INTERNATIONAL ELECTROTECHNICAL COMMISSION

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE (CISPR)

Guidance for users of the CISPR Standards

1 Introduction

This document has been prepared in order to provide guidance in the selection of appropriate CISPR EMC Standards applicable to your products, systems and installations. This document also gives an overview of the latest version of published CISPR Standards covering EMC aspects of products, systems and installations.

The document is regularly updated and expanded.

The Standards are divided into the following categories:

1.1 Basic Standards

Basic EMC Standards give the general and fundamental conditions or rules for the assessment of EMC and related performance of all products, systems or installations, and serve as reference documents for CISPR Generic and Product (Family) Standards. Basic Standards are general and hence are not dedicated to specific product families or products; they relate to general information, to the disturbing phenomena and to the measurement or testing techniques. They do not contain any prescribed limits or any product/system related performance specifications. However, methods and guidance on how to generate appropriate limits for the protection of radio reception are given.

1.2 Generic Standards

Generic EMC Standards are Standards related to a particular environment, which specify the set of essential EMC requirements and test procedures, applicable to all the products or systems intended for operation in this environment, provided that no specific EMC Standards for a particular product family, product, system or installation exist. Limits are included, and reference is made to the test procedures given in the relevant Basic Standards.

1.3 Product (Family) Standards

Product (Family) Standards define specific EMC requirements, test procedures and limits dedicated to particular products, systems or installations for which specific conditions must be considered.

2 List of available current CISPR Standards

2.1 General

This clause lists the CISPR standards available. It should be noted that CISPR 16 “Specification for radio disturbance and immunity measuring apparatus and methods” is published in multiple parts and sub-parts:

Part 1: Specification for radio disturbance and immunity measuring apparatus
Part 2: Methods of measurement of disturbances and immunity
Part 3: CISPR Technical Reports
Part 4: Uncertainties, statistics and limit modelling

Note: For details of the latest issues of the following standards, please go to the IEC Webstore : http://webstore.iec.ch

2.2 CISPR Basic EMC Standards

Publication	Description	Sub-Committee
CISPR 16-1-1	Part 1-1: Measuring apparatus	CIS/A
CISPR 16-1-2	Part 1-2: Coupling devices for conducted disturbance measurements	CIS/A
CISPR 16-1-3	Part 1-3: Ancillary equipment – Disturbance power	CIS/A
CISPR 16-1-4	Part 1-4: Antennas and test sites for radiated disturbance measurements	CIS/A
CISPR 16-1-5	Part 1-5: Antenna calibration sites & reference test sites for 5 MHz to 18 GHz	CIS/A
CISPR 16-1-6	Part 1-6: EMC antenna calibration	CIS/A
CISPR 16-2-1	Part 2-1: Conducted disturbance measurements	CIS/A
CISPR 16-2-2	Part 2-2: Measurement of disturbance power	CIS/A
CISPR 16-2-3	Part 2-3: Radiated disturbance measurements	CIS/A
CISPR 16-2-4	Part 2-4: Immunity measurements	CIS/A
CISPR 16-4-2	Part 4-2: Measurement instrumentation uncertainty	CIS/A
CISPR 17	Methods of measurement of the suppression characteristics of passive radio interference filters and suppression components	CIS/A
IEC 61000-4-20	Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides	CIS/A & SC77B
IEC 61000-4-21	Testing and measurement techniques - Reverberation chamber test methods	CIS/A & SC77B
IEC 61000-4-22	Testing and measurement techniques - Radiated emissions and immunity measurements in fully anechoic rooms (FARs)	CIS/A & SC77B

2.3 CISPR Generic EMC Standards

Publication	Description	Sub-Committee
IEC 61000-6-3 (see annex C.1)	Part 6-3: Generic standards - Emission standard for residential environments	CIS/H
IEC 61000-6-4 (see annex C.2)	Part 6-4: Generic standards - Emission standard for industrial environments	CIS/H
IEC 61000-6-8 (see annex C.3)	Part 6-8: Generic standards - Emission standard for professional equipment in commercial and light-industrial locations	CIS/H

2.4 CISPR Product Standards

Publication	Description	Sub-Committee
CISPR 11 (see annex A.1)	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement	CIS/B
CISPR 12 (see annex A.2)	Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers	CIS/D
CISPR 14-1 (see annex A.3)	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission	CIS/F
CISPR 14-2 (see annex A.4)	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity - Product family standard	CIS/F
CISPR 15 (see annex A.5)	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment	CIS/F
CISPR 25 (see annex A.6)	Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers	CIS/D
CISPR 32 (see annex A.7)	Electromagnetic Compatibility of multimedia equipment – Emission requirements	CIS/I
CISPR 35 (see annex A.8)	Electromagnetic Compatibility of multimedia equipment – Immunity requirements	CIS/I
CISPR 36 (see annex A.9)	Electric and hybrid electric road vehicles - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers below 30 MHz	CIS/D

2.5 CISPR Guidance documents

These document are for guidance, not for compliance testing.

