



INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE (CISPR)
STEERING COMMITTEE

Subject: Environment Definitions used in CISPR Publications

(updated December 2020)

1. Introduction

It is recognised that definitions of environments are not the same in CISPR standards and there has been discussion in CISPR initiated by the circulation of CISPR/1314/DC. The reasons for the development of the current definitions should be given to explain these inconsistencies. This document has been prepared to identify the specific ways in which the definitions of environments are used in each of the major CISPR subcommittee publications.

The information presented describes the rationale for retaining the way in which the environments are identified and which set of limits apply. This can help CISPR subcommittees and users of CISPR publications to understand what the experts in working groups had in mind when selecting the environments named in the standards. This should allow the continued use of the terms “residential” and “industrial” to describe environments as well as the future use of the terms “commercial” and “light industrial”. The information should also help manufacturers and their customers, as well as regulatory authorities, to understand the application of the environments and the associated limits.

2. Current use of environmental classifications or definitions

This section describes the environmental definitions that each CISPR subcommittee currently uses in its publications. The similarities and differences between definitions will become apparent for each product category.

2.1 CISPR/A (Measurement methods, instrumentation, and statistical techniques)

CISPR/A is responsible for basic standards and therefore does not define or use definitions for environments.

2.2 CISPR/B (Industrial, Scientific and Medical equipment)

CISPR/B bases the selection of limits on the environment in which the product is designed to be located. CISPR 11 requires class B emission limits to be applied to equipment for use in locations in residential environments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes. For equipment used in locations other than these the class A limit may be applied. The differentiation between application of the limits is not based on the distance from broadcast receivers but instead on the product’s connection to the public mains network.

2.3 CISPR/D (Automotive EMC)

CISPR/D uses a definition for residential environment in CISPR 12 and in CISPR 36:

Residential Environment

environment having a 10 m protection distance between the source and the point of radio reception.

NOTE Examples of a residential environment include rooming houses, private dwellings, entertainment halls, theatres, schools, public streets, etc.

2.4 CISPR/F (Appliances and lighting EMC)

CISPR/F does not restrict the environment to those commonly used by the other product committees. The reason for this is that lighting and appliances (products) are used everywhere. In its three product standards (CISPR 14-1, 14-2, and 15), CISPR/F does not base the selection of limits on the environment in which the product is designed to be located. However, CISPR 15 does exclude some types of lighting equipment which fall into the scope of CISPR 11.

2.5 CISPR/H (Generic Emission Limits)

CISPR/H uses definitions of environments in its generic emission standards IEC 61000-6-3 and IEC 61000-6-4. These definitions of environments are currently under revision in line with the definitions adopted by IEC TC 77 in the new generic immunity standards IEC 61000-6-1 and IEC 61000-6-2.

2.5.1 IEC 61000-6-3:2020. Generic standards – Emission standard for equipment in residential environments

This standard states in its scope:

This part of IEC 61000 for emission requirements applies to electrical and electronic equipment intended for use at residential (see 3.1.14) locations.

And

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 following definition is given:

Residential locations

residential locations include areas of land designated for domestic dwellings. Domestic dwellings are places for one or more people to live. The mains power within these locations is directly connected to the low-voltage public mains network

Note 1 to entry: Examples of residential locations are: houses, apartments, farm buildings housing people.

Note 2 to entry: A dwelling can be a single building, separate building or a separate section of a larger building.

Note 3 to entry: Within these locations it is expected to operate a radio receiver within a distance of 10 m from the equipment.

2.5.2 IEC 61000-6-8:2020. Generic standards – Emission standard for professional equipment in commercial and light-industrial locations

This standard states in its scope:

This part of IEC 61000 for emission requirements applies to electrical and electronic equipment intended for use in commercial and light-industrial (see 3.1.3) locations.

And

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 following definition is given:

commercial and light-industrial locations

locations which are not residential in accordance with Clause 3.1.16, where the mains supply is directly connected to the low-voltage public network or connected to a dedicated DC source

which is intended to interface between the equipment and the low-voltage public mains network.

Note 1 to entry: Examples of commercial or light-industrial locations are:

- *retail outlets*
- *business premises*
- *areas of public entertainment*
- *places of worship*
- *outdoor locations*
- *general public locations*
- *hospitals, educational institutions*
- *public traffic area, railway stations, and public areas of an airport*
- *specific common area of buildings, such as basements, control rooms, electrical service areas*
- *workshops, laboratories, service centres*

Note 2 to entry: Within these locations it is expected to operate a radio receiver within a distance of 30 m from the equipment. The risk of interference will be minimized by following the instructions defined in Clause 6.

2.5.3 IEC 61000-6-4:2018

This standard states in its scope:

This part of IEC 61000 for emission requirements applies to electrical and electronic equipment intended for use within the environment existing at industrial (see 3.1.12) locations.

