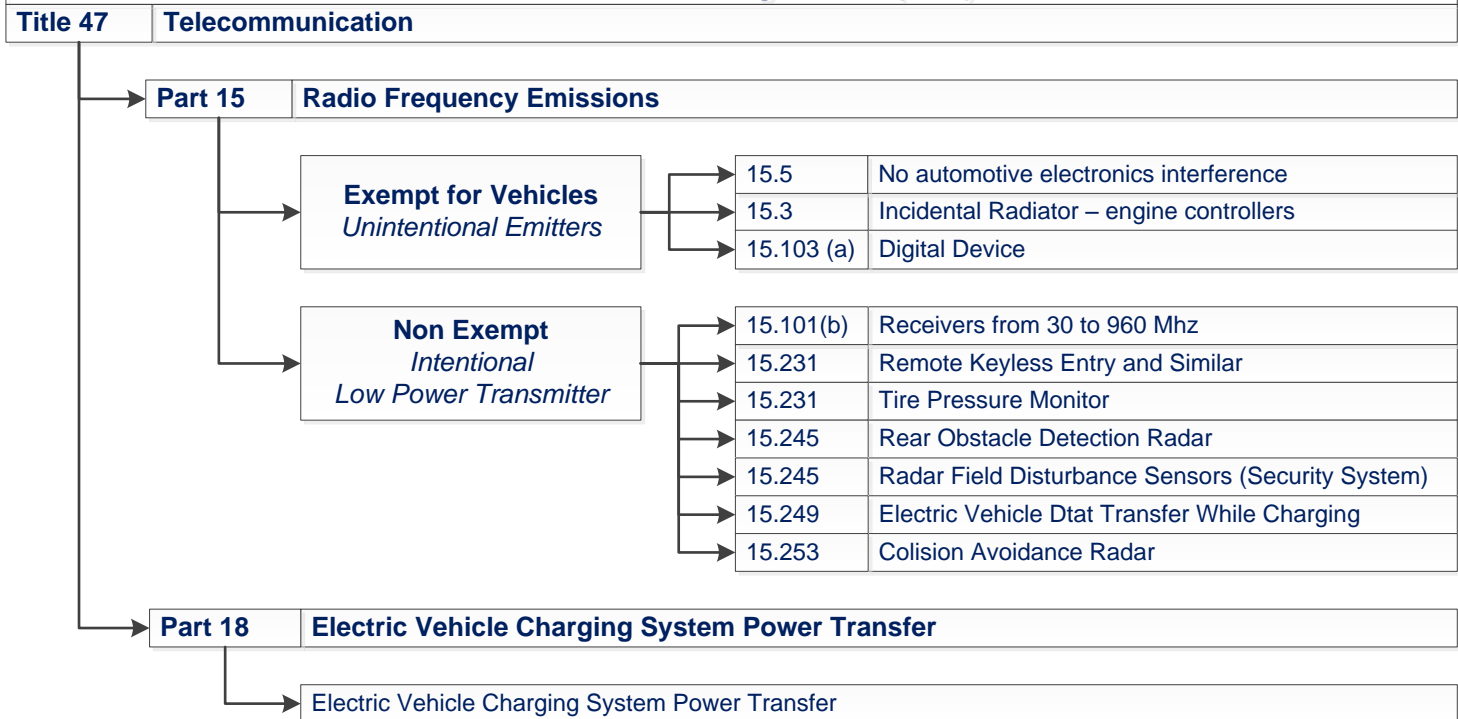


Automotive electronics electromagnetic compatibility regulations in United States of America

Federal Communications Commission (FCC)

Independent United States government agency that establishes and enforces radiated emissions requirements from electronic devices

Code of Federal Regulations (CFR)



CFR Title 47, Part 15 exempts automotive electronics from reporting compliance to the FCC. The FCC regulation is less stringent than the automotive OEM self-imposed RF emissions requirements. In order to maintain automotive electronics industry relatively regulation-free status the OEM, ANSI, SAE driven standards are reviewed and harmonized with developments in IEC, CISPR, ISO international standards. The after-market electronics devices used in automotive environment falls under automotive OEM approval for electromagnetic compatibility.

US EMC Automotive Electronics EMC Standards	
ANSI	American National Standards Institute (ANSI C63.4, C63.5, C63.19)
IEEE	Institute of Electrical and Electronics Engineers (ANSI/IEEE C63.2, ANSI/IEEE C63.14)
SAE	Society of Automotive Engineers (SAE J551 – vehicle and SAE J1113 – component level standard)
GM	GMW3097, GMW3172
Ford	EMC-CS-2009
Chrysler	CS-11979
MIL-STD	MIL-STD-461, MIL-STD-462

World Trade Organization (WTO) member countries are obliged to adopt international standards for national use wherever possible.

