



MALAYSIAN STANDARD

MS CISPR 18-1:2003

RADIO INTERFERENCE CHARACTERISTICS OF OVERHEAD POWER LINES AND HIGH- VOLTAGE EQUIPMENT PART 1: DESCRIPTION OF PHENOMENA (CISPR 18-1:1982, IDT)

ICS: 33.100.01

Descriptors: radio interference, characteristic, overhead power lines, high voltage equipment, phenomena

© Copyright 2003

DEPARTMENT OF STANDARDS MALAYSIA

DEVELOPMENT OF MALAYSIAN STANDARDS

The **Department of Standards Malaysia (DSM)** is the national standardisation and accreditation body.

The main function of the Department is to foster and promote standards, standardisation and accreditation as a means of advancing the national economy, promoting industrial efficiency and development, benefiting the health and safety of the public, protecting the consumers, facilitating domestic and international trade and furthering international cooperation in relation to standards and standardisation.

Malaysian Standards are developed through consensus by committees which comprise of balanced representation of producers, users, consumers and others with relevant interests, as may be appropriate to the subject in hand. To the greatest extent possible, Malaysian Standards are aligned to or are adoption of international standards. Approval of a standard as a Malaysian Standard is governed by the Standards of Malaysia Act 1996 (Act 549). Malaysian Standards are reviewed periodically. The use of Malaysian Standards is voluntary except in so far as they are made mandatory by regulatory authorities by means of regulations, local by-laws or any other similar ways.

The Department of Standards appoints **SIRIM Berhad** as the agent to develop Malaysian Standards. The Department also appoints SIRIM Berhad as the agent for distribution and sale of Malaysian Standards.

For further information on Malaysian Standards, please contact:

Department of Standards Malaysia
Level 1 □ 2, Block C4, Parcel C
Federal Government Administrative Centre
62502 Putrajaya
MALAYSIA

Tel: 60 3 88858000
Fax: 60 3 88885060

<http://www.dsm.gov.my>

E-mail: central@dsm.gov.my

OR **SIRIM Berhad**
(Company No. 367474 - V)
1, Persiaran Dato□ Menteri
P.O. Box 7035, Section 2
40911 Shah Alam
Selangor D.E.
Tel: 60 3 5544 6000
Fax: 60 3 5510 8095

<http://www.sirim.my>

Committee representation

The Electrotechnical Industry Standards Committee (ISC E) under whose supervision this Malaysian Standard was developed comprises representatives from the following organisations:

Department of Standards Malaysia
Federation of Malaysian Consumers Association
Federation of Malaysian Manufacturers
Jabatan Kerja Raya
Malaysian Electrical Appliances and Distributors Association
Malaysian Electric Cables and Wires Association
Ministry of Domestic Trade and Consumer Affairs
Pusat Tenaga Malaysia
Suruhanjaya Komunikasi dan Multimedia Malaysia
Suruhanjaya Tenaga
The Electrical and Electronics Association of Malaysia
The Institution of Engineers, Malaysia
Universiti Teknologi Malaysia

The Technical Committee on Electromagnetic Compatibility which developed this Malaysian Standard consists of representatives from the following organisations:

Federation of Malaysian Manufacturers
Ministry of Domestic Trade and Consumer Affairs
SIRIM Berhad (Secretariat)
SIRIM QAS Sdn Bhd
Suruhanjaya Komunikasi dan Multimedia Malaysia
Suruhanjaya Tenaga
Tenaga Nasional Berhad Research Sdn Bhd
The Electrical and Electronics Association of Malaysia
The Institution of Engineers, Malaysia
Universiti Teknologi Malaysia

MS CISPR 18-1:2003

NATIONAL FOREWORD

This Malaysian Standard was developed by the Technical Committee on Electromagnetic Compatibility under the authority of the Electrotechnical Industry Standards Committee.

This Malaysian Standard is identical with CISPR 18-1:1982, Radio interference characteristics of overhead power lines and high-voltage equipment Part 1: Description of phenomena, published by the International Electrotechnical Commission (IEC). The text of the IEC Standard is recommended for publication as a Malaysian Standard without deviation. However, for the purposes of this Malaysian Standard, the following apply:

- a) in the source text, "this IEC Standard" should read "this Malaysian Standard"
- b) the comma which is used as a decimal sign (if any), to read as a full point; and
- c) the basic CISPR 18-1 is printed in English and French languages. However, only the English version on odd pages is retained for this Malaysian Standard.

Compliance with a Malaysian Standard does not of itself confer immunity from legal obligations.

NOTE. IDT on the front cover indicates an identical standard i. e. a standard where the technical content, structure, wording and presentation of a Malaysian Standard is exactly the same as in an International Standard or is identical in technical content and it may contain the minimal editorial changes specified in clause 4.2 of ISO/IEC Guide 21.

