



EMC Standards

Testing is all about standards.

Whether you are developing 5G products, automotive equipment or something as simple as a common table lamp, your device must meet requirements set by a standardization body such as CISPR, CENELEC, ETSI, IEEE, ISO, FCC or the IEC. Enforcement of strict EMC limits can delay product certification, leading to lost revenue, added cost, and redesign headaches.

The number of EMC standards published is steadily increasing. The different types of standards include basic standards, generic standards and product or product family standards. Basic standards defining requirements on the measurement apparatus, measurement methods, measurement uncertainty and test facilities. Generic standards apply for all cases, which are not covered by specific product or product family standards. The product (family) standards are divided into standards limiting low-frequency and high-frequency emission and standards defining the requirements of immunity to electromagnetic emission. Besides, there is a series of specific product standards defining EMC requirements.

Please see following overview.

International Electrotechnical Commission

The IEC is an international standards organization that prepares and publishes standards for electrical, electronic and related technologies. IEC standards on EMC are mostly part of the IEC 61000 family. With few exceptions IEC 61000 family is developed by IEC Technical Committee TC77.

IEC standards of the IEC 61000 family include:

Basic standards

IEC 61000-1-2 - Electromagnetic compatibility (EMC) - Part 1-2: General - Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena

IEC 61000-2-2 - Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems

IEC 61000-2-4 - Electromagnetic compatibility (EMC) - Part 2-4: Environment - Compatibility levels in industrial plants for low-frequency conducted disturbances

IEC 61000-2-9 - Electromagnetic compatibility (EMC) - Part 2: Environment - Section 9: Description of HEMP environment - Radiated disturbance

IEC 61000-2-10 - Electromagnetic compatibility (EMC) - Part 2: Environment - Section 10: Description of HEMP environment - Conducted disturbance

IEC 61000-2-11 - Electromagnetic compatibility (EMC) - Part 2-11: Environment - Classification of HEMP environments

IEC 61000-2-12 - Electromagnetic compatibility (EMC) - Part 2-12: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public medium-voltage power supply systems



IEC 61000-2-13 - Electromagnetic compatibility (EMC) - Part 2-13: Environment - High-power electromagnetic (HPEM) environments - Radiated and conducted

IEC 61000-3-2 - Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

IEC 61000-3-3 - Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

IEC 61000-3-8 - Electromagnetic compatibility (EMC) - Part 3-8: Limits - Signalling on low-voltage electrical installations - Emission levels, frequency bands and electromagnetic disturbance levels

IEC 61000-3-11 - Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection

IEC 61000-3-12 - Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase

IEC 61000-4-2 - Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test

IEC 61000-4-3 - Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test

IEC 61000-4-4 - Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test

IEC 61000-4-5 - Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test

IEC 61000-4-6 - Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields

IEC 61000-4-7 - Electromagnetic compatibility (EMC) - Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto

IEC 61000-4-8 - Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test

IEC 61000-4-9 - Electromagnetic compatibility (EMC) - Part 4-9: Testing and measurement techniques - Impulse magnetic field immunity test

IEC 61000-4-10 - Electromagnetic compatibility (EMC) - Part 4-10: Testing and measurement techniques - Damped oscillatory magnetic field immunity test

IEC 61000-4-11 - Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase



IEC 61000-4-12 - Electromagnetic compatibility (EMC) - Part 4-12: Testing and measurement techniques - Ring wave immunity tests

IEC 61000-4-13 - Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests

IEC 61000-4-14 - Electromagnetic compatibility (EMC) - Part 4-14: Testing and measurement techniques - Voltage fluctuation immunity test for equipment with input current not exceeding 16 A per phase

IEC 61000-4-15 - Electromagnetic compatibility (EMC) - Part 4-15: Testing and measurement techniques - Flicker meter - Functional and design specifications

IEC 61000-4-16 - Electromagnetic compatibility (EMC) - Part 4-16: Testing and measurement techniques - Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz

IEC 61000-4-17 - Electromagnetic compatibility (EMC) - Part 4-17: Testing and measurement techniques - Ripple on d.c. input power port immunity test

IEC 61000-4-18 - Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Damped oscillatory wave immunity test

IEC 61000-4-19 - Electromagnetic compatibility (EMC) - Part 4-19: Testing and measurement techniques - Test for immunity to conducted, differential mode disturbances and signalling in the frequency range 2 kHz to 150 kHz at a.c. power ports

IEC 61000-4-20 - Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides

IEC 61000-4-21 - Electromagnetic compatibility (EMC) - Part 4-21: Testing and measurement techniques - Reverberation chamber test methods

IEC 61000-4-22 - Electromagnetic compatibility (EMC) - Part 4-22: Testing and measurement techniques - Radiated emissions and immunity measurements in fully anechoic rooms (FARs)

IEC 61000-4-23 - Electromagnetic compatibility (EMC) - Part 4-23: Testing and measurement techniques - Test methods for protective devices for HEMP and other radiated disturbances

IEC 61000-4-24 - Electromagnetic compatibility (EMC) - Part 4-24: Testing and measurement techniques - Test methods for protective devices for HEMP conducted disturbance

IEC 61000-4-25 - Electromagnetic compatibility (EMC) - Part 4-25: Testing and measurement techniques - HEMP immunity test methods for equipment and systems

IEC 61000-4-27 - Electromagnetic compatibility (EMC) - Part 4-27: Testing and measurement techniques - Unbalance, immunity test for equipment with input current not exceeding 16 A per phase

IEC 61000-4-28 - Electromagnetic compatibility (EMC) - Part 4-28: Testing and measurement techniques - Variation of power frequency, immunity test for equipment with input current not exceeding 16 A per phase

IEC 61000-4-29 - Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests



IEC 61000-4-30 - Electromagnetic compatibility (EMC) - Part 4-30: Testing and measurement techniques - Power quality measurement methods

IEC 61000-4-31 - Electromagnetic compatibility (EMC) - Part 4-31: Testing and measurement techniques - AC mains ports broadband conducted disturbance immunity test

IEC 61000-4-33 - Electromagnetic compatibility (EMC) - Part 4-33: Testing and measurement techniques - Measurement methods for high-power transient parameters

IEC 61000-4-34 - Electromagnetic compatibility (EMC) - Part 4-34: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with mains current more than 16 A per phase

IEC 61000-4-36 - Electromagnetic compatibility (EMC) - Part 4-36: Testing and measurement techniques - IEMI immunity test methods for equipment and systems

IEC 61000-4-39 - Electromagnetic compatibility (EMC) - Part 4-39: Testing and measurement techniques - Radiated fields in close proximity - Immunity test

IEC 61000-5-5 - Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines - Section 5: Specification of protective devices for HEMP conducted disturbance

IEC 61000-5-7 - Electromagnetic compatibility (EMC) - Part 5-7: Degrees of protection provided by enclosures against electromagnetic disturbances (EM code)

Generic standards

IEC 61000-6-1 - Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments

IEC 61000-6-2 - Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

IEC 61000-6-3 - Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

IEC 61000-6-4 - Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

IEC 61000-6-6 - Electromagnetic compatibility (EMC) - Part 6-6: Generic standards - HEMP immunity for indoor equipment

IEC 61000-6-7 - Electromagnetic compatibility (EMC) - Part 6-7: Generic standards - Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations

Technical reports and specifications

IEC TR 61000-1-1 - Electromagnetic compatibility (EMC) - Part 1: General - Section 1: Application and interpretation of fundamental definitions and terms



IEC TR 61000-1-3 - Electromagnetic compatibility (EMC) - Part 1-3: General - The effects of high-altitude EMP (HEMP) on civil equipment and systems

IEC TR 61000-1-4 - Electromagnetic compatibility (EMC) - Part 1-4: General - Historical rationale for the limitation of power-frequency conducted harmonic current emissions from equipment, in the frequency range up to 2 kHz

IEC TR 61000-1-5 - Electromagnetic compatibility (EMC) - Part 1-5: General - High power electromagnetic (HPEM) effects on civil systems

IEC TR 61000-1-6 - Electromagnetic compatibility (EMC) - Part 1-6: General - Guide to the assessment of measurement uncertainty