Publication	Description	Sub-Committee
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	CIS/H
CISPR/TR 16-3	CISPR technical reports	CIS/A
CISPR/TR 16-4-1	Uncertainties in standardized EMC tests	CIS/A
CISPR/TR 16-4-3	Statistical considerations in the determination of EMC compliance of mass-produced products	CIS/A
CISPR/TR 16-4-4	Statistics of complaints and a model for the calculation of limits	CIS/H
CISPR/TR 16-4-5	Conditions for the use of alternative test methods	CIS/A
CISPR/TR 18-1 (see annex B.1)	Radio interference characteristics of overhead power lines and high voltage equipment. Part 1: Description of phenomena	CIS/B
CISPR/TR 18-2 (see annex B.2)	Radio interference characteristics of overhead power lines and high voltage equipment. Part 2: Methods of measurement and procedures for determining limits	CIS/B
CISPR/TR 18-3 (see annex B.3)	Radio interference characteristics of overhead power lines and high-voltage equipment - Part 3: Code of practice for minimizing the generation of radio noise	CIS/B
CISPR/TR 28	Industrial, scientific and medical equipment (ISM) - Guidelines for emission levels within the bands designated by the ITU	CIS/B
CISPR/TR 29	Television broadcast receivers and associated equipment - Immunity characteristics - Methods of objective picture assessment	CIS/I
CISPR/TR 30-1	Test method on electromagnetic emissions- Part 1: Electronic control gear for single- and double-capped fluorescent lamps	CIS/F
CISPR/TR 30-2	Test method on electromagnetic emissions - Part 2: Electronic control gear for discharge lamps excluding fluorescent lamps	CIS/F
CISPR/TR 31	Provisions for the inclusion of new information the Radio Services Database on the characteristics of radio services (Note: The Database itself is available in the IEC EMC Zone)	CIS/H

3 Selection list of products and Standards to be applied

NOTE Product lists are available for this table from IEC etc.

Product	Applicable CISPR Standard(s)								
	11	12/25	14-1	14-2	15	32	35	36	Remarks
Accelerators (medical)	✓								
Agricultural machinery		✓						✓	See ISO 14982
Arc Welding equipment	✓								
Audio Amplifiers						✓	✓		
Automatic Teller Machine						✓	✓		
Battery Chargers – other than WPT	✓		✓	✓					
Battery Chargers – wireless power transfer (WPT) mode	✓		✓	✓					CISPR 14-1 and 14-2 cover only IPT appliances
Battery powered floor professional finishing machines		✓							
Boats (<15m in length)		✓							
Cap lights for mines					✓				
Car radios		✓				✓	✓		
CD / DVD Player						✓	✓		
Centrifuges for laboratories	✓								
Character Reader						✓	✓		
Compact fluorescent luminaires					✓				
Copying Machine						✓	✓		
Data Display: CRT, plasma, LED, Liquid crystal						✓	✓		
Data Input Device: Keyboard, mouse Magnetic card reader Optical character reader Image scanner, pen						✓	✓		
Data Plotter						✓	✓		
Data Printer: Dot matrix, laser, LED						✓	✓		
Data Processing Equipment						✓	✓		
Data Processor: Computer, calculator						✓	✓		
Data Scanner						✓	✓		
Data Storage Device						✓	✓		
Converters (AC/DC, DC/DC)	✓								
Decoders NTSC, PAL, SECAM						✓	✓		
Demultiplexers						✓	✓		
Digital Still Camera						✓	✓		Data processing + display + memory suggests ITE/MME
Digital Video Camera						✓	✓		
Earth moving and building construction machinery		✓						✓	See ISO 13766
EDM equipment	✓								Electro-Discharge Machining equipment
Education entertainment service robot						✓	✓		As described in CISPR/1421/INF
Encoders NTSC, PAL, SECAM						✓	✓		
Facsimile Machine						✓	✓		
FAX Modem						✓	✓		
FM sound receivers						✓	✓		
FM tuners						✓	✓		