COMMISSION
ÉLECTROTECHNIQUE
INTERNATIONALE

CISPR 18-1

Première édition
First edition
1982

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMITÉ INTERNATIONAL SPÉCIAL DES PERTURBATIONS RADIOÉLECTRIQUES
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**Caractéristiques des lignes et des équipements
à haute tension relatives aux perturbations
radioélectriques**

Première partie:
Description des phénomènes

**Radio interference characteristics
of overhead power lines
and high-voltage equipment**

Part 1:
Description of phenomena



Numéro de référence
Reference number
CEI/IEC CISPR 18-1: 1982

Révision de la présente publication

Le contenu technique des publications de la CEI et du CISPR est constamment revu par la Commission et par le CISPR afin qu'il reflète bien l'état actuel de la technique.

Les renseignements relatifs à des questions à l'étude et des travaux en cours entrepris par le comité technique qui a établi cette publication, ainsi que la liste des publications établies, se trouvent dans les documents ci-dessous:

- «Site web» de la CEI*
- **Catalogue des publications de la CEI**
Publié annuellement et mis à jour régulièrement
(Catalogue en ligne)*
- **Bulletin de la CEI**
Disponible à la fois au «site web» de la CEI* et comme périodique imprimé

Terminologie utilisée dans la présente publication

Seuls sont définis ici les termes spéciaux se rapportant à la présente publication.

En ce qui concerne la terminologie générale, le lecteur se reportera à la CEI 60050: *Vocabulaire Electrotechnique International* (VEI), qui est établie sous forme de chapitres séparés traitant chacun d'un sujet défini, l'Index général étant publié séparément. Des détails complets sur le VEI peuvent être obtenus sur demande.

Pour les termes concernant les perturbations radio-électriques, voir le chapitre 902.

Symboles graphiques et littéraux

Pour les symboles graphiques, les symboles littéraux et les signes d'usage général approuvés par la CEI, le lecteur consultera:

- la CEI 60027: *Symboles littéraux à utiliser en électrotechnique;*
- la CEI 60617: *Symboles graphiques pour schémas;*

Les symboles et signes contenus dans la présente publication ont été soit tirés de la CEI 60027 ou CEI 60617, soit spécifiquement approuvés aux fins de cette publication.

* «Site web» de la CEI <http://www.iec.ch>

Revision of this publication

The technical content of IEC and CISPR publications is kept under constant review by the IEC and CISPR, thus ensuring that the content reflects current technology.

Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is to be found at the following IEC sources:

- **IEC web site***
- **Catalogue of IEC publications**
Published yearly with regular updates
(On-line catalogue)*
- **IEC Bulletin**
Available both at the IEC web site* and as a printed periodical

Terminology used in this publication

Only special terms required for the purpose of this publication are defined herein.

For general terminology, readers are referred to IEC 60050: *International Electrotechnical Vocabulary* (IEV), which is issued in the form of separate chapters each dealing with a specific field, the General Index being published as a separate booklet. Full details of the IEV will be supplied on request.

For terms on radio interference, see Chapter 902.

Graphical and letter symbols

For graphical symbols, and letter symbols and signs approved by the IEC for general use, readers are referred to:

- IEC 60027: *Letter symbols to be used in electrical technology;*
- IEC 60617: *Graphical symbols for diagrams;*

The symbols and signs contained in the present publication have either been taken from IEC 60027 or IEC 60617, or have been specifically approved for the purpose of this publication.

* IEC web site <http://www.iec.ch>

CONTENTS

	Page
FOREWORD	5
PREFACE	5
Clause	
1. Scope	9
2. Object	9
3. Introduction	11
4. Radio noise from power lines.	13
4.1 Physical aspects of radio noise	13
4.2 Main characteristics of the noise field resulting from conductor corona	19
5. Effects of corona from conductors.	27
5.1 Physical aspects of corona from conductors	27
5.2 Methods of investigation of corona by cages and test lines.	31
5.3 Methods of predetermination	33
5.4 Catalogue of standard profiles	35
6. Radio noise levels due to insulators, fittings and substation equipment (excluding bad contacts).	39
6.1 Physical aspects of radio noise sources	39
6.2 Correlation between radio noise voltage and the corresponding field for distributed and individual sources.	43
6.3 Influence of ambient conditions	51
7. Sparking due to bad contacts.	51
7.1 Physical aspects of the radio noise phenomenon	51
7.2 Examples of gap sources.	53
8. Special d.c. effects.	55
8.1 General	55
8.2 Effects of corona from conductors	57
8.3 Radio noise due to insulators, fittings and substation equipment	63
8.4 Valve firing effects	65
Bibliography and references	69
APPENDIX A — Calculation of the voltage gradient at the surface of a conductor of an overhead line	73
APPENDIX B — Catalogue of profiles of radio noise field due to conductor corona for certain types of power line	79
APPENDIX C — Summary of the catalogue of radio noise profiles according to the recommendations of the C.I.S.P.R.	94
FIGURES	96