IEC TR 61000-1-7 - Electromagnetic compatibility (EMC) - Part 1-7: General - Power factor in single-phase systems under non-sinusoidal conditions

IEC TR 61000-1-8 - Electromagnetic compatibility (EMC) - Part 1-8: General - Phase angles of harmonic current emissions and voltages in the public supply networks - Future expectations

IEC TR 61000-2-1 - Electromagnetic compatibility (EMC) - Part 2: Environment - Section 1: Description of the environment - Electromagnetic environment for low-frequency conducted disturbances and signalling in public power supply systems

IEC TR 61000-2-3 - Electromagnetic compatibility (EMC) - Part 2: Environment - Section 3: Description of the environment - Radiated and non-network-frequency-related conducted phenomena

IEC TR 61000-2-5 - Electromagnetic compatibility (EMC) - Part 2-5: Environment - Description and classification of electromagnetic environments

IEC TR 61000-2-6 - Electromagnetic compatibility (EMC) - Part 2: Environment - Section 6: Assessment of the emission levels in the power supply of industrial plants as regards low-frequency conducted disturbances

IEC TR 61000-2-7 - Electromagnetic compatibility (EMC) - Part 2: Environment - Section 7: Low frequency magnetic fields in various environments

IEC TR 61000-2-8 - Electromagnetic compatibility (EMC) - Part 2-8: Environment - Voltage dips and short interruptions on public electric power supply systems with statistical measurement results

IEC TR 61000-2-14 - Electromagnetic compatibility (EMC) - Part 2-14: Environment - Overvoltages on public electricity distribution networks

IEC TS 61000-3-4 - Electromagnetic compatibility (EMC) - Part 3-4: Limits - Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A (note: for currents > 16 A and ≤ 75 A per phase this standard should be replaced with IEC EN 61000-3-12)

IEC TS 61000-3-5 - Electromagnetic compatibility (EMC) - Part 3-5: Limits - Limitation of voltage fluctuations and flicker in low-voltage power supply systems for equipment with rated current greater than 16 A

IEC TR 61000-3-6 - Electromagnetic compatibility (EMC) - Part 3-6: Limits - Assessment of emission limits for the connection of distorting installations to MV, HV and EHV power systems



IEC TR 61000-3-7 - Electromagnetic compatibility (EMC) - Part 3-6: Limits - Assessment of emission limits for the connection of fluctuating installations to MV, HV and EHV power systems

IEC TR 61000-3-13 - Electromagnetic compatibility (EMC) - Part 3-13: Limits - Assessment of emission limits for the connection of unbalanced installations to MV, HV and EHV power systems

IEC TR 61000-3-14 - Electromagnetic compatibility (EMC) - Part 3-14: Limits - Assessment of emission limits for harmonics, interharmonics, voltage fluctuations and unbalance for the connection of disturbing installations to LV power systems

IEC TR 61000-3-15 - Electromagnetic compatibility (EMC) - Part 3-15: Limits - Assessment of low frequency electromagnetic immunity and emission requirements for dispersed generation systems in LV network

IEC TR 61000-4-1 – Electromagnetic compatibility (EMC) - Part 4-1: Testing and measurement techniques - Overview of IEC 61000-4 series

IEC TR 61000-4-32 - Electromagnetic compatibility (EMC) - Part 4-32: Testing and measurement techniques - High-altitude electromagnetic pulse (HEMP) simulator compendium

IEC TR 61000-4-35 - Electromagnetic compatibility (EMC) - Part 4-35: Testing and measurement techniques - HPEM simulator compendium

IEC TR 61000-4-37 - Electromagnetic compatibility (EMC) - Part 4-37: Testing and measurement techniques - Calibration and verification protocol for harmonic emission compliance test systems

IEC TR 61000-4-38 - Electromagnetic compatibility (EMC) - Part 4-38: Testing and measurement techniques - Test, verification and calibration protocol for voltage fluctuation and flicker compliance test systems

IEC TR 61000-4-40 - Electromagnetic compatibility (EMC) - Part 4-40: Testing and measurement techniques - Digital methods for the measurement of power quantities of modulated or distorted signals

IEC TR 61000-5-1 - Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines - Section 1: General considerations - Basic EMC publication

IEC TR 61000-5-2 - Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines - Section 2: Earthing and cabling

IEC TR 61000-5-3 - Electromagnetic compatibility (EMC) - Part 5-3: Installation and mitigation guidelines - HEMP protection concepts

IEC TS 61000-5-4 - Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines - Section 4: Immunity to HEMP - Specifications for protective devices against HEMP radiated disturbance

IEC TR 61000-5-6 - Electromagnetic compatibility (EMC) - Part 5-6: Installation and mitigation guidelines - Mitigation of external EM influences

IEC TS 61000-5-8 - Electromagnetic compatibility (EMC) - Part 5-8: Installation and mitigation guidelines - HEMP protection methods for the distributed infrastructure

IEC TS 61000-5-9 - Electromagnetic compatibility (EMC) - Part 5-9: Installation and mitigation guidelines - System-level susceptibility assessments for HEMP and HPEM



IEC TS 61000-5-10 - Electromagnetic compatibility (EMC) - Part 5-10: Installation and mitigation guidelines - Guidance on the protection of facilities against HEMP and IEMI



International special committee on radio interference

CISPR set standards for the protection of radio reception from interference caused by operation of electrical or electronic appliances and systems in the electromagnetic environment, and is a part of IEC.

CISPR's standards cover the measurement of radiated and conducted interference, as well as immunity for some products. CISPR develops generic standards for emission measurements.

CISPR standards include:

Basic standards

CISPR 16-1-1 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus

CISPR 16-1-2 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements

CISPR 16-1-3 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-3: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Disturbance power

CISPR 16-1-4 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Antennas and test sites for radiated disturbance measurements

CISPR 16-1-5 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-5: Radio disturbance and immunity measuring apparatus - Antenna calibration sites and reference test sites for 5 MHz to 18 GHz

CISPR 16-1-6 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-6: Radio disturbance and immunity measuring apparatus - EMC antenna calibration

CISPR 16-2-1 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements

CISPR 16-2-2 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-2: Methods of measurement of disturbances and immunity - Measurement of disturbance power

CISPR 16-2-3 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements

CISPR 16-2-4 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-4: Methods of measurement of disturbances and immunity - Immunity measurements

CISPR 16-4-2 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-2: Uncertainties, statistics and limit modelling - Measurement instrumentation uncertainty

CISPR 31 - Database on the characteristics of radio services

Generic standards – emission



IEC 61000-6-3 - Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

IEC 61000-6-4 - Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

Product family standards – emission

CISPR 11 - Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement

CISPR 12 - Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers

CISPR 14-1 - Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission

CISPR 15 - Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

CISPR 17 - Methods of measurement of the suppression characteristics of passive radio interference filters and suppression components

CISPR 18-1 - Radio interference characteristics of overhead power lines and high voltage equipment. Part 1: Description of phenomena

CISPR 18-2 - Radio interference characteristics of overhead power lines and high voltage equipment. Part 2: Methods of measurement and procedures for determining limits

CISPR 18-3 - Radio interference characteristics of overhead power lines and high-voltage equipment - Part 3: Code of practice for minimizing the generation of radio noise

CISPR 25 - Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers

CISPR 32 - Electromagnetic compatibility of multimedia equipment - Emission requirements (this replaced CISPR 13 and CISPR 22)

Product family standards – immunity

CISPR 14-2 - Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity

CISPR 35 - Electromagnetic compatibility of multimedia equipment - Immunity requirements (this replaced CISPR 20 and CISPR 24)

Technical reports

CISPR TR 16-2-5 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-5: In situ measurements for disturbing emissions produced by physically large equipment



CISPR TR 16-3 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 3: CISPR technical reports

CISPR TR 16-4-1 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-1: Uncertainties, statistics and limit modelling - Uncertainties in standardized EMC tests

CISPR TR 16-4-3 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-3: Uncertainties, statistics and limit modelling - Statistical considerations in the determination of EMC compliance of mass-produced products

CISPR TR 16-4-4 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-4: Uncertainties, statistics and limit modelling - Statistics of complaints and a model for the calculation of limits for the protection of radio services

CISPR TR 16-4-5 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-5: Uncertainties, statistics and limit modelling - Conditions for the use of alternative test methods

CISPR TR 28 - Industrial, scientific and medical equipment (ISM) - Guidelines for emission levels within the bands designated by the ITU

CISPR TR 29 - Television broadcast receivers and associated equipment - Immunity characteristics - Methods of objective picture assessment

CISPR TR 30-1 - Test method on electromagnetic emissions - Part 1: Electronic control gear for single- and double-capped fluorescent lamps

CISPR TR 30-2 - Test method on electromagnetic emissions - Part 2: Electronic control gear for discharge lamps excluding fluorescent lamps



International Organization for Standardization

ISO is an international standards organization that develops standards in all technology areas requested by industry. Members are the national standard bodies.

