



International Telecommunication Union

Vehicles and Telecommunication - EMC Standards and Regulations

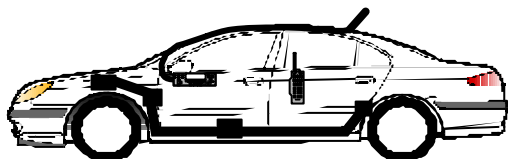
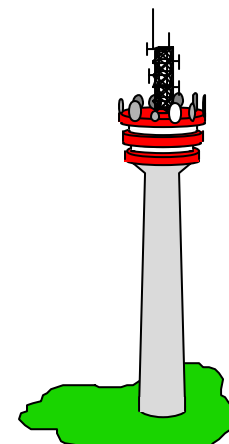
Ariel LECCA, PSA Peugeot Citroen
ISO/TC22/SC3/WG3 Chairman

"The Fully Networked Car, A Workshop on ICT in Vehicles"
ITU-T Geneva, 2-4 March 2005

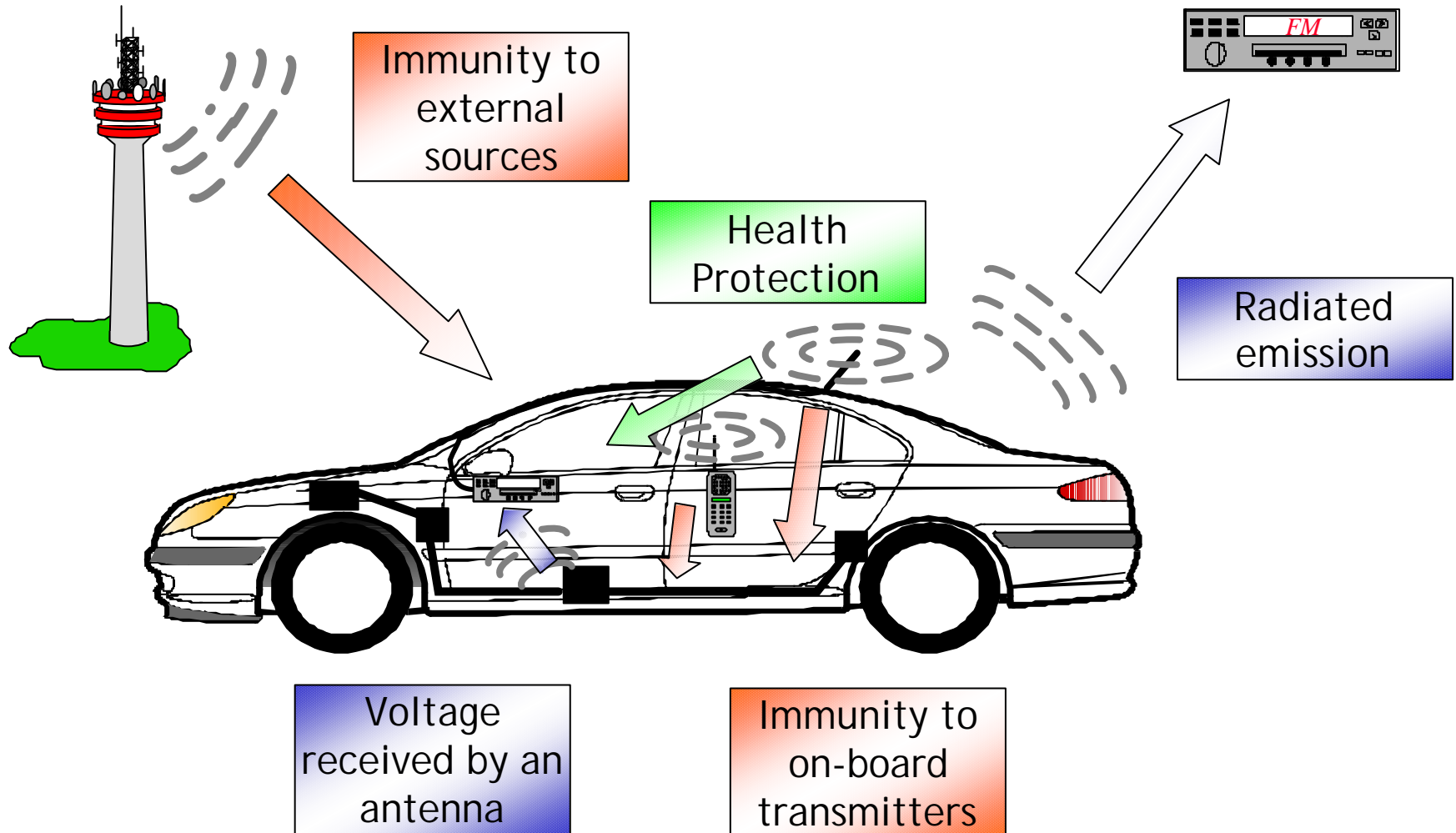
PSA PEUGEOT CITROËN