Product	Applicable CISPR Standard(s)								
	11	12/25	14-1	14-2	15	32	35	36	Remarks
Forestry Equipment		✓						✓	See ISO 14982
Gas analyser	✓								
Ice maker			✓	✓					
Induction cooking appliances			✓	✓					
Industrial robots (including Automated Guided Vehicles; inspection, medical, old-age support service and security robots)	✓								As described in CISPR/1421/INF
Internal combustion engine devices: (electric generators, pumps, lawn mowers, garden tools, chain saws, etc.)		✓							
IPT Appliances			✓	✓					Inductive Power Transfer appliances
Kitchen machines			✓	✓					
LED luminaires					✓				
Local Area Network devices						✓	✓		
Magnetic Tape Device						✓	✓		
Magnetic Disk Device						✓	✓		
Memory Device						✓	✓		
Microwave oven	✓			✓					
Modem (all types)						✓	✓		
MP3 player						✓	✓		
Optical Disk Device: CD-ROM, DVD-ROM						✓	✓		
PC TV Tuner Cards						✓	✓		
PC AM / FM Radio Tuner cards						✓	✓		
Personal Electric Transporters (PeT's)		✓							
Record Players						✓	✓		
Rectifier diode power supplies			✓	✓					
Point of Sale Terminal						✓	✓		
Power Supplies – other than WPT mode	✓		✓	✓		✓	✓		
Power Supplies – wireless power transfer (WPT) mode	✓		✓	✓					CISPR 14-1 and 14-2 cover only IPT appliances
Power tools (including battery powered)			✓	✓					
Public service robots (including Personal safety robots or intelligent housekeeper; Domestic helper robots, Hotel, Bank, Venue and Catering service robots)			✓	✓					As described in CISPR/1421/INF
RF amplifiers						✓	✓		
RF converters						✓	✓		
Road vehicles including passenger cars, trucks and busses powered by an internal combustion, an electric motor or hybrid technology		✓							
Satellite tuner units (1st IF)						✓	✓		
Solar inverters	✓								
Switch mode power supplies	✓		✓	✓					
Telecommunication Terminal						✓	✓		
Television receivers						✓	✓		
Telephone						✓	✓		
TV set-top boxes (analog or digital)						✓	✓		

Product	Applicable CISPR Standard(s)								
	11	12/25	14-1	14-2	15	32	35	36	Remarks
Video projector						✓	✓		
Video recorders						✓	✓		

NOTE For some types of products listed above there might be more specific product standards

For other products not listed above and where a specific product standard does not exist, use the Generic EMC Emission standards IEC 61000-6-3, IEC 61000-6-4 or IEC 61000-6-8 and Generic EMC Immunity standards IEC 61000-6-1 or IEC 61000-6-2.

Annex A
CISPR Product Standards

Definitions of available current CISPR Standards referred to in Clause 2.4.

A.1 CISPR 11

CISPR 11	**Industrial, scientific and medical equipment –Radio Frequency disturbance characteristics – Limits and methods of measurement**

CISPR 11 applies to industrial, scientific and medical electrical equipment operating in the frequency range 0 Hz to 400 GHz and to domestic and similar appliances designed to generate and/or use locally radio-frequency energy.

It covers emission requirements related to radio-frequency (RF) disturbances in the frequency range of 9 kHz to 400 GHz. Measurements need only be performed in frequency ranges where limits are specified.

For ISM RF applications in the meaning of the definition found in the ITU Radio Regulations, CISPR 11 covers emission requirements related to radio-frequency disturbances in the frequency range of 9 kHz to 18 GHz.

NOTE 1: Emission requirements for induction cooking appliances are specified in CISPR 14-1.

Requirements for ISM RF lighting equipment and UV irradiators operating at frequencies within the ISM frequency bands defined by the ITU Radio Regulations are contained in CISPR 11.

To fully cover all EMC aspects and phenomena that are considered applicable to equipment in the scope of CISPR 11 the following other EMC related standards may apply in their own right:

- IEC 61000-6-1 *Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments*
- IEC 61000-6-2 *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments*
- IEC 61000-6-5 *Electromagnetic compatibility (EMC) - Part 6-5: Generic standards - Immunity for equipment used in power station and substation environment*
- 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 61000-3-11 *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*

NOTE 2: IEC 61000-3-2, IEC 61000-3-3, IEC 61000-3-11 and IEC 61000-3-12 are applicable in some regions for equipment that is intended to be connected directly to a public low-voltage network.

NOTE 3: Instead of the generic immunity standards IEC 61000-6-1, IEC 61000-6-2 and IEC 61000-6-5, the immunity requirements given in more specific product standards apply.

A.2 CISPR 12

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

The limits in CISPR 12 are designed to provide protection for broadcast receivers in the frequency range of 30 MHz to 1000 MHz when used in the residential environment. Compliance with CISPR 12 may not provide adequate protection for new types of radio transmissions or receivers used in the residential environment nearer than 10 m to the vehicle, boat or device.

Note 1: Experience has shown that compliance with CISPR 12 may provide satisfactory protection for receivers of other types of transmissions when used in the residential environment, including radio transmissions in frequency ranges other than that specified.

CISPR 12 applies to the emission of electromagnetic energy which may cause interference to radio reception and which is emitted from:

a) vehicles propelled by an internal combustion engine, electrical means or both;
b) boats propelled by an internal combustion engine, electrical means or both. Boats are to be tested in the same manner as vehicles except where they have unique characteristics as explicitly stated in CISPR 12;
c) devices equipped with internal combustion engines;

Annex G in the standard gives a flow chart to help determine the applicability of CISPR 12.