ISO standards on EMC are most relevant for automotive EMC issues.

ISO 7637 Road vehicles - **Electrical disturbances from conduction and coupling**

ISO 7637-1 Road vehicles - Electrical disturbances from conduction and coupling - Part 1: Definitions and general considerations

ISO 7637-2 Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only

ISO 7637-3 Road vehicles - Electrical disturbances from conduction and coupling - Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines

ISO/TS 7637-4 Road vehicles - Electrical disturbances from conduction and coupling - Part 4: Electrical transient conduction along shielded high voltage supply lines only

ISO/TR 7637-5 Road vehicles - Electrical disturbances from conduction and coupling - Part 5: Enhanced definitions and verification methods for harmonization of pulse generators according to ISO 7637

ISO 11451 Road vehicles - **Vehicle test methods**

ISO 11451-1 Road vehicles – Vehicle test methods for electrical disturbances from narrow band electromagnetic energy – Part 1: General principles and terminology

ISO 11451-2 Road vehicles – Vehicle test methods for electrical disturbances from narrow band electromagnetic energy – Part 2: Off-vehicle radiation sources

ISO 11451-3 Road vehicles - Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 3: On-board transmitter simulation

ISO 11451-4 Road vehicles - Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 4: Bulk current injection (BCI)

ISO 11452 Road vehicles - **Component test methods**

ISO 11452-1 Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 1: General principles and terminology

ISO 11452-2 Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 2: Absorber-lines shielded enclosure

ISO 11452-3 Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 3: Transverse electromagnetic mode (TEM) cell

ISO 11452-4 Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 4: Harness excitation methods

ISO 11452-5 Road Vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 5: Stripline

ISO 11452-6 Road Vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 6: Parallel plate antenna

ISO 11452-7 Road Vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 7: Direct radio frequency (RF) power injection



ISO 11452-8 Road Vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 8: Immunity to magnetic fields

ISO 11452-9 Road Vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 9: Portable transmitters

ISO 11452-10 Road Vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 10: Immunity to conducted disturbances in the extended audio frequency range

ISO 11452-11 Road Vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 11: Reverberation chamber

ISO 10605 Road Vehicles - Test methods for electrical disturbances from electrostatic discharge

ISO 13766 Earthmoving Machinery - Electromagnetic Compatibility

ISO 14982 Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria

ISO 21609 Road Vehicles - EMC guidelines for installation of aftermarket radio frequency transmitting equipment



IEEE EMC Society

The IEEE EMC Society is an international developer of fundamental test, measurement and verification standards for EMC. The EMC Society's Standards Development & Education Committee (SDECom) gives guidance for the development of IEEE EMC Standards, the training of those involved in the standards making process and the education of the EMC Society community on all aspects of EMC Standards.

IEEE standards on EMC include:

Std.139-1988	Recommended Practice for the Measurement of RF Emission from ISM Equipment on User's Premises
Std. 187-2003	Standard Measurement Methods of Emissions from FM and Television Broadcast Receivers in the Frequency Range of 9 kHz to 40 GHz
Std. 299-2006	Standard Method for Measuring the Effectiveness of Shielding Enclosures (ANSI Recognized)
Std. 299.1-2013	Standard Method for Measuring the Shielding Effectiveness of Enclosures and Boxes Having Dimensions Between 0.1 m and 2 m
Project 370	Electrical Characterization of Printed Circuit Board and Related Interconnects at Frequencies up to 50 GHz
Std. 377-1980	Recommended Practice on the Measurement of Spurious Emissions from Land-Mobile Comm. Transmitters (ANSI Recognized)
Project 473	Recommended Practice for an Electromagnetic Site Survey (10 kHz to 40 GHz)
Std. 475-2000	Measurement Procedure for Field Disturbance Sensors, 300 MHz to 40 GHz (ANSI Recognized)
Std. 1128-1998	Recommended Practice for RF Absorber Evaluation in the Range of 30 MHz to 5 GHz
Std. 1302-2008	Guide for the Electromagnetic Characterization of Conductive Gaskets in the Frequency Range of DC to 40 GHz
Std. 1309-2013	Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9 kHz to 40 GHz
Std. 1560-2013	Methods of Measurement of Radio Frequency Interference Filter Suppression Capability in the Range of 100 Hz to 10 GHz
Std. 1597.1-2008	Standard for validation of CEM Computer Modeling (CEM) and Simulation
Std. 1597.2-2010	Recommended Practice for Computational Electromagnetics (CEM) Computer Modeling and Simulation Applications
Std. 1613-2009	Standard for Environmental and Testing Requirements for Devices with Communications Functions in Electric Transmission and Distribution Facilities
Std. 1642-2015	Recommended Practice for Protecting Public Accessible Computer Systems from Intentional EMI
Std. 1688-2015	Standard for Module Electromagnetic Interference (EMI) Testing
Project 1848	Techniques & Measures to Manage Risks With Regard to Electromagnetic Disturbances
Project 1897	Resolution of Power-Line Gap-Noise Reports



Project 2425	Standard for Electromagnetic Compatibility Testing of Electrical and Instrumentation and Control Equipment at Nuclear Power Generating Stations and Other Nuclear Facilities
Project 2665	Recommended Practice for Statistical Process Control for EMC Test Laboratories
Project 2710	Electromagnetic Shielding Performance of Enclosures for Portable Electronic Devices
Project 2715	Guide for the Characterization of the Shielding Effectiveness of Planar Materials
Project 2716	Guide for the Characterization of the Effectiveness of Printed Circuit Board Level Shielding
Project 2717	Passive Intermodulation Test Methods for Wireless Systems in Low Noise Environments
Project 2718	Guide for Near Field Characterization of Unintentional Stochastic Radiators
C37.90 Series	C37.90.1 – Surge protection C37.90.2 – Protective Relays C37.90.3 – ESD for protective relays



European Committee for Electrotechnical Standardization

CENELEC produces standards for electrical engineering. Together with ETSI (Information and Communications Technologies) and CEN (other technical areas), it forms the European system for technical standardization.

EMC is a subject of national and international regulation. In Europe, it is regulated through the European Commission’s **EMC Directive 2014/30/EU** and for radio equipment through **Radio Equipment Directive 2014/53/EU (RED)**. These directives are New Approach Directives. As such, they rely for their operation on Harmonised Standards developed by recognized European standards bodies, such as CEN, CENELEC and ETSI. Harmonised Standards define technical characteristics that can be used to demonstrate compliance with the essential requirements of the directive.

The summary below consolidates the references of Harmonised Standards published by the Commission in the Official Journal of the European Union (OJ) under **EMC Directive 2014/30/EU (as of June 2020)**.

