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 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.

1.3 Product Standards

Product Standards define specific EM 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 and methods
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 see 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:Uncertainty in EMC measurements	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, commercial and light-industrial environments	CIS/H
IEC 61000-6-4 (see annex C.2)	Part 6-4: Generic standards - Emission standard for industrial environments	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 0)	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 20 (will be withdrawn August 2020, see annex A.6)	Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement	CIS/I
CISPR 24 (will be withdrawn August 2020, see annex A.7)	Information technology equipment - Immunity characteristics - Limits and methods of measurement	CIS/I
CISPR 25 (see annex A.8)	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.9)	EMC of multimedia equipment – Emission requirements	CIS/I
CISPR 35 (see annex A.10)	EMC of multimedia equipment – Immunity requirements	CIS/I

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	Database on the characteristics of radio services	CIS/H
IEC PAS 62437	Radio disturbance characteristics for the protection of receivers used on board vehicles, boats, and on devices - Limits and methods of measurement - Specifications for active antennas	CIS/D
IEC PAS 62825 (will expire in 2019)	Methods of measurement and limits for radiated disturbances from plasma display panel TVs in the frequency range 150 kHz to 30 MHz	CIS/I

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	20	24	32	35	Remarks
Accelerators (medical)	✓									
Agricultural machinery		✓								
Arc Welding equipment	✓									
Audio Amplifiers						✓		✓	✓	
Automatic Teller Machine							✓	✓	✓	
Battery Chargers - rectifier style	✓		✓	✓						
Battery Chargers – switch mode	✓		✓	✓						
Battery Chargers – wireless power transfer (WPT) mode	✓									
Battery powered floor 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							✓	✓	✓	
DC to DC convertor	✓									
Decoders NTSC, PAL, SECAM						✓		✓	✓	
Demultiplexers						✓		✓	✓	
Digital Still Camera							✓	✓	✓	Data processing + display + memory suggests ITE/MME
Digital Video Camera							✓	✓	✓	
EDM equipment	✓									Electro-Discharge Machining equipment
Encoders NTSC, PAL, SECAM						✓		✓	✓	
Facsimile Machine							✓	✓	✓	
FAX Modem							✓	✓	✓	
FM sound receivers						✓		✓	✓	
FM tuners						✓		✓	✓	
Forestry Equipment		✓								
Gas analyser	✓									
Ice maker			✓	✓						

Product	Applicable CISPR Standard(s)									
	11	12/25	14-1	14-2	15	20	24	32	35	Remarks
Induction cooking appliances			✓	✓						
Internal combustion engine devices: (electric generators, pumps, lawn mowers, garden tools, chain saws, etc.)		✓								
Kitchen machines			✓	✓						
LED luminaires					✓					
Local Area Network devices							✓	✓	✓	
Magnetic Tape Device							✓	✓	✓	
Magnetic Disk Device							✓	✓	✓	
Memory Device							✓	✓	✓	
Microwave oven	✓			✓						
Modem (all types)							✓	✓	✓	
MP3 player						✓	✓	✓	✓	Going by definition of product and scope of the std, CISPR 20 seems appropriate – AV equip.
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 Convertors	✓									
Power Supplies – wireless power transfer (WPT) mode	✓									
Power tools (including battery powered)			✓	✓						
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)						✓		✓	✓	
Switch mode power supplies	✓		✓	✓						
Telecommunication Terminal							✓	✓	✓	
Television receivers						✓		✓	✓	
Telephone							✓	✓	✓	
TV set-top boxes (analog or digital)						✓		✓	✓	
Video projector						✓		✓	✓	
Video recorders						✓		✓	✓	

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 or IEC 61000-6-4 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.

Equipment covered by other CISPR product and product family emission standards are excluded from the scope of 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 61000-3-2 *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 to a public low-voltage network.

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.

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).

Within CISPR 14-1 wherever the term “equipment” is used it includes the more specific terms “appliance”, “household or similar appliances”, “electric tool”, “toys” and “apparatus”.

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.

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;

– 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 radiated emission requirements in CISPR 14-1 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.

The comparable 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 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 deals with the electromagnetic immunity of appliances and similar apparatus for household and similar purposes that use electricity, as well as electric toys and electric tools, the rated voltage of the apparatus being not more than 250 V for single-phase apparatus to be connected to phase and neutral, and 480 V for other apparatus.

Apparatus may incorporate motors, heating elements or their combination, may contain electric or electronic circuitry, and may be powered by the mains, by transformer, by batteries, or by any other electrical power source.

