



Limits of electromagnetic interference from overhead a.c. powerlines and high voltage equipment installations in the frequency range 0.15 MHz to 3000 MHz



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- Australian Information Industry Association
- Consumer Electronics Supplier Association
- Curtin University of Technology
- Department of Defence, Australia
- Electrical Compliance Testing Association
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- Engineers Australia
- Free TV Australia
- Lighting Council Australia
- National Measurement Institute
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- Lighting Council New Zealand
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-

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Australian Standard[®]

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from overhead a.c. powerlines and high
voltage equipment installations in the
frequency range 0.15 MHz to 3000 MHz**

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PREFACE

This Standard was prepared by the Australian members of Joint Standards Australia/Standards New Zealand Committee TE-003, Electromagnetic Compatibility, to supersede AS/NZS 2344:1997 *Limits of electromagnetic interference from overhead a.c. powerlines and high voltage equipment installations in the frequency range 0.15 MHz to 1000 MHz* and its Amendment 1 in 2007.

The objective of this Standard is to establish limits for electromagnetic interference (radio disturbance) from alternating current (a.c.) overhead powerlines and high voltage (HV) equipment installations in the frequency range 0.15 MHz to 3000 MHz. Significant changes incorporated in this edition include but are not limited to the following:

- (a) The limits above 30 MHz have reduced and aligned with those of the CISPR product standards.
- (b) The measurement distances from overhead power lines have been modified to align with generally accepted easement widths of the Network Service Providers in Australia.

This Standard only deals with the Australian region (see Figure 1 in this Standard), not all regions internationally. This follows the decision of IEC CISPR not to proceed with an international standard, and the decision of Standards New Zealand to develop their own region-specific Standard in 2004.

Appendix B from the amendment of 2007 has been taken into the main body of this revision.

Statements expressed in Notes to Tables are deemed to be normative requirements of this Standard.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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STANDARDS AUSTRALIA

Australian Standard

Limits of electromagnetic interference from overhead a.c. powerlines
and high voltage equipment installations in the frequency range 0.15
MHz to 3000 MHz

1 SCOPE AND APPLICATION

1.1 Scope

This Standard establishes limits for electromagnetic interference (radio disturbance) from alternating current (a.c.) overhead powerlines and high voltage (HV) equipment installations in the frequency range 0.15 MHz to 3000 MHz. The limits are specified in accordance with geographical zones and coverage areas. Australia is situated in Region 3 and the various coverage areas within Zones A, B and C of Region 3 are shown in Figure 1. These limits are specified for the protection of broadcast radio reception and other radio communication services, including navigation and safety-of-life services.

The limits assume the powerlines and equipment installations have a defined corridor or boundaries within which radio reception cannot be guaranteed and where special measures may be taken.

Outside these boundaries, a satisfactory level of reception, as defined by the International Telecommunication Union (ITU), can be expected.

Limits for single components of powerlines and equipment installations are under consideration.

1.2 Application

This publication applies to a.c. powerlines and high voltage equipment installations used in power systems for the generation, transmission and distribution of electric energy.

The limits herein apply to both the incidental radiation of radio frequencies fortuitously generated by the power system and to radio frequencies borne by the system.

Compliance of individual system components to the limits stated for these components does not imply compliance with system limits. However, the compliance of a component with its respective limit is a guide to the likely performance of the component when incorporated into a power system and a quantitative measure of electromagnetic interference quality for design and contractual purposes.

The limits set down herein are achievable by powerlines and high voltage installations with components in good working condition. Radio disturbance generated by faulty components (i.e. bad contacts or cracked insulators) may be expected to exceed these limits.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS/NZS CISPR

- 11 Industrial, scientific and medical equipment—Radio-frequency disturbance characteristics—Limits and methods of measurement
- 16 Specification for radio disturbance and immunity measuring apparatus and methods
- 16.1.1 Part 1.1: Radio disturbance and immunity measuring apparatus—Measuring apparatus

CISPR TR

18 Radio interference characteristics of overhead powerlines and high-voltage equipment

18-2 Part 2: Methods of measurement and procedure for determining limits

ISO/IEC

98 Uncertainty of measurement

98-3 Part 3: Guide to the expression of uncertainty in measurement

ITU

P.372-12 (07/2015) Radio Noise

3 DEFINITIONS AND ACRONYMS

3.1 Definitions

For the purpose of this Standard, the definitions below apply.

3.1.1 Corridor

Abstract pathway beneath and alongside an overhead powerline or high voltage equipment installation within which the reception of broadcast and radio communication services is not protected from radio disturbance generated by the line or high voltage equipment.

3.1.2 Easement (also known as right-of-way)

Pathway beneath and alongside an overhead powerline over which the owner or operator of the overhead line has legal entitlement, e.g. ownership, access to or control of land usage.

3.1.3 Fair weather

Dry conditions in which no rain or snow has fallen in the previous 24 h period and no perceptible residue of snow, ice or water remains on the line, insulators or other live apparatus.

3.1.4 Fog or mist

Microscopic water droplets suspended in air which reduce visibility to less than 1 km.

3.1.5 Ice

Frozen water deposits.

3.1.6 Installation

Set of permanently fixed high voltage (HV) equipment.

3.1.7 Protection distance (corridor boundary)

Distance beyond which radio reception is protected from radio disturbance from the line or high voltage equipment.

3.1.8 Protection ratio

Minimum value of the wanted to unwanted signal ratio, usually expressed in decibels at the receiver input, determined under specified conditions so that a specified reception quality of the wanted signal is achieved at the receiver output.

3.1.9 Rain

Precipitation of 0.6 mm or more per hour.

3.1.10 Snow

Precipitation of ice crystals, isolated or agglomerated, which is falling or has fallen from cloud.

3.1.11 System voltage

Nominal phase-to-phase r.m.s. voltage of the power system.

3.1.12 Urban area

Any area (such as a village, town or city) having a population of greater than 2000 people.

3.1.13 Useable signal strength

Minimum value of the field strength necessary to permit a desired reception quality, under specified receiving conditions, in the presence of natural and man-made noise and interference, either in an existing situation or as determined by agreements and frequency plans.

3.2 Acronyms

The following acronyms are used in this Standard:

- (a) *a.m.*—amplitude modulation.
- (b) *h.f.*—high frequency 3 MHz to 30 MHz.
- (c) *l.f.*—low frequency 30 kHz to 0.3 MHz.
- (d) *m.f.*—medium frequency 0.3 MHz to 3 MHz.
- (e) *r.m.s.*—root mean square.
- (f) *v.h.f.*—very high frequency 30 MHz to 300 MHz.
- (g) *u.h.f.*—ultra high frequency 300 MHz to 3000 MHz.

4 OPERATING CONDITIONS

The limits specified cover the normal operation of the power system including variations of voltage, load and the environment.

5 LIMITS

5.1 Overhead power lines and HV equipment installations, 0.15 MHz to 30 MHz

The ITU(R) specifies minimum broadcast signal levels to be protected for the regions and climatic zones of the world. These regions and zones are illustrated in Figure 1. Using the recommendations for Region 3 (Australia) as a base, a protection ratio of 30 dB has been applied to arrive at levels of maximum permissible radio noise disturbance for the satisfactory reception of broadcast radio in this region.

NOTE: An explanation of limit derivation is contained in Appendix A.

Limits are given in Table 1 for the radio disturbance field strength at the corridor boundary of the line being measured or 30 m from an installation boundary. Where no protection distance is defined, the default distance given in Table 3 applies.