Harmonised EMC standards drafted by CEN include:

EN 617:2001+A1:2010	Continuous handling equipment and systems - Safety and EMC requirements for the equipment for the storage of bulk materials in silos, bunkers, bins and hoppers
EN 618:2002+A1:2010	Continuous handling equipment and systems - Safety and EMC requirements for equipment for mechanical handling of bulk materials except fixed belt conveyors
EN 619:2002+A1:2010	Continuous handling equipment and systems - Safety and EMC requirements for equipment for mechanical handling of unit loads
EN 620:2002+A1:2010	Continuous handling equipment and systems - Safety and EMC requirements for fixed belt conveyors for bulk materials
EN 1155:1997, EN 1155:1997/A1:2002 EN 12015:2014	Building hardware - Electrically powered hold-open devices for swing doors - Requirements and test methods Electromagnetic compatibility - Product family standard for lifts, escalators and moving walks - Emission
EN 12016:2013	Electromagnetic compatibility - Product family standard for lifts, escalators and moving walks - Immunity
EN 12895:2015	Industrial trucks - Electromagnetic compatibility
EN 12895:2015+A1:2019	Industrial trucks - Electromagnetic compatibility
EN 13241-1:2003+A1:2011	Industrial, commercial and garage doors and gates - Product standard - Part 1: Products without fire resistance or smoke control characteristics
EN 13309:2010	Construction machinery - Electromagnetic compatibility of machines with internal power supply
EN ISO 13766-1:2018	Earth-moving and building construction machinery - Electromagnetic compatibility (EMC) of machines with internal electrical power supply - Part 1: General EMC requirements under typical electromagnetic environmental conditions (ISO 13766-1:2018)
EN 14010:2003+A1:2009	Safety of machinery - Equipment for power driven parking of motor vehicles - Safety and EMC requirements for design, manufacturing, erection and commissioning stages
EN ISO 14982:2009	Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria (ISO 14982:1998)



EN 16361:2013	Power operated pedestrian doors - Product standard, performance characteristics - Pedestrian doorsets, other than swing type, initially designed for installation with power operation without resistance to fire and smoke leakage characteristics
EN 16361:2013+A1:2016	Power operated pedestrian doors - Product standard, performance characteristics - Pedestrian doorsets, other than swing type, initially designed for installation with power operation

Harmonised EMC standards drafted by CENELEC include:

EN 50065-1:2011	Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 1: General requirements, frequency bands and electromagnetic disturbances
EN 50065-2-1:2003, EN 50065-2-1:2003/A1:2005, EN 50065-2-1:2003/AC:2003	Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 2-1: Immunity requirements for mains communications equipment and systems operating in the range of frequencies 95 kHz to 148,5 kHz and intended for use in residential, commercial and light industrial environments
EN 50065-2-2:2003, EN 50065-2-2:2003/A1:2005, EN 50065-2-2:2003/A1:2005/AC:2006, EN 50065-2-2:2003/AC:2003	Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 2-2: Immunity requirements for mains communications equipment and systems operating in the range of frequencies 95 kHz to 148,5 kHz and intended for use in industrial environments
EN 50065-2-3:2003, EN 50065-2-3:2003/A1:2005, EN 50065-2-3:2003/AC:2003	Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz - Part 2-3: Immunity requirements for mains communications equipment and systems operating in the range of frequencies 3 kHz to 95 kHz and intended for use by electricity suppliers and distributors
EN 50083-2:2012, EN 50083-2:2012/A1:2015	Cable networks for television signals, sound signals and interactive services - Part 2: Electromagnetic compatibility for equipment
EN 50121-1:2006, EN 50121-1:2006/AC:2008	Railway applications - Electromagnetic compatibility - Part 1: General
EN 50121-2:2006, EN 50121-2:2006/AC:2008	Railway applications - Electromagnetic compatibility - Part 2: Emission of the whole railway system to the outside world
EN 50121-3-1:2006, EN 50121-3-1:2006/AC:2008	Railway applications - Electromagnetic compatibility - Part 3-1: Rolling stock - Train and complete vehicle
EN 50121-3-1:2017	Railway applications - Electromagnetic compatibility - Part 3-1: Rolling stock - Train and complete vehicle
EN 50121-3-2:2006, EN 50121-3-2:2006/AC:2008	Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus
EN 50121-3-2:2016	Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus
EN 50121-4:2006, EN 50121-4:2006/AC:2008	Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus
EN 50121-4:2016	Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus
EN 50121-5:2006, EN 50121-5:2006/AC:2008	Railway applications - Electromagnetic compatibility - Part 5: Emission and immunity of fixed power supply installations and apparatus
EN 50121-5:2017	Railway applications - Electromagnetic compatibility - Part 5: Emission and immunity of fixed power supply installations and apparatus
EN 50130-4:2011	Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems



EN 50148:1995	Electronic taximeters
EN 50270:2006	Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen
EN 50270:2015, EN 50270:2015/AC:2016-08	Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen
EN 50293:2012	Road traffic signal systems - Electromagnetic compatibility
EN 50370-1:2005	Electromagnetic compatibility (EMC) - Product family standard for machine tools - Part 1: Emission
EN 50370-2:2003	Electromagnetic compatibility (EMC) - Product family standard for machine tools - Part 2: Immunity
EN 50412-2-1:2005, EN 50412-2-1:2005/AC:2009	Power line communication apparatus and systems used in low-voltage installations in the frequency range 1,6 MHz to 30 MHz - Part 2-1: Residential, commercial and industrial environment - Immunity requirements
EN 50428:2005, EN 50428:2005/A1:2007, EN 50428:2005/A2:2009	Switches for household and similar fixed electrical installations - Collateral standard - Switches and related accessories for use in home and building electronic systems (HBES)
EN 50470-1:2006	Electricity metering equipment (a.c.) - Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)
EN 50490:2008	Electrical installations for lighting and beaconing of aerodromes - Technical requirements for aeronautical ground lighting control and monitoring systems - Units for selective switching and monitoring of individual lamps
EN 50491-5-1:2010	General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 5-1: EMC requirements, conditions and test set-up
EN 50491-5-2:2010	General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light industry environment
EN 50491-5-3:2010	General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) - Part 5-3: EMC requirements for HBES/BACS used in industry environment
EN 50498:2010	Electromagnetic compatibility (EMC) - Product family standard for aftermarket electronic equipment in vehicles
EN 50512:2009	Electrical installations for lighting and beaconing of aerodromes - Advanced Visual Docking Guidance Systems (A-VDGS)
EN 50529-1:2010	EMC Network Standard - Part 1: Wire-line telecommunications networks using telephone wires
EN 50529-2:2010	EMC Network Standard - Part 2: Wire-line telecommunications networks using coaxial cables
EN 50550:2011, EN 50550:2011/AC:2012, EN 50550:2011/A1:2014	Power frequency overvoltage protective device for household and similar applications (POP)
EN 50557:2011	Requirements for automatic reclosing devices (ARDs) for circuit breakers-RCBOs-RCCBs for household and similar uses
EN 50561-1:2013, EN 50561-1:2013/AC:2015	Power line communication apparatus used in low-voltage installations - Radio disturbance characteristics - Limits and methods of measurement - Part 1: Apparatus for in-home use



EN 55011:2009, EN 55011:2009/A1:2010	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
EN 55012:2007, EN 55012:2007/A1:2009	Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers
EN 55014-1:2006, EN 55014-1:2006/A1:2009, EN 55014-1:2006/A2:2011	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
EN 55014-2:1997, EN 55014-2:1997/A1:2001, EN 55014-2:1997/A2:2008, EN 55014-2:1997/AC:1997	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity - Product family standard
EN 55015:2006, EN 55015:2006/A1:2007, EN 55015:2006/A2:2009	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 55015:2013	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 55022:2010, EN 55022:2010/AC:2011	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
EN 55024:2010	Information technology equipment - Immunity characteristics - Limits and methods of measurement
EN 55032:2012, EN 55032:2012/AC:2013	Electromagnetic compatibility of multimedia equipment - Emission requirements
EN 55035:2017	Electromagnetic compatibility of multimedia equipment - Immunity requirements
EN 55103-1:2009, EN 55103-1:2009/A1:2012	Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 1: Emissions
EN 55103-2:2009	Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 2: Immunity
EN 60034-1:2010, EN 60034-1:2010/AC:2010	Rotating electrical machines - Part 1: Rating and performance
EN 60204-31:1998	Safety of machinery - Electrical equipment of machines - Part 31: Particular safety and EMC requirements for sewing machines, units and systems
EN 60204-31:2013	Safety of machinery - Electrical equipment of machines - Part 31: Particular safety and EMC requirements for sewing machines, units and systems
EN 60255-26:2013, EN 60255-26:2013/AC:2013	Measuring relays and protection equipment - Part 26: Electromagnetic compatibility requirements
EN 60669-2-1:2004, EN 60669-2-1:2004/A1:2009, EN 60669-2-1:2004/A12:2010, EN 60669-2-1:2004/AC:2007	Switches for household and similar fixed electrical installations - Part 2-1: Particular requirements - Electronic switches
EN 60730-1:2000, EN 60730-1:2000/A1:2004, EN 60730-1:2000/A16:2007, EN 60730-1:2000/A2:2008, EN 60730-1:2000/A16:2007/AC:2010, EN 60730-1:2000/AC:2007	Automatic electrical controls for household and similar use - Part 1: General requirements