International Automotive Electronics EMC Standards	
IEC	International Electrotechnical Commission (IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-8, IEC 61000-4-21)
CISPR	International Special Committee on Radio Interference (CISPR 12 – vehicle, CISPR 25 – component level)
ISO	International Organization for Standardization (ISO 11451, ISO 11452, ISO 7637, ISO 10605, ISO 8820, ISO 16750)

Automotive electronics electromagnetic compatibility regulations in Canada

Industry Canada

Industry Canada is the department of the Government of Canada with responsibility for RF Emission Limits for automotive electronics

Industry Canada's Interference-Causing Equipment Standard (ICES)

EMCAB-1	Immunity of Electrical/Electronic Equipment Intended to Operate in the Canadian Radio Environment (0.010-10,000 MHz)
EMCAB-2	Criteria for Resolution of Immunity Complaints Involving Fundamental Emissions of Radiocommunications Transmitters
EMCAB-3	Implementation and Interpretation of the Interference-Causing Equipment Standard for Digital Apparatus, ICES-003

Canadian Standards Association (CSA) Standards

CAN/CSA-C108.4-06	Vehicles, boats, and internal combustion engine driven devices - Radio disturbance characteristics - Limits
CSA Standard C108.1.5 M-85	LISN used in the measurement of conducted electromagnetic emissions in the frequency range 0.01 to 30 MHz
C108.1.1-1977 (R2008)	measurements of electromagnetic interference conducted and radiated in the frequency range 0.15 MHz - 1000 MHz

The United States and Canada have a Mutual Recognition Agreement whereby each country agrees to accept test reports from the other country for equipment authorization.

Automotive electronics electromagnetic compatibility regulations in Europe

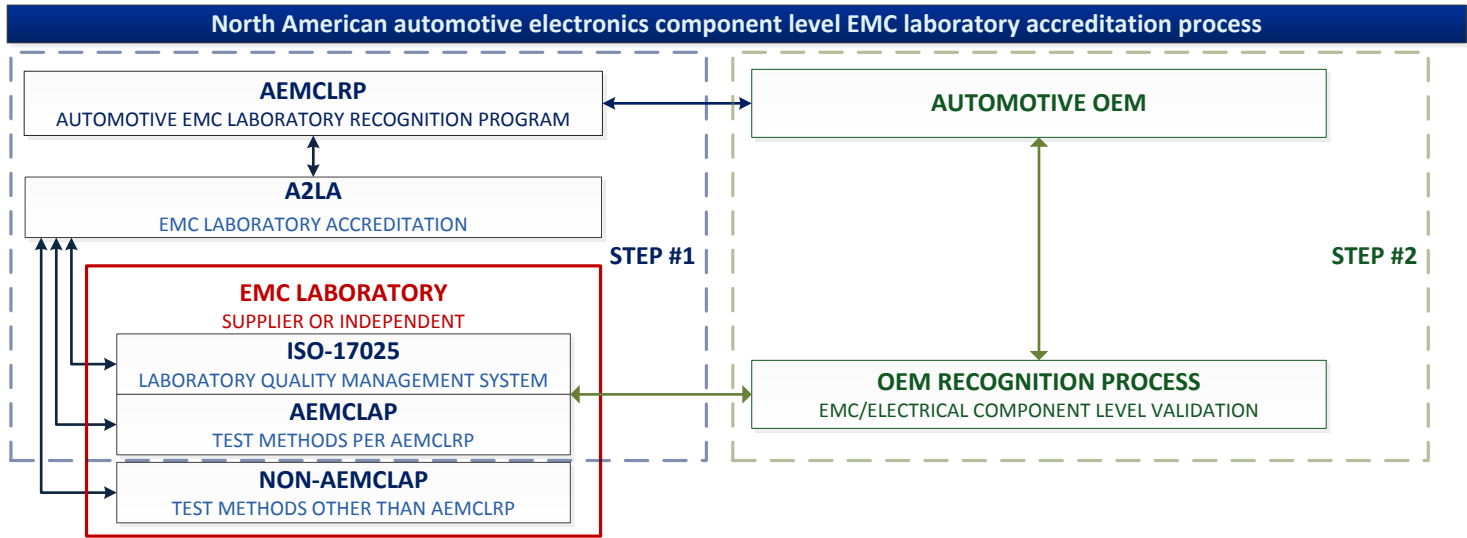
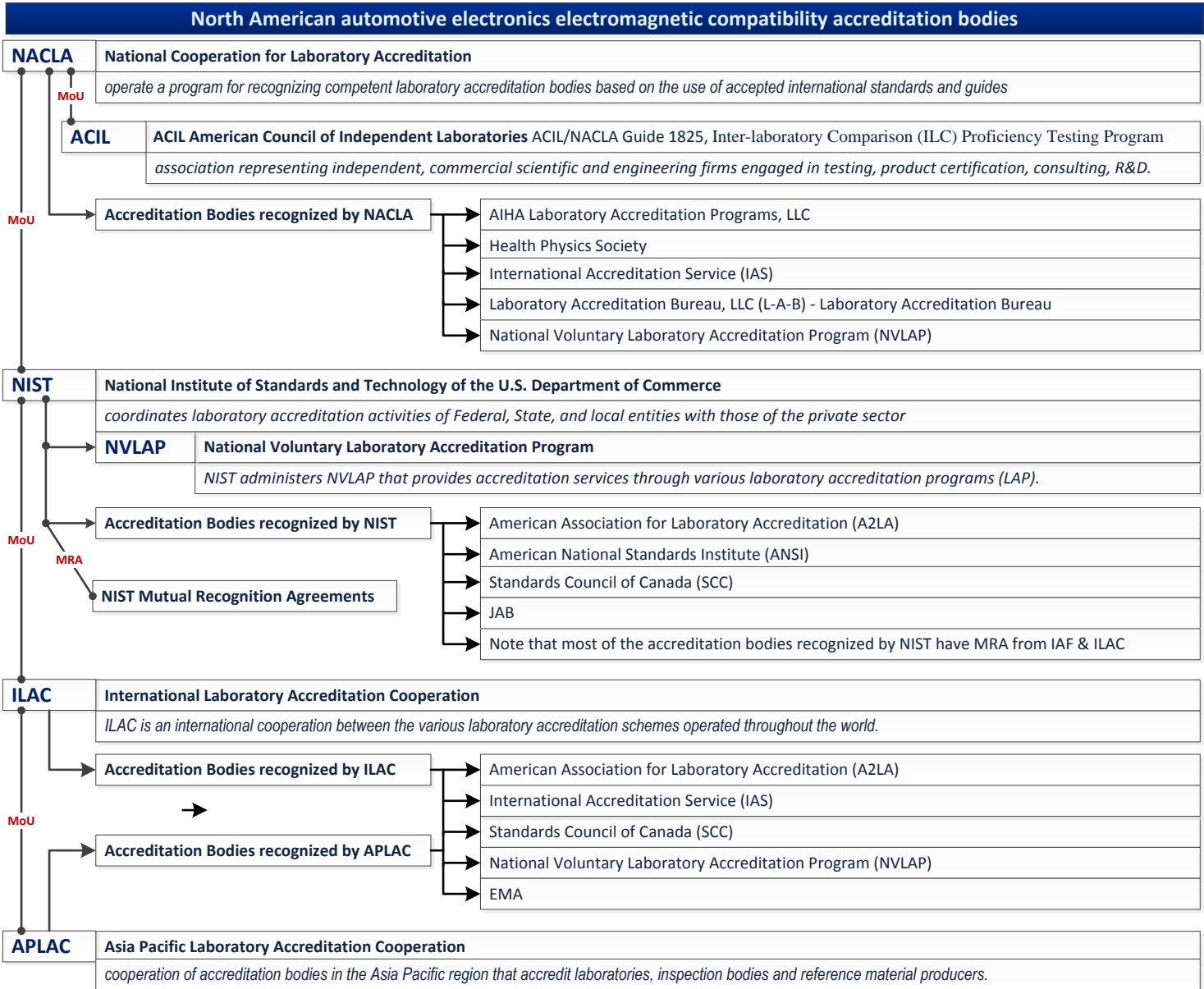
European Committee for Electrotechnical Standardization (CENELEC)