Summary

- o Vehicle / Telecommunication Main EMC interactions
- o International Standardization
- o Immunity to external sources
- o Immunity to on-board transmitters
- o Voltage received by an antenna
- o Radiated Field Emission
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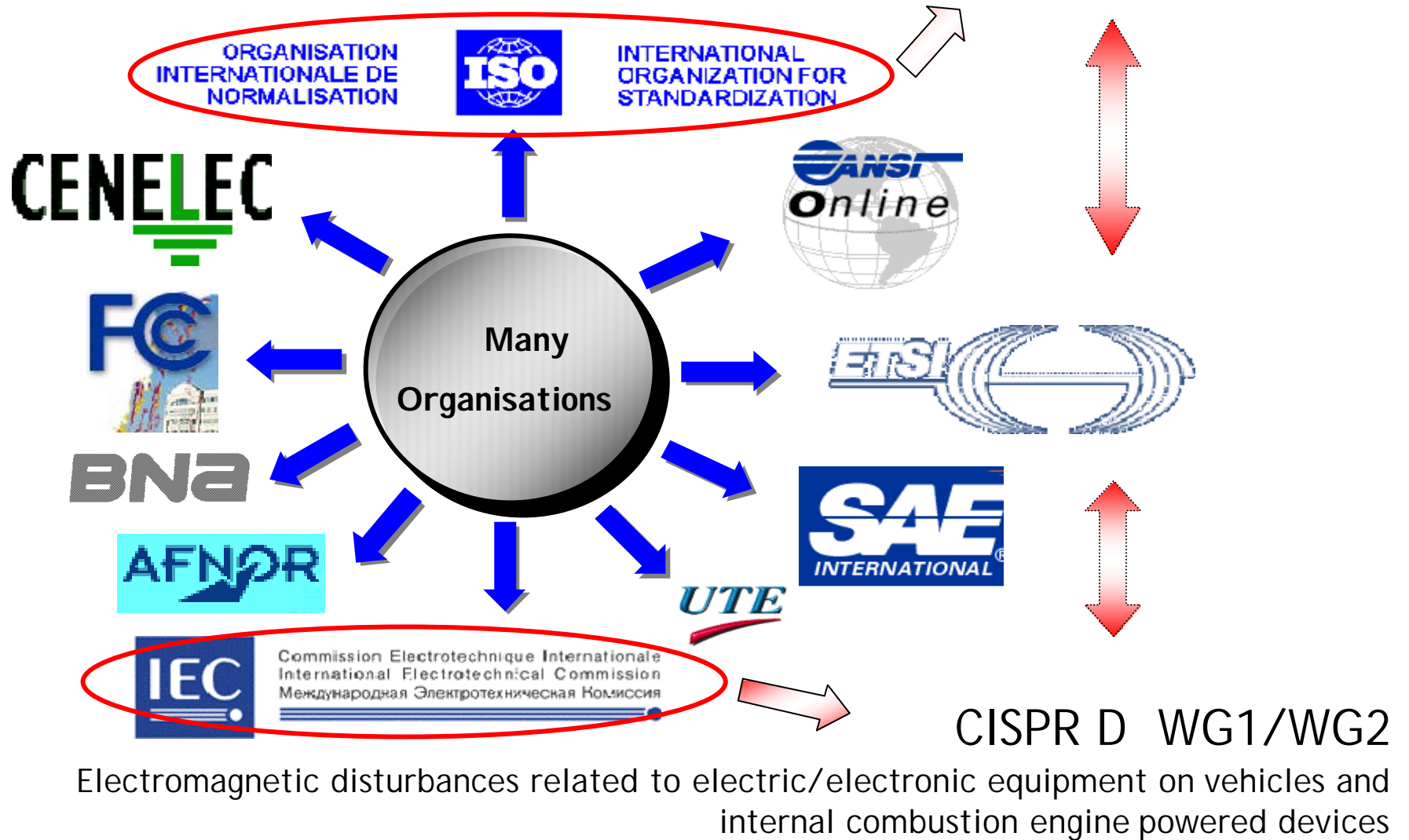
Vehicle / Telecommunication Main EMC interactions