EN 60730-1:2011	Automatic electrical controls for household and similar use - Part 1: General requirements
EN 60730-2-5:2002, EN 60730-2-5:2002/A11:2005, EN 60730-2-5:2002/A1:2004, EN 60730-2-5:2002/A2:2010	Automatic electrical controls for household and similar use - Part 2-5: Particular requirements for automatic electrical burner control systems
EN 60730-2-6:2008	Automatic electrical controls for household and similar use - Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements
EN 60730-2-7:2010, EN 60730-2-7:2010/AC:2011	Automatic electrical controls for household and similar use - Part 2-7: Particular requirements for timers and time switches
EN 60730-2-8:2002, EN 60730-2-8:2002/A1:2003	Automatic electrical controls for household and similar use - Part 2-8: Particular requirements for electrically operated water valves, including mechanical requirements
EN 60730-2-9:2010	Automatic electrical controls for household and similar use - Part 2-9: Particular requirements for temperature sensing controls
EN 60730-2-14:1997, EN 60730-2-14:1997/A1:2001	Automatic electrical controls for household and similar use - Part 2-14: Particular requirements for electric actuators
EN 60730-2-15:2010	Automatic electrical controls for household and similar use - Part 2-15: Particular requirements for automatic electrical air flow, water flow and water level sensing controls
EN 60870-2-1:1996	Telecontrol equipment and systems - Part 2: Operating conditions - Section 1: Power supply and electromagnetic compatibility
EN 60945:2002	Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results
EN 60947-1:2007, EN 60947-1:2007/A1:2011, EN 60947-1:2007/A2:2014	Low-voltage switchgear and controlgear - Part 1: General rules
EN 60947-2:2006, EN 60947-2:2006/A1:2009, EN 60947-2:2006/A2:2013	Low-voltage switchgear and controlgear - Part 2: Circuit-breakers
EN 60947-3:2009, EN 60947-3:2009/A1:2012	Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units
EN 60947-4-1:2010, EN 60947-4-1:2010/A1:2012	Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters
EN IEC 60947-4-1:2019	Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters
EN 60947-4-2:2012	Low-voltage switchgear and controlgear - Part 4-2: Contactors and motor-starters - AC semiconductor motor controllers and starters
EN 60947-4-3:2000, EN 60947-4-3:2000/A1:2006, EN 60947-4-3:2000/A2:2011	Low-voltage switchgear and controlgear - Part 4-3: Contactors and motor-starters - AC semiconductor controllers and contactors for non-motor loads
EN 60947-4-3:2014	Low-voltage switchgear and controlgear - Part 4-3: Contactors and motor-starters - AC semiconductor controllers and contactors for non-motor loads
EN 60947-5-1:2004, EN 60947-5-1:2004/A1:2009, EN 60947-5-1:2004/AC:2004, EN 60947-5-1:2004/AC:2005	Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices
EN 60947-5-2:2007, EN 60947-5-2:2007/A1:2012	Low-voltage switchgear and controlgear - Part 5-2: Control circuit devices and switching elements - Proximity switches



<p>EN 60947-5-3:1999, EN 60947-5-3:1999/A1:2005</p>	<p>Low-voltage switchgear and controlgear - Part 5-3: Control circuit devices and switching elements - Requirements for proximity devices with defined behaviour under fault conditions (PDF)</p>
<p>EN 60947-5-6:2000</p>	<p>Low-voltage switchgear and controlgear - Part 5-6: Control circuit devices and switching elements - DC interface for proximity sensors and switching amplifiers (NAMUR)</p>
<p>EN 60947-5-7:2003</p>	<p>Low-voltage switchgear and controlgear - Part 5-7: Control circuit devices and switching elements - Requirements for proximity devices with analogue output</p>
<p>EN 60947-5-9:2007</p>	<p>Low-voltage switchgear and controlgear - Part 5-9: Control circuit devices and switching elements - Flow rate switches</p>
<p>EN 60947-6-1:2005, EN 60947-6-1:2005/A1:2014</p>	<p>Low-voltage switchgear and controlgear - Part 6-1: Multiple function equipment - Transfer switching equipment</p>
<p>EN 60947-6-2:2003, EN 60947-6-2:2003/A1:2007</p>	<p>Low-voltage switchgear and controlgear - Part 6-2: Multiple function equipment - Control and protective switching devices (or equipment) (CPS)</p>
<p>EN 60947-8:2003, EN 60947-8:2003/A1:2006, EN 60947-8:2003/A2:2012</p>	<p>Low-voltage switchgear and controlgear - Part 8: Control units for built-in thermal protection (PTC) for rotating electrical machines</p>
<p>EN IEC 60947-9-1:2019</p>	<p>Low-voltage switchgear and controlgear - Part 9-1: Active arc-fault mitigation systems - Arc quenching devices</p>
<p>EN 60974-10:2007</p>	<p>Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements</p>
<p>EN 60974-10:2014</p>	<p>Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements</p>
<p>EN 61000-3-2:2006, EN 61000-3-2:2006/A1:2009, EN 61000-3-2:2006/A2:2009</p>	<p>Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)</p>
<p>EN 61000-3-2:2014</p>	<p>Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)</p>
<p>EN 61000-3-3:2008</p>	<p>Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection</p>
<p>EN 61000-3-3:2013</p>	<p>Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection</p>
<p>EN 61000-3-11:2000</p>	<p>Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection</p>
<p>EN 61000-3-12:2011</p>	<p>Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase</p>
<p>EN 61000-6-1:2007</p>	<p>Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments</p>
<p>EN 61000-6-2:2005, EN 61000-6-2:2005/AC:2005</p>	<p>Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments</p>
<p>EN 61000-6-3:2007, EN 61000-6-3:2007/A1:2011/AC:2012, EN 61000-6-3:2007/A1:2011</p>	<p>Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments</p>



<p>EN 61000-6-4:2007, EN 61000-6-4:2007/A1:2011 EN 61000-6-5:2015</p>	<p>Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments Electromagnetic compatibility (EMC) - Part 6-5: Generic standards - Immunity for equipment used in power station and substation environment</p>
<p>EN 61000-6-5:2015, EN 61000-6-5:2015/AC:2018-01</p>	<p>Electromagnetic compatibility (EMC) - Part 6-5: Generic standards - Immunity for equipment used in power station and substation environment</p>
<p>EN 61008-1:2004, EN 61008-1:2004/A11:2007, EN 61008-1:2004/A12:2009, EN 61008-1:2004/A13:2012</p>	<p>Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules</p>
<p>EN 61008-1:2012, EN 61008-1:2012/A1:2014</p>	<p>Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) - Part 1: General rules</p>
<p>EN 61009-1:2004, EN 61009-1:2004/A11:2008, EN 61009-1:2004/A12:2009, EN 61009-1:2004/A13:2009, EN 61009-1:2004/A14:2012</p>	<p>Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules</p>
<p>EN 61009-1:2012</p>	<p>Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Part 1: General rules</p>
<p>EN IEC 61058-1:2018</p>	<p>Switches for appliances - Part 1: General requirements</p>
<p>EN 61131-2:2007</p>	<p>Programmable controllers - Part 2: Equipment requirements and tests</p>
<p>EN 61204-3:2000</p>	<p>Low voltage power supplies, d.c. output - Part 3: Electromagnetic compatibility (EMC)</p>
<p>EN 61326-1:2013</p>	<p>Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements</p>
<p>EN 61326-2-1:2013</p>	<p>Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-1: Particular requirements - Test configurations, operational conditions and performance criteria for sensitive test and measurement equipment for EMC unprotected applications</p>
<p>EN 61326-2-2:2013</p>	<p>Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-2: Particular requirements - Test configurations, operational conditions and performance criteria for portable test, measuring and monitoring equipment used in low-voltage distribution systems</p>
<p>EN 61326-2-3:2013</p>	<p>Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning</p>
<p>EN 61326-2-4:2013</p>	<p>Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-4: Particular requirements - Test configurations, operational conditions and performance criteria for insulation monitoring devices according to IEC 61557-8 and for equipment for insulation fault location according to IEC 61557-9</p>
<p>EN 61326-2-5:2013</p>	<p>Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-5: Particular requirements - Test configurations, operational conditions and performance criteria for devices with field bus interfaces according to IEC 61784-1</p>