The following definition is given:

industrial location

location characterized by a separate power network, supplied from a high- or medium-voltage transformer, dedicated for the supply of the installation

Note 1 to entry: Industrial locations can generally be described by the existence of an installation with one or more of the following characteristics:

- *items of equipment installed and connected together and working simultaneously;*
- *significant amount of electrical power generated, transmitted and/or consumed;*
- *frequent switching of heavy inductive or capacitive loads;*
- *high currents and associated magnetic fields;*
- *presence of industrial, high power scientific and medical (ISM) equipment (for example, welding machines).*

The electromagnetic environment at an industrial location is predominantly produced by the equipment and installation present at the location. There are types of industrial locations where some of the electromagnetic phenomena appear in a more severe degree than in other installations.

Example locations include metalworking, pulp and paper, chemical plants, car production, farm building, high-voltage areas of airports

Note 2 to entry: The connection between location and electromagnetic environment is given in 3.1.13.

2.6 CISPR/I (Multimedia equipment and receivers)

CISPR/I bases the selection of limits on the environment in which the product is designed to be located.

CISPR 32 mentions the residential environment and associates it with the application of class B limits. Class A limits are applied to products operating elsewhere. However, no definition of the residential environment is provided in the CISPR 32 (i.e. there is no reference to the distance from broadcast receivers as differentiation of the environment).

3. Rationale for the differences

This section gives the basis for maintaining the current approach to defining environments and associated limits.

3.1 CISPR/A

CISPR/A does not engage in defining environments and limits

3.2 CISPR/B

Besides the definitions described in 2.2, there were no instances in the past which led CISPR/B to define the environment selected to apply to a particular set of limits. Extensive background to the setting of limits by CISPR/B is given in the references listed in section 5.

3.3 CISPR/D

In the 1940s and 1950s there was concern with interference to television reception. The limit to apply was established taking into account the sensitivity of the TV receiver and by considering the signal strength of an interfering signal caused by a vehicle passing by a home with a TV antenna at a distance of separation such as 10 m. A vehicle stationed in a driveway or garage causing interference may have less separation, but it would probably be the car owner possibly interfering with their own TV.

In the 1960s and 1970s the concerns moved to interference with mobile communications, which obviously has closer coupling. Again, the levels were set to protect the majority of receivers, knowing that some of the more sensitive ones would experience interference. This was also the time that communication intelligibility was introduced: i.e. a little background noise was acceptable so long as the message could be understood.

3.4 CISPR/F

CISPR/F considered several ways to indicate what environments they considered to be important:

- Products in the scope of CISPR 14-1 and CISPR 14-2 are intended to be used in residential, commercial and light industry environment.
- Products in the scope of CISPR 15 are intended to be used in all environments. The limits have been selected to cover the needs of these environments.
- Up to now it was not accepted in CISPR/F to establish an additional set of limits for industrial environment for these standards.
- Other selection criteria include the type of ports, the type of product and the technologies inside the product (clock frequencies).
- For lighting equipment one selection criteria was the likelihood that this equipment will be used in proximity to other environments for example street lights in residential areas.

3.5 CISPR/H

CISPR/H bases the selection of limits on the environment in which the product is designed to be located. This approach was adopted from the CENELEC generic emission standards EN 50081-1 "Generic emission standard. Residential, commercial and light industry" and EN 50081-2 "Generic emission standard. Industrial environment", which were published before the IEC generic standards.

Since the introduction of the Generic Standards, there has always been discussion about the limits to be applied to the commercial and light industrial environment because different limits have been applied in the product standards for these environments. The table below gives a summary of the limits applied in the present CISPR publications with the "comment" column showing the rationale for application of the limits in the different environments.

Standard	Product Type	Environments where <u>Class B</u> limits apply	Environments where <u>Class A</u> limits apply	Comment
IEC 61000-6-3 IEC 61000-6-4 IEC 61000-6-8	Generic	Equipment intended primarily for use in a residential environment shall meet the Class B limits.	All other equipment	IEC 61000-6-3 used to cover residential, commercial and light industrial environments. In 2020 it was limited to residential environments only and a new standard, IEC 61000-6-8 published to cover commercial and light industrial environments. Class A shall have a warning notice.
CISPR 32	MME	Intended primarily to be used in the domestic environment.	All other locations	Class A equipment shall have a warning notice.
CISPR 11 Group 1 Power <20kVA	ISM	Equipment used in the residential environment and connected to the low voltage public network. Equipment connected to the low voltage public network where this network may also supply buildings used for domestic purposes.	All other equipment	Class A shall have a warning notice. This standard also includes further classifications for other equipment types, mostly depending on the power rating.
CISPR 14-1	Household Appliances Power Tools	No definition is provided. Standard contains one set of limits which are equivalent to the limits for class B equipment.	Not needed	These are home appliances and therefore they are typically used within the domestic environment.

3.6 CISPR/I

There were no recent instances which led CISPR/I to change the definition of the environment and its associated limits. The choice of environments was made many years ago and the rationale is not on record.

