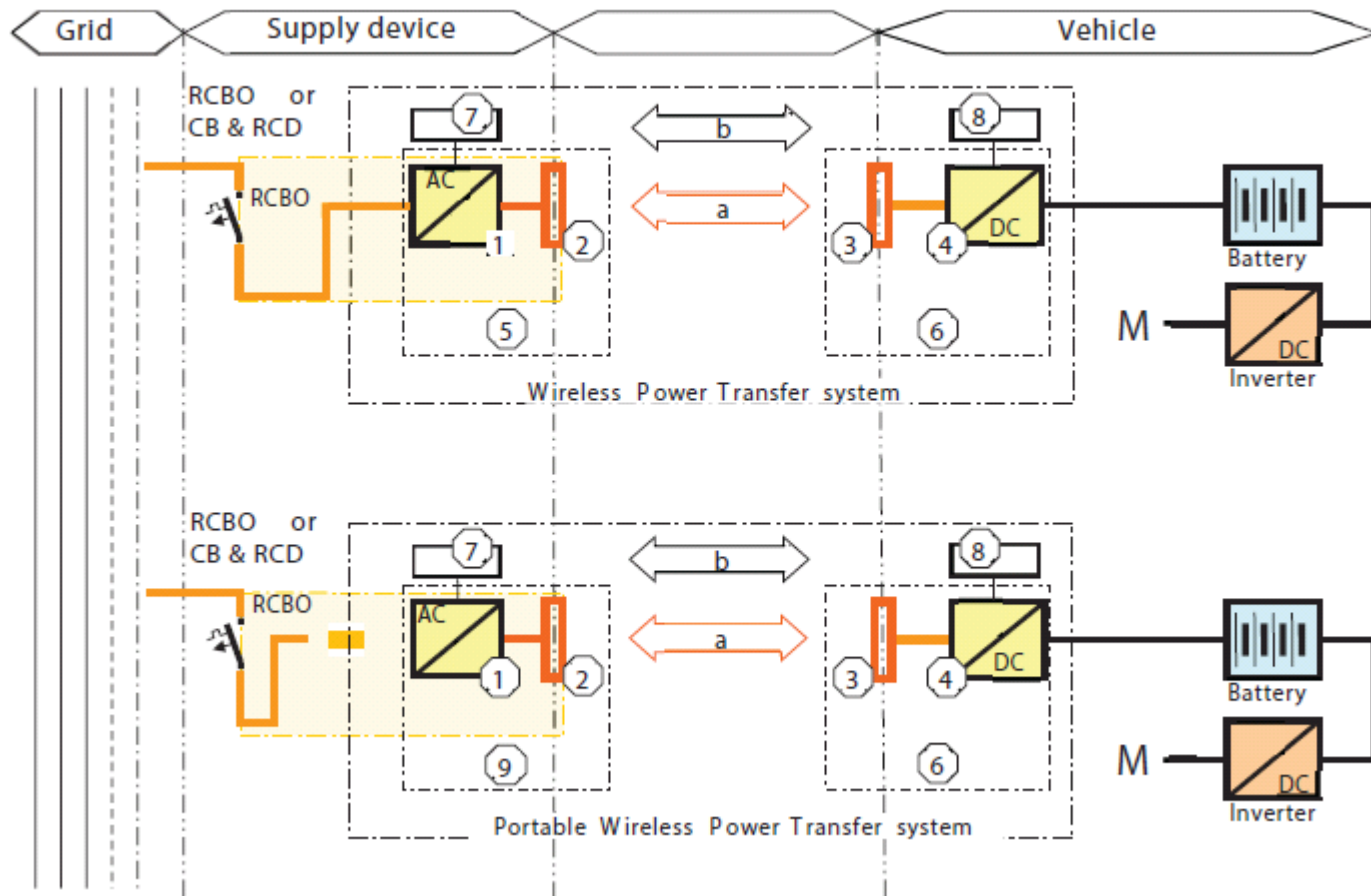
The Standard under development is ISO 19363 “Magnetic field Wireless Power Transfer - Interoperability and Safety requirements”

The Standard is considered to be complemented by the Standard IEC 61980, under development and harmonized with other standards dealing with the WPT

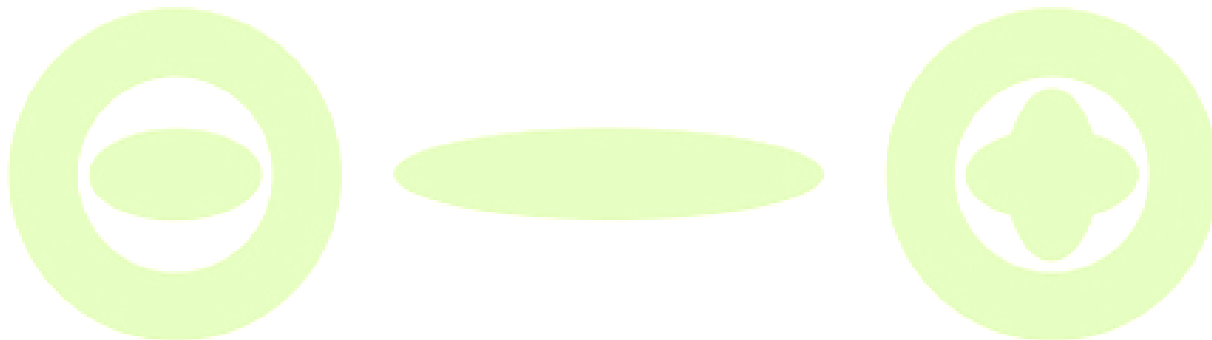
# General Scope of Standards

1. Standards harmonization concerning wireless systems, electric vehicles and grid infrastructure can play a fundamental role as guidance for the technology development by:
  - Providing prescriptions and procedures related to system safety
  - Assuring a common basis for the development of interoperable systems
  - Providing a coordination between the networks energy supply and Information connection infrastructure – vehicle – user.
  - Standard should not interfere with technology development, should not be related to specific design but should assure functional response of the system addressing safety and interoperability, giving the appropriate boundary conditions.