EN 61439-1:2011	Low-voltage switchgear and controlgear assemblies - Part 1: General rules
EN 61439-2:2011	Low-voltage switchgear and controlgear assemblies - Part 2: Power switchgear and controlgear assemblies
EN 61439-3:2012	Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons (DBO)
EN 61439-3:2012, EN 61439-3:2012/AC:2019-04	Low-voltage switchgear and controlgear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons (DBO)
EN 61439-4:2013	Low-voltage switchgear and controlgear assemblies - Part 4: Particular requirements for assemblies for construction sites (ACS)
EN 61439-5:2011	Low-voltage switchgear and controlgear assemblies - Part 5: Assemblies for power distribution in public networks
EN 61439-6:2012	Low-voltage switchgear and controlgear assemblies - Part 6: Busbar trunking systems (busways)
EN 61543:1995, EN 61543:1995/A11:2003, EN 61543:1995/A12:2005, EN 61543:1995/A2:2006, EN 61543:1995/A11:2003/AC:2004, EN 61543:1995/AC:1997 EN 61547:2009	Residual current-operated protective devices (RCDs) for household and similar use - Electromagnetic compatibility Equipment for general lighting purposes - EMC immunity requirements
EN 61557-12:2008	Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 12: Performance measuring and monitoring devices (PMD)
EN 61800-3:2004, EN 61800-3:2004/A1:2012 EN 61812-1:2011	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods Time relays for industrial and residential use - Part 1: Requirements and tests
EN 62020:1998, EN 62020:1998/A1:2005 EN 62026-1:2007	Electrical accessories - Residual current monitors for household and similar uses (RCMs) Low-voltage switchgear and controlgear - Controller-device interfaces (CDIs) - Part 1: General rules
EN 62026-2:2013	Low-voltage switchgear and controlgear - Controller-device interfaces (CDIs) - Part 2: Actuator sensor interface (AS-i)
EN 62026-3:2009	Low-voltage switchgear and controlgear - Controller-device interfaces (CDIs) - Part 3: DeviceNet
EN 62026-7:2013	Low-voltage switchgear and controlgear - Controller-device interfaces (CDIs) - Part 7: CompoNet
EN 62040-2:2006, EN 62040-2:2006/AC:2006 EN 62052-11:2003	Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment
EN 62052-21:2004	Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Part 21: Tariff and load control equipment
EN 62053-11:2003	Electricity metering equipment (a.c.) - Particular requirements - Part 11: Electromechanical meters for active energy (classes 0,5, 1 and 2)
EN 62053-21:2003	Electricity metering equipment (a.c.) - Particular requirements - Part 21: Static meters for active energy (classes 1 and 2)



EN 62053-22:2003	Electricity metering equipment (a.c.) - Particular requirements - Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)
EN 62053-23:2003	Electricity metering equipment (a.c.) - Particular requirements - Part 23: Static meters for reactive energy (classes 2 and 3)
EN 62054-11:2004	Electricity metering (a.c.) - Tariff and load control - Part 11: Particular requirements for electronic ripple control receivers
EN 62054-21:2004	Electricity metering (a.c.) - Tariff and load control - Part 21: Particular requirements for time switches
EN 62135-2:2008	Resistance welding equipment - Part 2: Electromagnetic compatibility (EMC) requirements
EN 62310-2:2007	Static transfer systems (STS) - Part 2: Electromagnetic compatibility (EMC) requirements
EN 62423:2009	Type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses (Type B RCCBs and Type B RCBOs)
EN 62423:2012	Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses
EN 62586-1:2014	Power quality measurement in power supply systems - Part 1: Power quality instruments (PQI)
EN 62586-2:2014	Power quality measurement in power supply systems - Part 2: Functional tests and uncertainty requirements
EN 62606:2013	General requirements for arc fault detection devices
EN 63024:2018	Requirements for automatic reclosing devices (ARDs) for circuit-breakers, RCBOs and RCCBs for household and similar uses

Harmonised EMC standards drafted by ETSI include:

EN 300 386 V1.6.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; Electro Magnetic Compatibility (EMC) requirements
EN 301 489-1 V1.9.2	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
EN 301 489-34 V1.4.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 34: Specific conditions for External Power Supply (EPS) for mobile phones



European Telecommunications Standards Institute

ETSI produces globally applicable standards for Information and Communications Technologies (ICT) enabled systems, applications and services. This includes fixed and mobile radio, broadcast and internet technologies.

EMC is a subject of national and international regulation. In Europe it is regulated through the European Commission’s **EMC Directive 2014/30/EU** and for radio equipment through **Radio Equipment Directive 2014/53/EU (RED)**. These directives are New Approach Directives. As such, they rely for their operation on Harmonised Standards developed by recognized European standards bodies, such as CEN, CENELEC and ETSI. Harmonised Standards define technical characteristics that can be used to demonstrate compliance with the essential requirements of the directive.

The summary below consolidates the references of Harmonised Standards published by the Commission in the Official Journal of the European Union (OJ) under **Radio Equipment Directive 2014/53/EU (as of June 2020)**.

EN 50360:2017	Product standard to demonstrate the compliance of wireless communication devices, with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 300 MHz to 6 GHz: devices used next to the ear
EN 50385:2017	Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when placed on the market
EN 50401:2017	Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when put into service
EN 50566:2017	Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 30 MHz to 6 GHz: hand-held and body mounted devices in close proximity to the human body
EN 55035:2017	Electromagnetic compatibility of multimedia equipment - Immunity requirements
EN 300 065 V2.1.2	Narrow-band direct-printing telegraph equipment for receiving meteorological or navigational information (NAVTEX); Harmonised Standard covering the essential requirements of articles 3.2 and 3.3(g) of the Directive 2014/53/EU
EN 300 224 V2.1.1	Land Mobile Service; Radio Equipment for use in a Paging Service operating within the frequency range 25 MHz - 470 MHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 302 065-2 V2.1.1	Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 2: Requirements for UWB location tracking
EN 302 065-3 V2.1.1	Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 3: Requirements for UWB devices for ground based vehicular applications
EN 302 065-4 V1.1.1	Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 4: Material Sensing devices using UWB technology below 10,6 GHz
EN 302 066-2 V1.2.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Ground- and Wall- Probing Radar applications (GPR/WPR) imaging systems; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive



EN 302 077-2 V1.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Transmitting equipment for the Terrestrial - Digital Audio Broadcasting (T-DAB) service; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive
EN 302 186 V2.1.1	Satellite Earth Stations and Systems (SES); Harmonised Standard for satellite mobile Aircraft Earth Stations (AESs) operating in the 11/12/14 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 194-2 V1.1.2	Electromagnetic compatibility and Radio spectrum Matters (ERM); Navigation radar used on inland waterways; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive
EN 302 195 V2.1.1	Short Range Devices (SRD); Ultra Low Power Active Medical Implants (ULP-AMI) and accessories (ULP-AMI-P) operating in the frequency range 9 kHz to 315 kHz Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 300 224-2 V1.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); On-site paging service; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive
EN 302 208 V3.1.1	Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W and in the band 915 MHz to 921 MHz with power levels up to 4 W; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 217-2 V3.1.1	Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2: Digital systems operating in frequency bands from 1 GHz to 86 GHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 302 217-2-2 V2.2.1	Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2-2: Digital systems operating in frequency bands where frequency co-ordination is applied; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 302 245-2 V1.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Transmitting equipment for the Digital Radio Mondiale (DRM) broadcasting service Part 2: Harmonized EN under article 3.2 of the R&TTE Directive
EN 302 248 V2.1.1	Navigation radar for use on non-SOLAS vessels; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 264-2 V1.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short Range Radar equipment operating in the 77 GHz to 81 GHz band; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 302 288-2 V1.6.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices; Road Transport and Traffic Telematics (RTTT); Short range radar equipment operating in the 24 GHz range; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 302 296-2 V1.2.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Transmitting equipment for the digital television broadcast service, Terrestrial (DVB-T); Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 300 296 V2.1.1	Land Mobile Service; Radio equipment using integral antennas intended primarily for analogue speech; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 326-2 V1.2.2	Fixed Radio Systems; Multipoint Equipment and Antennas; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive for Digital Multipoint Radio Equipment
EN 302 340 V2.1.1	Satellite Earth Stations and Systems (SES); Harmonised Standard for satellite Earth Stations on board Vessels (ESVs) operating in the 11/12/14 GHz frequency bands allocated to the Fixed Satellite Service (FSS) covering the essential requirements of article 3.2 of the Directive 2014/53/EU



EN 302 372 V2.1.1	Short Range Devices (SRD); Tank Level Probing Radar (TLPR) equipment operating in the frequency ranges 4,5 GHz to 7 GHz, 8,5 GHz to 10,6 GHz, 24,05 GHz to 27 GHz, 57 GHz to 64 GHz, 75 GHz to 85 GHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 448 V2.1.1	Satellite Earth Stations and Systems (SES); Harmonised Standard for tracking Earth Stations on Trains (ESTs) operating in the 14/12 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 454 V2.1.1	Meteorological Aids (Met Aids); Radiosondes to be used in the 1 668,4 MHz to 1 690 MHz frequency range; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 302 454 V2.2.1	Meteorological Aids (Met Aids); Radiosondes to be used in the 1 668,4 MHz to 1 690 MHz frequency range; Harmonised Standard for access to radio spectrum
EN 302 480 V2.1.2	Mobile Communication On Board Aircraft (MCOBA) systems; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 302 502 V2.1.1	Wireless Access Systems (WAS); 5,8 GHz fixed broadband data transmitting systems; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 302 454-2 V1.2.1	Meteorological Aids (Met Aids); Radiosondes to be used in the 1 668,4 MHz to 1 690 MHz frequency range; Part 2: Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 510-2 V1.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio equipment in the frequency range 30 MHz to 37,5 MHz for Ultra Low Power Active Medical Membrane Implants and Accessories; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive
EN 300 328 V2.1.1	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 300 328 V2.2.2	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard for access to radio spectrum
EN 302 536-2 V1.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 315 kHz to 600 kHz; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive
EN 302 537 V2.1.1	Ultra Low Power Medical Data Service (MEDS) Systems operating in the frequency range 401 MHz to 402 MHz and 405 MHz to 406 MHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 561 V2.1.1	Land Mobile Service; Radio equipment using constant or non-constant envelope modulation operating in a channel bandwidth of 25 kHz, 50 kHz, 100 kHz or 150 kHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 567 V1.2.1	Broadband Radio Access Networks (BRAN); 60 GHz Multiple-Gigabit WAS/RLAN Systems; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 302 571 V2.1.1	Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 5 855 MHz to 5 925 MHz frequency band; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 302 574-1 V2.1.2	Satellite Earth Stations and Systems (SES); Harmonised Standard for Mobile Earth Stations (MES) operating in the 1 980 MHz to 2 010 MHz (earth-to-space) and 2 170 MHz to 2 200 MHz (space-to-earth) frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 1: Complementary Ground Component (CGC) for wideband systems



EN 302 574-2 V2.1.2	Satellite Earth Stations and Systems (SES); Harmonised Standard for Mobile Earth Stations (MES) operating in the 1 980 MHz to 2 010 MHz (earth-to-space) and 2 170 MHz to 2 200 MHz (space-to-earth) frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 2: User Equipment (UE) for wideband systems
EN 302 574-3 V2.1.1	Satellite Earth Stations and Systems (SES); Harmonised Standard for Mobile Earth Stations (MES) operating in the 1 980 MHz to 2 010 MHz (earth-to-space) and 2 170 MHz to 2 200 MHz (space-to-earth) frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 3: User Equipment (UE) for narrowband systems
EN 302 608 V1.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment for Eurobalise railway systems; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 302 609 V2.1.1	Short Range Devices (SRD); Radio equipment for Euroloop railway systems; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 300 330 V2.1.1	Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 302 617 V2.3.1	Ground-based UHF radio transmitters, receivers and transceivers for the UHF aeronautical mobile service using amplitude modulation; Harmonised Standard for access to radio spectrum
EN 302 617-2 V2.1.1	Ground-based UHF radio transmitters, receivers and transceivers for the UHF aeronautical mobile service using amplitude modulation; Part 2: Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 686 V1.1.1	Intelligent Transport Systems (ITS); Radiocommunications equipment operating in the 63 GHz to 64 GHz frequency band; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 302 729 V2.1.1	Short Range Devices (SRD); Level Probing Radar (LPR) equipment operating in the frequency ranges 6 GHz to 8,5 GHz, 24,05 GHz to 26,5 GHz, 57 GHz to 64 GHz, 75 GHz to 85 GHz; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 303 098 V2.2.1	Maritime low power personal locating devices employing AIS; Harmonised Standard for access to radio spectrum
EN 302 752 V1.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Active radar target enhancers; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 302 858-2 V1.3.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Automotive radar equipment operating in the 24,05 GHz up to 24,25 GHz or 24,50 GHz frequency range; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 302 885 V2.1.1	Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands with integrated handheld class D DSC; Harmonised Standard covering the essential requirements of articles 3.2 and 3.3(g) of the Directive 2014/53/EU
EN 302 885 V2.2.2	Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands with integrated handheld class H DSC; Harmonised Standard covering the essential requirements of articles 3.2 and 3.3(g) of Directive 2014/53/EU
EN 302 885 V2.2.3	Portable Very High Frequency (VHF) radiotelephone equipment for the maritime mobile service operating in the VHF bands with integrated handheld class H DSC; Harmonised Standard covering the essential requirements of articles 3.2 and 3.3(g) of Directive 2014/53/EU



EN 300 341 V2.1.1	Land Mobile Service; Radio equipment using an integral antenna transmitting signals to initiate a specific response in the receiver; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 961 V2.1.2	Maritime Personal Homing Beacon intended for use on the frequency 121,5 MHz for search and rescue purposes only; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 302 977 V2.1.1	Satellite Earth Stations and Systems (SES); Harmonised Standard for Vehicle-Mounted Earth Stations (VMES) operating in the 14/12 GHz frequency bands covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 303 039 V2.1.2	Land Mobile Service; Multichannel transmitter specification for the PMR Service; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 303 084 V2.1.1	Ground Based Augmentation System (GBAS) VHF ground-air Data Broadcast (VDB); Technical characteristics and methods of measurement for ground-based equipment; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 303 098 V2.1.1	Maritime low power personal locating devices employing AIS; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 303 132 V1.1.1	Maritime low power VHF personal locating beacons employing Digital Selective Calling (DSC); Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 303 135 V2.1.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Coastal Surveillance, Vessel Traffic Services and Harbour Radars (CS/VTs/HR); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 303 203 V2.1.1	Short Range Devices (SRD); Medical Body Area Network Systems (MBANSs) operating in the 2 483,5 MHz to 2 500 MHz range; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 303 204 V2.1.2	Network Based Short Range Devices (SRD); Radio equipment to be used in the 870 MHz to 876 MHz frequency range with power levels ranging up to 500 mW; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 303 213-6-1 V2.1.1	Advanced Surface Movement Guidance and Control System (A-SMGCS); Part 6: Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU for deployed surface movement radar sensors; Sub-part 1: X-band sensors using pulsed signals and transmitting power up to 100 kW
EN 300 390 V2.1.1	Land Mobile Service; Radio equipment intended for the transmission of data (and speech) and using an integral antenna; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU
EN 303 276 V1.1.1	Maritime Broadband Radiolink operating within the bands 5 852 MHz to 5 872 MHz and/or 5 880 MHz to 5 900 MHz for ships and off-shore installations engaged in coordinated activities; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EN 303 520 V1.2.1	Short Range Devices (SRD); Ultra Low Power (ULP) wireless medical capsule endoscopy devices operating in the band 430 MHz to 440 MHz; Harmonised Standard for access to radio spectrum



RTCA

The United States Department of Defense issued several military standards to integrate electromagnetic compatibility into the research and development stage for defense communications technology.