CISPR 12 does not apply to aircraft, traction systems (railway, tramway and electric trolley bus), or to incomplete vehicles. In the case of a dual-mode trolley bus (e.g. propelled by power from either a.c./d.c. mains or an internal combustion engine), the internal combustion propulsion system is included, but the a.c./d.c. mains portion of the vehicle propulsion system is excluded from CISPR 12.

NOTE 2: Protection of receivers used on board the same vehicle as the disturbance source(s) are covered by CISPR 25.

The measurement of electromagnetic disturbances while the vehicle is connected to power mains for charging is not covered in CISPR 12. Instead the appropriate IEC and CISPR standards which define measurement techniques and limits for this condition should be referred to.

NOTE 3: Requirements for the EMC of railway applications (emission and immunity) are given in the IEC standards series IEC 62236 maintained by IEC/TC 9.

NOTE 4: IEC/TC 69 maintains relevant standards for the EMC of vehicle charging systems.

A.3 CISPR 14-1

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

CISPR 14-1 specifies the requirements that apply to the emission of radiofrequency disturbances in the frequency range 9 kHz to 400 GHz from appliances, electric tools and similar apparatus as defined below, whether powered by AC or DC (including a battery).

It is applicable to the following equipment:

• household appliances or similar equipment;

NOTE 1: Examples are equipment used:

- for typical housekeeping functions in the household environment, which includes the dwelling and its associated buildings, the garden, etc.;
- for typical housekeeping functions in shops, offices, commercial and other similar working environments;
- in farms;
- by clients in hotels and other residential type environments;
- for induction cooking, either in residential or commercial environments.

• electric tools;

NOTE 2: Examples of electric tools include electric motor-operated or electromagnetically driven hand-held tools, transportable tools, lawn and garden machinery.

• similar apparatus.

NOTE 3: Examples are external power controllers using semiconductor devices, motor-driven electro-medical apparatus, electric/electronic toys, automatic goods-dispensing machines, electro-mechanical entertainment machines, cine or slide projectors, as well as battery chargers and external power supplies for use with products under the scope of CISPR 14-1.

Also included in the scope of CISPR 14-1 are separate parts of the equipment mentioned above, such as motors & switching devices (e.g. power or protective relays); however, no emission requirements apply to such separate parts, unless otherwise stated in CISPR 14-1.

Products which incorporate radio transmit/receive functions are included in the scope of this document.

Equipment under the scope of this document making use of IPT is also in the scope.

Excluded from the scope of CISPR 14-1 are:

– equipment for which all emission requirements in the radio-frequency range are explicitly formulated in other CISPR standards;

NOTE 4: Examples are:

- luminaires, including portable luminaires for children, discharge lamps and other lighting devices under the scope of CISPR 15;
- information technology equipment, e.g. home computers, personal computers, electronic copying machines under the scope of CISPR 32;
- audio/video equipment and electronic music instruments other than toys under the scope of CISPR 32;
- mains communication devices, as well as baby surveillance systems;
- equipment which is under the scope of CISPR 11 because of the use of radio frequency energy for heating (other than induction cooking) and therapeutic purposes, microwave ovens (but be aware of 6.5 on multifunction equipment e.g. for click measurements)
- radio controls, walkie-talkies and other types of radio-transmitters;
- arc welding equipment.

– equipment intended to be used only on a vehicle, ship or aircraft;

– equipment used only in industrial environment

– the effects of electromagnetic phenomena relating to the safety of the equipment.

Multifunction equipment may be required to comply with clauses in CISPR 14-1 and other standards.

The emission requirements in this document are not intended to be applicable to the intentional transmissions from a radio transmitter as defined by the ITU including their spurious emissions.

The complementary immunity Standard is CISPR 14-2.

To fully cover all EMC phenomena that are considered applicable to the equipment under the scope of CISPR 14-1 the following Standards are in most cases also applicable:

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

NOTE: IEC 61000-3-2 and IEC 61000-3-3 are applicable in some regions for equipment that is intended to be connected directly to a public low-voltage network.

A.4 CISPR 14-2

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

CISPR 14-2 specifies the electromagnetic immunity requirements in the frequency range 0 Hz to 400 GHz that apply to appliances, electric tools and similar apparatus as specified below, whether powered by AC or DC (including a battery).

It specifies immunity requirements for continuous and transient electromagnetic disturbances, both conducted and radiated.

Unless otherwise specified, CISPR 14-2 is applicable to all equipment in the scope of CISPR 14-1.

Included in the scope of CISPR 14-2 are also microwave ovens for domestic use or catering.

Equipment which incorporate radio transmit/receive functions are included in the scope of CISPR 14-2.

Excluded from the scope of this document are:

– equipment for which all electromagnetic immunity requirements are explicitly formulated in other CISPR or IEC standards;

Examples are:

  • luminaires, including portable luminaires for children, discharge lamps, LED lamps and other lighting devices under the scope of IEC 61547 (but see 8.7);

  • multimedia equipment under the scope of CISPR 35;

  • mains communication devices, as well as baby surveillance systems;

  • arc welding equipment.