Apparatus not intended for household use, but which nevertheless may require the immunity level, such as apparatus intended to be used by laymen in shops, in light industry and on farms, are within the scope of CISPR 14-2, as far as they are included in CISPR 14-1. In addition, the following are also included in the scope of CISPR 14-2:

- microwave ovens for domestic use and catering; – cooking hobs and cooking ovens, heated by means of r.f. energy;
- (single- and multiple-zone) induction cooking appliances;
- appliances for personal care equipped with radiators in the range from UV to IR, inclusive (this includes visible light);
- power supplies and battery chargers provided with or intended for apparatus within the scope of CISPR 14-2.

CISPR 14-2 does not apply to:

- equipment for lighting purposes;
- apparatus designed exclusively for heavy industrial purposes;
- apparatus intended to be part of the fixed electrical installation of buildings (such as fuses, circuit breakers, cables and switches);
- apparatus intended to be used in locations where special electromagnetic conditions prevail, such as the presence of high electromagnetic fields (for example in the vicinity of a broadcast transmitting station), or where high pulses occur on the power network (such as in a power generator station);
- radio and television receivers, audio and video equipment, and electronic music instruments other than toys;
- medical electrical appliances;
- personal computers and similar equipment other than toys;
- radio transmitters;
- apparatus designed to be used exclusively in vehicles;
- baby surveillance systems.

CISPR 14-2 covers immunity requirements in the frequency range 0 Hz to 400 GHz.

The effects of electromagnetic phenomena relating to the safety of apparatus are excluded from CISPR 14-2 and are covered by other standards, for example in the IEC 60335 series.

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

NOTE 1 Attention is drawn to the fact that additional requirements can be necessary for apparatus intended to be used on board ships or aircraft.

The object of CISPR 14-2 is to specify the immunity requirements for apparatus defined in the scope in relation to continuous and transient conducted and radiated electromagnetic disturbances, including electrostatic discharges.

These requirements represent essential electromagnetic compatibility immunity requirements.

NOTE 2 In special cases, situations will arise where the level of disturbances may exceed the test values specified in CISPR 14-2. In these instances special mitigation measures may have to be employed.

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

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:

- all lighting equipment with a primary function of generating and/or distributing light intended for illumination purposes, and intended either for connection to the low voltage electricity supply or for battery operation;
- the lighting part of multi-function equipment where one of the primary functions is illumination;
- independent auxiliaries exclusively for use with lighting equipment;
- UV and IR radiation equipment;
- neon advertising signs;
- street/flood lighting intended for outdoor use only;
- transport lighting (installed in buses, trains, etc.).

Excluded from the scope of CISPR 15 are :

- auxiliaries intended to be built into lighting equipment,
- lighting equipment operating in the ISM frequency bands (as defined in resolution 63 (1979) of the ITU Regulation),
- lighting equipment for aircraft and airports
- apparatus for which electromagnetic compatibility requirements in the radio frequency range are explicitly formulated in other CISPR Standards, even if they incorporate a built-in lighting function.

NOTE 1 Examples of exclusions are:

- built-in lighting devices for display back lighting;
- range hoods, refrigerators, freezers;
- photocopiers, projectors;
- lighting equipment for road vehicles.

The frequency range covered is 9 kHz to 400 GHz.

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.

NOTE 2 Examples of equipment with a secondary lighting function can be range hoods, fans, refrigerators, freezers, ovens and TV with ambient lighting.

The limits in CISPR 15 have been determined on a probabilistic basis to keep the suppression of disturbances within economically reasonable limits while still achieving an adequate level of radio protection and electromagnetic compatibility. In exceptional cases, additional provisions may be required.

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 to a public low-voltage network.

A.6 CISPR 20

CISPR 20	Sound and television broadcast receivers and associated equipment – Immunity characteristics – Limits and methods of measurement

At the time of publication of this document, CISPR 35 may be applied instead of CISPR 20. CISPR 35 will replace CISPR 20 in August 2020 when CISPR 20 will be withdrawn.

CISPR 20 is applicable to sound and television receivers for the reception of broadcast and similar services for terrestrial, cable and satellite transmissions and associated equipment, including e.g.:

- FM sound receivers;
- Car radios;
- Television receivers;
- Associated equipment with RF modulator;
- FM tuners;
- Tuners units at the first satellite intermediate frequency;
- Frequency converters;
- Radio-frequency amplifiers;
- Equalisers;
- Demodulators;
- Decoders for NTSC, PAL or SECAM;
- Encoders for NTSC, PAL or SECAM;
- Demultiplexers;
- D/A converters;
- Audio amplifiers;
- Active loudspeaker units;
- Record players;
- Compact disc players;
- Audio magnetic recording and playback equipment;
- Video recorders;
- Electronic organs.

CISPR 20 is **not** applicable to:

- Equipment included in CATV distribution networks;
- Information Technology Equipment (ITE);
- Professional receivers;
- Amateur receivers and transmitters;
- Telecommunication receivers;
- Telecommunication cordless transceivers;
- Radiofrequency remote control appliances;
- Apparatus for which immunity requirements are explicitly formulated in other IEC or CISPR Standards.