The Radio Technical Committee for Aeronautics (RTCA) is an independent standards development organization. RTCA works closely with the Federal Aviation Administration (FAA), industry experts from the US and around the world to develop comprehensive, industry-vetted, and endorsed recommendations on technical performance standards and the operating environment for utilizing standards. These standards can be used for showing compliance against FAA and other aviation regulatory authorities regulations.

Military standards on EMC

MIL-STD 461 is addressing EMC for subsystem and components. Currently in revision G, it covers Conducted and Radiated Emissions and Susceptibility.

MIL-STD 461 revision G comprises the following requirements.

CE101	Conducted Emissions, Audio Frequency Currents, Power Leads
CE102	Conducted Emissions, Radio Frequency Potentials, Power Leads
CE106	Conducted Emissions, Antenna Port
CS101	Conducted Susceptibility, Power Leads
CS103	Conducted Susceptibility, Antenna Port, Intermodulation
CS104	Conducted Susceptibility, Antenna Port, Rejection of Undesired Signals
CS105	Conducted Susceptibility, Antenna Port, Cross-Modulation
CS109	Conducted Susceptibility, Structure Current
CS114	Conducted Susceptibility, Bulk Cable Injection
CS115	Conducted Susceptibility, Bulk Cable Injection, Impulse Excitation
CS116	Conducted Susceptibility, Damped Sinusoidal Transients, Cables and Power Leads
CS117	Conducted Susceptibility, Lightning Induced Transients, Cables and Power Leads
CS118	Conducted Susceptibility, Personnel Borne Electrostatic Discharge
RE101	Radiated Emissions, Magnetic Field
RE102	Radiated Emissions, Electric Field
RE103	Radiated Emissions, Antenna Spurious and Harmonic Outputs
RS101	Radiated Susceptibility, Magnetic Field
RS103	Radiated Susceptibility, Electric Field
RS105	Radiated Susceptibility, Transient Electromagnetic Field

MIL-STD 464 is addressing EMC for systems. Currently in revision C, it covers intra-system EMC, external RF EME, High-power microwave (HPM) sources, Lightning, EMP, subsystems and equipment EMI, electrostatic charge control, electromagnetic radiation hazards such as HERP, HERF and HERO, life cycle E3 hardness, Electrical bonding, External grounds, TEMPEST, System radiated emissions and EM spectrum supportability.

MIL-STD 469 - This standard establishes the engineering interface requirements to control the electromagnetic emission and susceptibility characteristics of all new military radar equipment and systems operating between 100 megahertz (MHz) and 100 gigahertz (GHz).

Airborne standards on EMC

RTCA DO-160 is addressing environmental conditions and test procedures for airborne equipment. Sections on EMC phenomena are as follows.

Section 15.0 Magnetic Effect



- Section 16.0 Power Input
- Section 17.0 Voltage Spike
- Section 18.0 Audio Frequency Conducted Susceptibility - Power Inputs
- Section 19.0 Induced Signal Susceptibility
- Section 20.0 Radio Frequency Susceptibility (Radiated and Conducted)
- Section 21.0 Emission of Radio Frequency Energy
- Section 22.0 Lightning Induced Transient Susceptibility
- Section 23.0 Lightning Direct Effects
- Section 25.0 Electrostatic Discharge



Federal Communications Commission

The Federal Communications Commission regulates interstate and international communications by radio, television, wire, satellite, and cable in all 50 states, the District of Columbia and U.S. territories.

The FCC regulations are detailed in CFR 47 (Code of Federal Regulations). Its main definitions and authorization procedures are given in Part 2 and requirements on EMC are in Part 15 for radio frequency devices and Part 18 for ISM equipment.

CFR 47 Part 2 - FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

- Subpart A — Terminology
- Subpart B — Allocation, Assignment, and Use of Radio Frequencies
- Subpart C — Emissions
- Subpart D — Call Signs and Other Forms of Identifying Radio Transmissions
- Subpart E — Distress, Disaster, and Emergency Communications
- Subpart H — Prohibition against Eavesdropping
- Subpart I — Marketing of Radio-frequency Devices
- Subpart J — Equipment Authorization Procedures
- Subpart K — Importation of Devices Capable of Causing Harmful Interference
- Subpart M — Advance Approval of Subscription TV Transmission Systems
- Subpart F-G, L, N — Reserved

CFR 47 Part 15 - RADIO FREQUENCY DEVICES

- Subpart A — General
- Subpart B — Unintentional Radiators
- Subpart C — Intentional Radiators
- Subpart D — Unlicensed Personal Communications Service Devices
- Subpart E — Unlicensed National Information Infrastructure Devices
- Subpart F — Ultra-Wideband Operation
- Subpart G — Access Broadband Over Power Line (Access BPL)
- Subpart H — White Space Devices

CFR 47 Part 18 - INDUSTRIAL, SCIENTIFIC, AND MEDICAL EQUIPMENT

- Subpart A — General Information
- Subpart B — Applications and Authorizations
- Subpart C — Technical Standards



For EMC measurement methods and belonging measurement equipment are defined in bulletins and reports of the FCC's Office of Engineering and Technology (OET) and when accepted are published by the American National Standards Institute (ANSI) or in the past also by the Electronic Industries Alliance (EIA). EMC is in responsibility of Committee ANSI C63. It is focused on many aspects of emission and immunity measurements, instrumentation and resources for test lab competency and quality control. ANSI C63 standard series includes:

C63.2-2016	EM Interference and Field Strength Measuring Instrumentation 9 kHz to 40 GHz
C63.4-2014	Emission measurements
C63.5-2017	Antenna Calibration
C63.6-1996	Computation Errors in OATS Measurements – Guide
C63.7-2015	Guide for Construction of Test Sites for Performing Radiated Emission Measurements
C63.8-draft	Calibration of EMC Test Equipment – Guide
C63.9-2014	Laboratory immunity testing of office equipment exposed to RF sources
C63.10-2013	Procedures for compliance testing of unlicensed wireless devices
C63.11-draft	Inter-lab Comparison of EMC Testing
C63.12-2015	EMC Limit Setting
C63.13-1991	EMI Power Line Filters
C63.14-2014	Definitions
C63.15-2017	Immunity Measurement & Instrumentation
C63.16-2016	ESD Test Methodology
C63.17-2013	Unlicensed Personal Communications Service (PCS) Devices
C63.18-2014	On-Site Medical Radiated RF Immunity testing
C63.19-2011	EMC for Hearing Aids
C63.22-2012	Guide for Automated Electromagnetic Interference Measurements
C63.23-2012	Measurement Uncertainty
C63.24-draft	In-Situ RF Immunity Evaluation of Electronic Devices and Systems
C63.25.1-2018	Validation Methods for Radiated Emission Test Sites, 1 GHz to 18 GHz
C63.25.2-draft	Validation Methods for Radiated Emission Test Sites, 30 MHz to 1 GHz
C63.26-2015	Procedures for compliance testing of licensed transmitters
C63.27-2017	Evaluation of Wireless Coexistence
C63.28-draft	Best Practices for Electromagnetic Compatibility
C63.29-draft	Lighting products
C63.30-draft	Wireless Power Transfer Products
C63.31-draft	ISM equipment (MP-5)