– equipment intended to be part of the fixed electrical installation of buildings (e.g. fuses, circuit breakers, cables and switches);

– medical electrical equipment, including those in the scope of CISPR 14-1;

– equipment used only in industrial environment;

– equipment intended to be used exclusively in locations where special electromagnetic conditions exist (e.g. high electromagnetic fields nearby broadcast transmitting stations or high energy pulses nearby power generation stations);

– equipment intended to be used exclusively on a vehicle, ship, boat or aircraft;

– the effects of electromagnetic phenomena relating to the safety of apparatus (see IEC 60335 series);

Also excluded from the scope of this document is AC single-phase equipment with a rated voltage higher than 250 V between phase and neutral and AC multi-phase equipment with rated voltage higher than 480 V.

Abnormal operation of the apparatus (such as simulated faults in the electric circuitry for testing purposes) is not taken into consideration.

Multifunction equipment which is subjected simultaneously to different clauses of CISPR 14-2 and/or other Standards shall meet the provisions of each Clause/Standard with the relevant functions in operation.

The complementary emission Standard is CISPR 14-1 *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*.

To fully cover all EMC phenomena that are considered applicable to the equipment under the scope of CISPR 14-2 the following Standards are in most cases also applicable:

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

NOTE: IEC 61000-3-2 and IEC 61000-3-3 are applicable in some regions for equipment that is intended to be connected directly to a public low-voltage network.

A.5 CISPR 15

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

CISPR 15 applies to the emission (radiated and conducted) of radiofrequency disturbances from:

- lighting equipment
- the lighting part of multi-function equipment where this lighting part is a primary function; Examples are lighting equipment with visible-light communication, entertainment lighting.
- UV and IR radiation equipment for residential and non-industrial applications;
- advertising signs;
  Examples are neon tube advertising signs.
- decorative lighting;
- emergency signs.
-

Excluded from the scope of CISPR 15 are :

- components or modules intended to be built into lighting equipment and which are not user-replaceable; See CISPR 30 (all parts) for built-in controlgear.
- lighting equipment operating in the ISM frequency bands (as defined in Resolution 63 (1979) of the ITU Radio Regulation);
- lighting equipment for aircraft and airfield facilities (runways, service facilities, platforms);
- video signs;
- installations;
- equipment for which the electromagnetic compatibility requirements in the radio-frequency range are explicitly formulated in other CISPR standards, even if they incorporate a built-in lighting function.

Examples of the exclusions are:

- equipment with built-in lighting devices for display back lighting, scale illumination and signaling;
- SSL-displays;
- range hoods, refrigerators, freezers;
- photocopiers, projectors;
- lighting equipment for road vehicles (in scope of CISPR 12).

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The frequency range covered is 9 kHz to 400 GHz. No measurements need to be performed at frequencies where no limits are specified in the standard.

Multi-function equipment which is subjected simultaneously to different clauses of CISPR 15 and/or other standards need to meet the provisions of each clause/standard with the relevant functions in operation.

For equipment outside the scope of CISPR 15 and which includes lighting as a secondary function, there is no need to separately assess the lighting function against CISPR 15, provided that the lighting function was operative during the assessment in accordance with the applicable standard.

Examples of equipment with a secondary lighting function can be range hoods, fans, refrigerators, freezers, ovens and TV with ambient lighting.

The radiated emission requirements in CISPR 15 are not intended to be applicable to the intentional transmissions from a radio transmitter as defined by the ITU, nor to any spurious emissions related to these intentional transmissions.

To fully cover all EMC phenomena that are considered applicable to the equipment under the scope of CISPR 15 the following Standards are in most cases also applicable:

- IEC 61547 *Equipment for general lighting purposes - EMC immunity requirements*
- 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*

NOTE: IEC 61000-3-2 and IEC 61000-3-3 are applicable in some regions for equipment that is intended to be connected directly to a public low-voltage network.

A.6 CISPR 25

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

CISPR 25 contains limits and procedures for the measurement of radio disturbances in the frequency range of 150 kHz to 2 500 MHz. It applies to any electronic/electrical component intended for use in vehicles, trailers and devices. Refer to International Telecommunications Union (ITU) publications for details of frequency allocations. The limits are intended to provide protection for receivers installed in a vehicle from disturbances produced by components/modules in the same vehicle. The method and limits for a complete vehicle (whether connected to the power mains for charging purposes or not) and the methods and limits for components/modules are included. Only a complete vehicle test can be used to determine the component compatibility with respect to a vehicle's limit.