European Automotive EMC Directive

2004/104/EC	EMC “e” mark approval for motor vehicles and all equipment (including after-market equipment) intended to be fitted to them
2006/28/EC	Electromagnetic radiation measurement (2004/104/EC is amended by 2006/28/EC)
2007/46/EC	Framework for the approval of motor vehicles and their trailers

e-mark not required for:

- A laptop computer or video camera installed/modified by the car owner
- Passive equipment
- Equipment that can be used only if the vehicle is not moving (tire inflator powered from the cigarette lighter)
- Self-powered portable equipment (mobile phone)
- Equipment not permanently fixed to the vehicle and powered using the vehicle power supply, but connected by means of a separate interface (adapter, transformer) that is approved to the requirements of the Automotive Directive. The phone battery charger using VBATT has to be tested per automotive specs but the phone (powered from 5V adapter) does not need automotive compliance (only CE-mark)
- Vehicle manufacturers' spare parts



AEMCLRP is a joint document released in 2006 with EMC test methods based on OEM self imposed standards valid at that time. The test methods accredited by A2LA under AEMCLRP umbrella are partially outdated by newer OEM requirements.

As defined by OEM, AEMCLRP is just a first step in getting their recognition for EMC validation reports. Once accredited by A2LA for ISO-17025 & AEMCLRP the EMC laboratory is entitled to apply for recognition from OEM by providing OEM specific self-assessment reports. The laboratory recognition awarded by OEM is a business driven decision.

It is important for vehicle owners as well as insurance companies to understand that EMC North American regulator is the OEM and the validation testing is performed at "OEM recognized" EMC laboratories. It is unclear if the same labs are acceptable to assess product's compliance to regulatory standards in a lawsuit. The OEM EMC specifications deviate from international standards requirements to fit specific technical conditions and business goals. The RF severity levels and the number of test samples is adjusted to minimize the overall electromagnetic compatibility validation cost.