# General scheme of WPT between primary and secondary element (infrastructure and vehicle)



- Future transportation scenario based on WPT:
  - Different power transfer modes
    - Static
    - Stationary
    - Dynamic
  - WPT will be related to hardware and ICT transmission information:
    - ICT transmission should be coordinated by a central mobility management;



## Standards ISO, IEC, SAE, UL on wireless charging (source VDA)

**ISO 19363** (scheduled for 10-2016) Electrically propelled road vehicles – Magnetic field Power Transfer – Interoperability and Safety requirements

**IEC 61980** Electric vehicle wireless power transfer (WPT) systems

- Part 1: General requirements
- Part 2: Specific requirements for communication EV and infrastructure
- Part 3: Specific requirements for the magnetic field power transfer systems

**ISO/IEC 15118** (scheduled for 10-2016) Road vehicle to grid communication interface

- Part 6: General information and use-case definition for wireless communication
- Part 7: Network and application protocol requirements for wireless communication
- Part 8: Physical layer and data link layer requirements for wireless communication

**SAE J2954** Wireless Charging of Electric and Plug-in Hybrid Vehicles (Guideline scheduled for 06/2014)

**SAE J2836/6 J2847/6 J2931/6** Communication for inductive charging (Guideline scheduled for 06/2014)

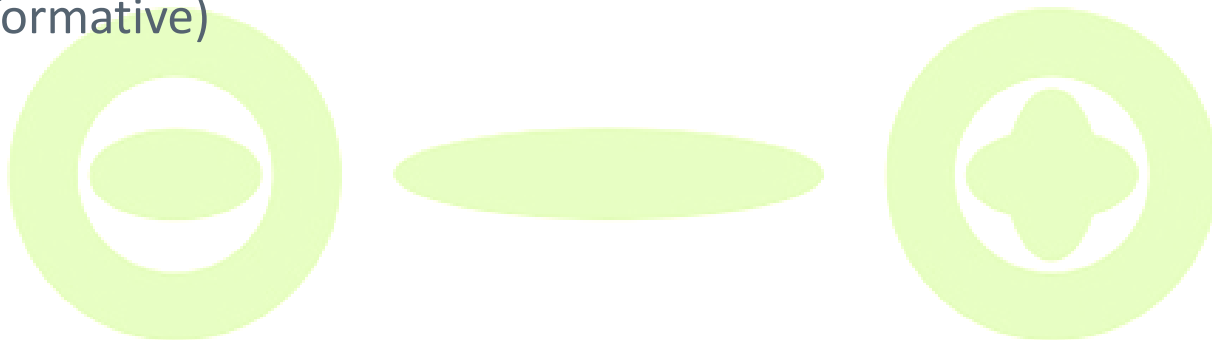
**SAE J1773** Electric Vehicle Inductively Coupled Charging (published as recommended practice)

**UL 2750** Wireless EV charging

# ISO and IEC focus points related to wireless

Focus point having relation with FABRIC development:

- Flux geometry / coil geometry
- Core specification
- Operating frequency
- Alignment tolerance requirements
- Location of secondary device
- Control loop of power transfer and response time of the loop
- Parameters needed to be exchanged for interoperability
- Resonant circuit topology, coupling factor and impedance (informative)



# Key points of ISO 19363 under consideration

## 1. Interoperability:

- Operating air gap classes
- Offset classes
- System frequency
- Transfer Power Classes
- Location and positioning of secondary device
- Command & control communication

## 2. Safety requirements:

- Protection against electrical shock (in accordance with ISO 6469-3)
- Protection against electromagnetic effect
- Protection against temperature effects by electromagnetic fields
- Operational safety in accordance with ISO 6469-2)



# IEC 61980

## Electric vehicle wireless power transfer systems

- Part 1: General requirements
  - FDIS circulation January 2015
- Part 2: Specific requirements for communication between electric road vehicle (EV) and infrastructure with respect to wireless power transfer (WPT) systems
  - Now circulating as CD, first publication as TS mid 2015
- Part 3: Specific requirements for the magnetic field wireless power transfer systems
  - Now circulating as CD, first publication as TS mid 2015

# Interactions

- Vehicle issues (ISO TC22 SC37): ISO 19363
- Optional communication issues (ISO TC22 SC31): ISO 15118 series
- EMC/EMF issues: (Wireless Power Transfer Task-Force CISPR B/WG1/ TF WPT)

# Standardization target

Standardisation targets should be mainly focused on:

- Interoperability, at the general mobility system level, should concern the Wireless Power Transfer capability between vehicle and infrastructure with dynamic mode and with static wireless infrastructure facilities.
- Homogenize vehicle layout in order to improve every aspect related to safety and rescue activities in case of accident



For these reasons, it should be very useful to establish a **liaison between FABRIC and ISO/TC22/SC37** (formerly named SC21)

# Conclusion

1. ISO and IEC in connection with SAE are working jointly for the development in harmonized way on standards for Magnetic field Wireless Power Transfer
2. The standards under development intend to offer guidelines for the studies of systems on WPT vehicle - infrastructure addressing the safety and interoperability for a general future applications
3. Issues coming from the technical developments of the studies, research and developments are welcome to be addressed in the relevant standards development



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# Thank you!

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