The receiver types to be protected are, for example, broadcast receivers (sound and television), land mobile radio, radio telephone, amateur, citizens' radio, Satellite Navigation (GPS etc.), Wi-Fi and Bluetooth. For the purpose of CISPR 25, a vehicle is a machine, which is self-propelled by an internal combustion engine, electric means, or both. Vehicles include (but are not limited to) passenger cars, trucks, agricultural tractors and snowmobiles. Annex A provides guidance in determining whether CISPR 25 is applicable to particular equipment.

CISPR 25 does not include protection of electronic control systems from radio frequency (RF) emissions or from transient or pulse-type voltage fluctuations. These subjects are included in ISO publications.

The limits in CISPR 25 are recommended and subject to modification as agreed between the vehicle manufacturer and the component supplier. CISPR 25 is also intended to be applied by manufacturers and suppliers of components and equipment which are to be added and connected to the vehicle harness or to an on-board power connector after delivery of the vehicle.

Since the mounting location, vehicle body construction and harness design can affect the coupling of radio disturbances to the on-board radio, CISPR 25 defines multiple limit levels. The level class to be used (as a function of frequency band) is agreed upon between the vehicle manufacturer and the component supplier.

CISPR 25 defines test methods for use by Vehicle Manufacturers and Suppliers, to assist in the design of vehicles and components and ensure controlled levels of on-board radio frequency emissions.

Vehicle test limits are provided for guidance and are based on a typical radio receiver using the antenna provided as part of the vehicle, or a test antenna if a unique antenna is not specified. The frequency bands that are defined are not applicable to all regions or countries of the world. For economic reasons, the vehicle manufacturer is free to identify what frequency bands are applicable in the countries in which a vehicle will be marketed and which radio services are likely to be used in that vehicle.

As an example, many vehicle models will probably not have a television receiver installed; yet the television bands occupy a significant portion of the radio spectrum. Testing and mitigating noise sources in such vehicles is not economically justified. The vehicle manufacturer should define the countries in which the vehicle is to be marketed, then choose the applicable frequency bands and limits. Component test parameters can then be selected from CISPR 25 to support the chosen marketing plan.

The World Administrative Radio Communications Conference (WARC) lower frequency limit in region 1 was reduced to 148,5 kHz in 1979. For vehicular purposes, tests at 150 kHz are considered adequate. For the purposes of CISPR 25, test frequency ranges have been generalized to cover radio services in various parts of the world. Protection of radio reception at adjacent frequencies can be expected in most cases.

A.7 CISPR 32

CISPR 32	Electromagnetic Compatibility of multimedia equipment - emission requirements

CISPR 32 applies to multimedia equipment (MME) and having a rated r.m.s. AC or DC supply voltage not exceeding 600 V.

Note: Equipment which was within the scope of CISPR 13 or CISPR 22 is within the scope of CISPR 32.

MME intended primarily for professional use is within the scope of CISPR 32.

The emission requirements in CISPR 32 are not intended to be applicable to the intentional transmissions from a radio communication device operated in accordance with the ITU-R Radio Regulations, nor to any spurious emissions related to these intentional transmissions.

Equipment, for which emission requirements in the frequency range covered by CISPR 32 are explicitly formulated in other CISPR publications, are excluded from the scope of this publication.

CISPR 32 does not contain requirements for in-situ assessment.

CISPR 32 covers two classes of MME (Class A and Class B). The MME classes are specified in Clause 4.

The objectives of CISPR 32 publication are:

1. to establish requirements which provide an adequate level of protection of the radio spectrum, allowing radio services to operate as intended in the frequency range 9 kHz to 400 GHz;
2. to specify procedures to ensure the reproducibility of measurement and the repeatability of results.

CISPR 32 replaced CISPR 13 and CISPR 22 in 2017.

To fully cover all EMC phenomena that are considered applicable to the equipment under the scope of CISPR 32 the following Standards are in most cases also applicable:

- CISPR 35 *Electromagnetic Compatibility of multimedia equipment – immunity requirements*
- 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 61000-3-11 *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*

NOTE: IEC 61000-3-2, IEC 61000-3-3, IEC 61000-3-11 and IEC 61000-3-12are applicable in some regions for equipment that is intended to be connected directly to a public low-voltage network.

A.8 CISPR 35

CISPR 35	Electromagnetic Compatibility of multimedia equipment - immunity requirements

CISPR 35 applies to multimedia equipment (MME) and having a rated AC or DC supply voltage not exceeding 600 V.

MME within the scope of CISPR 20 or CISPR 24 is within the scope of CISPR 35.

MME with a broadcast reception function is within the scope of CISPR 35, see Annex A.

MME with non-broadcast wireless interfaces is also within the scope of CISPR 35, however, compliance with CISPR 35 does not require the assessment of the performance of these interfaces.

MME intended primarily for professional use is within the scope of CISPR 35.

MME for which immunity requirements in the frequency range covered by CISPR 35 are explicitly formulated in other CISPR documents (except CISPR 20 and CISPR 24) are excluded from the scope of CISPR 35.