The comparable emission Standard is CISPR 32.

To fully cover all EMC phenomena that are considered applicable to the equipment under the scope of CISPR 20 the following Standards are in most cases also applicable:

- CISPR 32 *EMC 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*.

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

A.7 CISPR 24

CISPR 24	Information technology equipment – Immunity characteristics – Limits and methods of measurement

At the time of publication of this document, CISPR 35 may be applied instead of CISPR 24. CISPR 35 will replace CISPR 24 in August 2020 when CISPR 24 will be withdrawn.

CISPR 24 is applicable to the radiated and conducted immunity of Information technology equipment (ITE), examples of which include the following:

- Telecommunication Terminal
- Telephone
- Facsimile Machine
- Data Processing Equipment
- Data Display
- CRT, plasma, LED
- Liquid crystal
- Data Input Device
- Keyboard, mouse
- Magnetic card reader
- Optical character reader
- Image scanner, pen
- Data Printer
- Dot matrix, laser, LED
- Data Plotter
- Data Processor
- Computer, calculator
- Local Area Network
- Data Storage Device
- Data Scanner
- Character Reader
- Copying Machine
- Automatic Teller Machine
- Point of Sale Terminal
- Magnetic Tape Device
- Magnetic Disk Device
- Optical Disk Device
- CD-ROM, DVD-ROM
- Memory Device
- FAX Modem
- Modem

To fully cover all EMC phenomena that are considered applicable to the equipment under the scope of CISPR 24 the following Standards are in most cases also applicable:

- CISPR 32 *EMC 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*

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

A.8 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.9 CISPR 32

CISPR 32	EMC 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.

Equipment 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 radiated emission requirements in CISPR 32 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.

Equipment, for which emission requirements in the frequency range covered by CISPR 32 are explicitly formulated in other CISPR publications (except CISPR 13 and CISPR 22), 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 20 *Sound and television broadcast receivers and associated equipment – Immunity characteristics – Limits and methods of measurement*
- CISPR 24 *Information technology equipment – Immunity characteristics – Limits and methods of measurement*
- CISPR 35 *EMC 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*

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

A.10 CISPR 35

CISPR 35	EMC 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.

At the time of publication of this document, CISPR 35 may be applied instead of CISPR 20 and/or CISPR 24. CISPR 35 will replace CISPR 20 and CISPR 24 in August 2020.

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 *EMC 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*

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

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 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 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 which may cause interference to radio reception, excluding the fields from power line carrier signals.

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, commercial and light-industrial environments**

IEC 61000-6-3 provides EMC emission requirements applicable to electrical and electronic apparatus intended for use in residential, commercial and light-industrial environments.

Emission requirements in the frequency range 0 Hz to 400 GHz are covered. No measurement needs to be performed at frequencies where no requirement is specified.

This generic EMC emission standard is applicable only if no product or product-family EMC emission standard exists.

IEC 61000-6-3 applies to apparatus intended to be directly connected to a low-voltage public mains network or connected to a dedicated DC power source, which is intended to interface between the apparatus and the low-voltage public mains network. IEC 61000-6-3 applies also to apparatus which is battery operated or is powered by a non-public, but non-industrial, low-voltage power distribution system if this apparatus is intended to be used in the locations described below.

The environments encompassed by IEC 61000-6-3 are residential, commercial and light-industrial locations, both indoor and outdoor. The following list, although not comprehensive, gives an indication of locations that are included:

– residential properties, for example houses, apartments;

– retail outlets, for example shops, supermarkets;

– business premises, for example offices, banks;

– areas of public entertainment, for example cinemas, public bars, dance halls;

– outdoor locations, for example petrol stations, car parks, amusement and sports centres;

– light-industrial locations, for example workshops, laboratories, service centres.

Locations that are characterised by being supplied directly at low voltage from the public mains network are considered to be residential, commercial or light-industrial.

The object of IEC 61000-6-3 is to define the emission test requirements for apparatus defined in the scope in relation to continuous and transient conducted and radiated disturbances.

The emission requirements have been selected so as to ensure that disturbances generated by apparatus operating normally in residential, commercial and light-industrial locations do not exceed a level which could prevent other apparatus from operating as intended. Fault conditions of apparatus are not taken into account. Not all disturbance phenomena have been included for testing purposes in IEC 61000-6-3 but only those considered as relevant for the equipment covered by IEC 61000-6-3. These requirements represent essential electromagnetic compatibility emission requirements.

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*

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 apparatus intended for use in industrial locations.

IEC 61000-6-3 does not apply to equipment that fall within the scope of IEC 61000-6-3.

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*