4. Coordination of use of definitions

This section identifies the coordination among subcommittees to use the same environment definitions and the associated limits. It also shows that the coordination was not complete.

4.1 CISPR/A

CISPR/A does not coordinate definition use.

4.2 CISPR/B

There has been no discussion in CISPR/B of possible coordinated use of environments similar to those used in the other product committees. However the limits for Class A and Class B are identical to those used in the other product committee standards. This is because CISPR/B has used its environment classification for decades and no request has been received to coordinate it with other standards.

4.3 CISPR/D

There has been discussion of possible coordinated use of similar environments and associated limits in CISPR/D standards. The question was raised by Australia concerning a common definition across all standards. The minutes from Frankfurt recorded "The chairman was asked to forward the question related to the definition of residential environment to the CISPR management."

4.4 CISPR/F

There has been no discussion of possible coordinated use of similar environments and associated limits in CISPR/F in its product standards.

CISPR/F considers that no coordination is necessary because it is and was not planned to use limits for industrial environments since the products are intended for either residential environment (CISPR 14) or for all environments (CISPR 15).

4.5 CISPR/H

There has been discussion about possibly coordinating the use of similar environments and associated limits in CISPR/H in its generic standards. The outcome is to revise the Generic standards in order to apply Class A limits to Commercial and light industrial environments under certain conditions (e.g. no presence of broadcast receivers).

While there is no coordination with product committees so far, the revised Generic standards take into consideration the limits applied in the various environments by the CISPR product standards (see table above).

4.6 CISPR/I

There has been discussion of possible coordinated use of similar environments and associated limits in CISPR/I in its product standards. During the drafting of CISPR 32 alignment with CISPR H was discussed which involves moving light industrial and commercial from class A (CISPR I) into class B (CISPR H), but this was not supported. This coordination was carried out through CISPR Steering and was reported back to CISPR/I by the Chair of CISPR/I.

5. References

There are many references, some of which date back decades. It is expected that as those relating to the use of environments are uncovered they will be added to the list below.

CISPR/B/WG1(Sec)91-3

CCIR, XVII Plenary Assembly Duesseldorf, 1990, Reports of the CCIR 1990, Annex to volume I, Spectrum utilization and monitoring, Section 1D - Spectrum utilization and applications: Report 1104 - Limitation of radiation from Industrial, Scientific and Medical (ISM) equipment, pp. 703 to 730

CISPR 11:2015 + AMD1:2016 + AMD2:2019 and all previous editions

CISPR 12:2007+AMD1:2009 and all previous editions

CISPR 13:2009+AMD1:2015 and all previous editions (withdrawn)

CISPR 14-1:2016 and all previous editions

CISPR 14-2:2015 and all previous editions

CISPR 15:2013+AMD1:2015 and all previous editions

CISPR 22:2008 and all previous editions (withdrawn)

CISPR 32:2015 and all previous editions

CISPR 36:2020

IEC 61000-6-3:2020 and all previous editions

IEC 61000-6-4:2018 and all previous editions

IEC 61000-6-8:2020

6. Future Action

There has been continued discussion of making consistent use of environment definitions and the associated limits. Each subcommittee has indicated what their approach will be as shown below.

6.1 CISPR/A

CISPR/A plans no future action on environmental definitions

6.2 CISPR/B

CISPR/B is not planning any action to move towards further coordination with other subcommittees to harmonize the use of environment definitions.

6.3 CISPR/D

CISPR/D is not planning any action to move towards further coordination with other subcommittees to harmonize the use of environment definitions.

6.4 CISPR/F

CISPR/F will participate in any discussions on consistent use of environmental definitions. The coordinated definition of residential, commercial, light industry and industrial to be used commonly in all CISPR standards might be a benefit. However, for CISPR/F it is not required since only one set of limits is used.

CISPR/F notes that the current terms, classes and definitions associated with environments used in different EMC product and basic standards are very diverse. Also differences between environments and limits in emission and immunity are different and have generally no relation. It is important, as a first step to understand all these differences. Coordination (harmonisation/equalisation of limits, classes etc) should not become mandatory for all products/applications.

6.5 CISPR/H

Suggested action is that CISPR 32 and CISPR 11 require alignment. In the ongoing work with the generic standards, CISPR/H has moved away from the concept of a distance between a broadcast receiver and the test product as a means of defining the environment. CISPR scope calls for protection of radio reception in general, so the term "radio reception" is now in use.

6.6 CISPR/I

The Chair of CISPR/I noted that there have been discussions in CISPR Steering to try set a policy, or to ask sub-committees to explain discrepancies with the generics. It is suggested that Steering need to decide on a policy and ask National Committees to vote on it (at CISPR and SC level).

7.0 Summary:

This document presents information about the development and use of the different definitions of environments in CISPR publications. It may be cited in each product committee or the appropriate sections of product standards. The CISPR Steering Committee will take the lead in asking each subcommittee to address this information in the next editions of their product standard(s).