The objectives of CISPR 35 are:

- to establish requirements which provide an adequate level of intrinsic immunity so that the MME will operate as intended in its environment in the frequency range 0 kHz to 400 GHz;
- to specify procedures to ensure the reproducibility of tests and the repeatability of results.

Due to technology convergence of the functions of MME, the performance criteria have been determined on a function-orientated basis rather than on an equipment-orientated basis.

To fully cover all EMC phenomena that are considered applicable to the equipment under the scope of CISPR 35 the following Standards are in most cases also applicable:

- CISPR 32 *Electromagnetic Compatibility of multimedia equipment- emission requirements*
- 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 61000-3-11 *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*
-

NOTE: IEC 61000-3-2, IEC 61000-3-3, IEC 61000-3-11 and IEC 61000-3-12 are applicable in some regions for equipment that is intended to be connected directly to a public low-voltage network.

A.9 CISPR 36

CISPR 36	**Electric and hybrid electric road vehicles - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers below 30 MHz**

CISPR 36 defines limits for 3 m measurement distance and methods of measurement that are designed to provide protection for off-board receivers (at 10 m distance) in the frequency range of 150 kHz to 30 MHz when used in the residential environment.

CISPR 36 applies to the emission of electromagnetic energy which might cause interference to radio reception and which is emitted from electric and hybrid electric vehicles propelled by an internal traction battery (see 3.2 and 3.3) when operated on the road. It applies to vehicles that have a traction battery voltage between 100 V and 1 000 V.

Electric vehicles to which CISPR 14-1 applies are not in the scope of CISPR 36.

It applies only to road vehicles where an electric propulsion is used for sustained speed of more than 6 km/h.

Vehicles where the electric motor is only used to start up the internal combustion engine (e.g. "micro hybrid") and vehicles where the electric motor is used for additional propulsion only during acceleration (e.g. "48 V mild hybrid vehicles") are not in the scope of CISPR 36.

The radiated emission requirements in CISPR 36 are not applicable to the intentional transmissions from a radio transmitter as defined by the ITU including their spurious emissions.

Annex B
CISPR Guidance documents

Definitions of available current CISPR documents referred to in Clause 2.5.

B.1 CISPR TR 18-1

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

CISPR TR 18-1 applies to radio noise from overhead power lines, associated equipment, and high-voltage equipment which may cause interference to radio reception. The scope of CISPR TR 18-1 includes the causes, measurement and effects of radio interference, design aspects in relation to this interference, methods and examples for establishing limits and prediction of tolerable levels of interference from high voltage overhead power lines above 1 kV and associated equipment, to the reception of radio signals and services.

The frequency range covered is 0,15 MHz to 3 GHz.

Radio frequency interference caused by the pantograph of overhead railway traction systems is not considered in CISPR TR 18-1.

B.2 CISPR TR 18-2:

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

CISPR TR 18-2 applies to radio noise from overhead power lines and high-voltage equipment above 1 kV which may cause interference to radio reception.

The frequency range covered by CISPR TR 18-2 is 0,15 MHz to 3 GHz.

A general procedure for establishing the limits of the radio noise field from the power lines and equipment is recommended, together with typical values as examples, and methods of measurement.

The clause on limits concentrates on the low frequency and medium frequency bands and it is only in these bands where ample evidence, based on established practice, is available. No examples of limits to protect radio reception in the frequency band 30 MHz to 3 GHz have been given, as measuring methods and certain other aspects of the problems in this band have not yet been fully resolved. Site measurements and service experience have shown that levels of noise from power lines at frequencies higher than 300 MHz in normal operation are so low that interference is unlikely to be caused to television reception.

The values of limits given as examples are calculated to provide a reasonable degree of protection to the reception of broadcasting at the boundary of the recognized service areas of the appropriate transmitters in the radio frequency bands used for a.m. radio broadcasting, in the least favourable conditions likely to be generally encountered. These limits are intended to provide guidance at the planning stage of the line and national standards or other specifications against which the performance of the line may be checked after construction and during its useful life.

The measuring apparatus and methods used for checking compliance with limits should comply with the respective CISPR specifications, as e.g. the basic standards series CISPR 16

B.3 CISPR TR 18-3

CISPR TR 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 TR 18-3 applies to radio noise from overhead power lines and high-voltage equipment above 1 kV which may cause interference to radio reception, excluding the fields from power line carrier signals.

The code of practice provides guidance on the techniques that may be applied during the design, construction and operation of high voltage overhead power lines and associated equipment in order to keep the various types of radio noise described in CISPR TR 18-3 within acceptable levels. The conditions of hardware and the prediction method are provided to minimize radio noise.

The frequency range covered is 0,15 MHz to 3 GHz.

Annex C
CISPR Generic EMC Standards

C.1 IEC 61000-6-3

IEC 61000-6-3	Part 6-3: Generic standards - Emission standard for residential environments

IEC 61000-6-3 is applicable only if no relevant dedicated product or product family EMC emission standard has been published.