International Standardization

ISO/TC22/SC3/WG3

Road vehicles/Electrical and electronic equipment/Electromagnetic compatibility

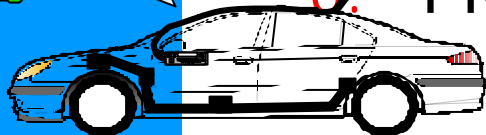




ITU-T

Immunity to external sources

- o ISO 11451-2 : Road vehicles - Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 2 : Off-vehicle radiation sources - 2nd ed - 04/2001 (3rd in 2005)
 1. 10 kHz - 18 GHz frequency range
 2. Use of absorber-lined shielded enclosure
 3. Substitution method (forward power)
 4. Single sensor / 4 sensors calibration
 5. CW, AM, PM signals with peak conservation
 6. Field uniformity and harmonics requirements

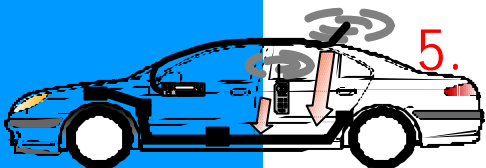




ITU-T

Immunity to on-board transmitters

- o ISO 11451-3 : Road vehicles - Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 3 : On-board transmitter simulation - 1st ed - 12/1994 (2nd in 2005)
 1. 1.8 MHz - 18 GHz frequency range
 2. Use of absorber-lined shielded enclosure
 3. Transmitters with antenna outside (OEM or reference) and inside the vehicle (simulated or commercial handy)
 4. Closed-loop on forward/net power
 5. Representative signals and power levels



2005, March 4th

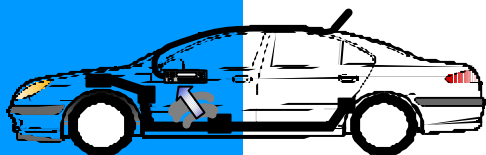
A.LECCA

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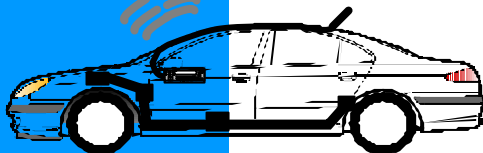
Voltage received by an antenna

- o CISPR 25 : Radio disturbances characteristics for the protection of receivers used on board vehicles, boats and on devices - Limits and methods of measurements - Clauses 1 to 5 - 2nd ed - 08/2002 (3rd in progress - CD stage)
 1. 150 kHz - 1 GHz frequency range (including new services bands up to 2.5 GHz)
 2. Use of absorber-lined shielded enclosure
 3. Vehicle and/or reference antenna
 4. NB / BB discrimination (Peak/Average) - Use of Average and Quasi-peak detectors and limits



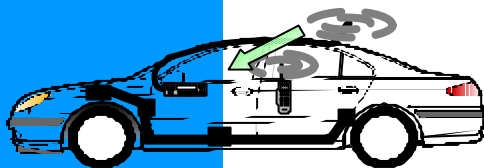
Radiated Field Emission

- o CISPR 12 : Limits and methods of measurements for the protection of receivers except those installed in the vehicle/boat/devices itself or in adjacent vehicle/boat/devices - 5th ed - 09/2001
 1. 30 MHz - 1 GHz frequency range
 2. Use of OATS (or absorber-lined shielded enclosure)
 3. 10 m / 3 m measurement
 4. Vertical and Horizontal polarization
 5. Running engine conditions
 6. NB / BB discrimination (Peak/Average)



Health protection

- o 1999/519/EC Recommendation : Limitation of exposure of the general public to electromagnetic fields (0 Hz to 200 GHz)
- o 2004/40/EC Directive : Minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields)
 1. Main concern is on-board transmitter radiated electric field in vehicle compartment (driver, passenger places)



Vehicle European Directive (1)

- o EMC directive 2004/104/EC (« revised » 95/54/EC) -
 1. 01/07/2006 for vehicle/equipment new type, 01/01/2009 for all types
 2. Extended definitions of immunity related functions
 3. Extension of test frequencies and of frequency range up to 2 GHz, Introduction of transient immunity and emission requirements, Reference to ISO and CISPR standards, Quality requirements (ISO 17025) for laboratories

Vehicle European Directive (2)

4. Vehicle manufacturer statement regarding on-board transmitters characteristics (frequency bands, power levels, antenna positions and installation provisions)
5. Aftermarket equipment intended for installation in vehicles need no type-approval if not related to immunity related functions : Declaration of Conformity according to the procedures of Directives 89/336/EEC or 1999/5/EC must be issued stating that the ESA fulfils the limits defined in paragraphs 6.5, 6.6, 6.8 and 6.9 of Annex I of the Directive

Conclusion

EMC standards and regulations are one of the necessary steps towards a successful vehicle / telecommunication functional synergy