It to electrical and electronic equipment intended for use at residential (see 3.1.14) locations. It also applies to electrical and electronic equipment intended for use at other locations that do not fall within the scope of IEC 61000-6-8 or IEC 61000-6-4.

The intention is that all equipment used in the residential, commercial and light-industrial environments are covered by IEC 61000-6-3 or IEC 61000-6-8. If there is any doubt, the requirements in IEC 61000-6-3 apply.

The conducted and radiated emission requirements in the frequency range up to 400 GHz are considered essential and have been selected to provide an adequate level of protection of radio reception in the defined electromagnetic environment. Not all disturbance phenomena have been included for testing purposes but only those considered relevant for the equipment intended to operate within the locations included within this document.

The emission requirements in IEC 61000-6-3 are not intended to be applicable to the intentional transmissions and their harmonics from a radio transmitter as defined by the ITU.

To fully cover all EMC phenomena the following other EMC related standards may apply:

- IEC 61000-6-1 *Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments*
- 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 61000-3-11 *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*

NOTE: IEC 61000-3-2, IEC 61000-3-3, IEC 61000-3-11 and IEC 61000-3-12 are applicable in some regions for equipment that is intended to be connected directly to a public low-voltage network.

C.2 IEC 61000-6-4

IEC 61000-6-4	Part 6-4: Generic standards - Emission standard for industrial environments

IEC 61000-6-4 provides EMC emission requirements applicable to electrical and electronic equipment intended for use within the environment existing at industrial locations.

IEC 61000-6-4 does not apply to equipment that falls within the scope of IEC 61000-6-3 or IEC 61000-6-8.

The environments encompassed by this document cover both indoor and outdoor locations.

Emission requirements in the frequency range 9 kHz to 400 GHz are covered in IEC 61000-6-4 and have been selected to provide an adequate level of protection of radio reception in the defined electromagnetic environment. No measurement needs to be performed at frequencies where no requirement is specified. These requirements are considered essential to provide an adequate level of protection to radio services.

Not all disturbance phenomena have been included for testing purposes but only those considered relevant for the equipment intended to operate within the environments included within IEC 61000-6-4.

Requirements are specified for each port considered.

IEC 61000-6-4 is to be used where no applicable product or product family EMC emission standard is available.

NOTE 1 Safety considerations are not covered by IEC 61000-6-4.

NOTE 2 In special cases, situations will arise where the levels specified in IEC 61000-6-4 will not offer adequate protection; for example where a sensitive receiver is used in close proximity to an apparatus. In these instances, special mitigation measures may have to be employed.

NOTE 3 Disturbances generated in fault conditions of equipment are not covered by IEC 61000-6-4.

To fully cover all EMC phenomena the following other EMC related standards may apply:

- IEC 61000-6-2 *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments*
- 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 61000-3-11 *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*

NOTE: IEC 61000-3-2, IEC 61000-3-3, IEC 61000-3-11 and IEC 61000-3-12 are applicable in some regions for equipment that is intended to be connected directly to a public low-voltage network.

C.3 IEC 61000-6-8

IEC 61000-6-8	Part 6-8: Generic standards - Emission standard for professional equipment in commercial and light-industrial locations

IEC 61000-6-8 is applicable only if no relevant dedicated product or product family EMC emission standard has been published.

It applies to electrical and electronic equipment intended for use in commercial and light-industrial locations as defined in the standard. It applies to equipment that satisfy the following restrictions of use:

- is defined as professional equipment as described in the standard,
- is professionally installed and maintained as described in the standard,
- is not intended to be used in residential locations as described in the standard.

IEC 61000-6-3 applies to electrical and electronic equipment intended for use at commercial and light-industrial locations that do not satisfy these restrictions.

The intention is that all equipment used in the residential, commercial and light-industrial environments are covered by IEC 61000-6-3 or IEC 61000-6-8. If there is any doubt, the requirements in IEC 61000-6-3 apply.

Emission requirements within the frequency range 0 Hz to 400 GHz are covered.

The conducted and radiated emission requirements in the frequency range up to 400 GHz are considered essential and have been selected to provide an adequate level of protection of radio reception in the defined electromagnetic environment. Not all disturbance phenomena have been included for testing purposes but only those considered relevant for the equipment intended to operate within the locations included within this document.

The emission requirements in IEC 61000-6-8 are not intended to be applicable to the intentional transmissions and their harmonics from a radio transmitter as defined by the ITU.

To fully cover all EMC phenomena the following other EMC related standards may apply:

- IEC 61000-6-1 *Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments*
- 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 61000-3-11 *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*

NOTE: IEC 61000-3-2, IEC 61000-3-3, IEC 61000-3-11 and IEC 61000-3-12 are applicable in some regions for equipment that is intended to be connected directly to a public low-voltage network.