



SLOVENSKI STANDARD
SIST R210-006:2003

01-april-2003

**Interference to mobile radio communications in the presence of impulsive noise -
Methods of judging degradation and measures to improve performance (CISPR
21:1999)**

Interference to mobile radiocommunications in the presence of impulsive noise -
Methods of judging degradation and measures to improve performance

Störung von Mobilfunkübertragungen in Gegenwart von Impulsstörrößen - Verfahren
zur Beurteilung der Beeinträchtigung und Maßnahmen zur Verbesserung der
Übertragungsqualität

Perturbations des communications radiotéléphoniques mobiles en présence de bruit
impulsif - Méthodes d'appréciation de la dégradation et mesures pour améliorer le
fonctionnement

Ta slovenski standard je istoveten z: R210-006:2000

ICS:

33.100.20 Imunost Immunity

SIST R210-006:2003 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST R210-006:2003](#)

<https://standards.iteh.ai/catalog/standards/sist/0112483e-3103-49a6-a600-ffb73f49ffb1/sist-r210-006-2003>

CENELEC

R210-006

REPORT

November 2000

English version

**Interference to mobile radiocommunications
in the presence of impulsive noise -
Methods of judging degradation and measures
to improve performance
(CISPR 21:1999)**

Perturbations des communications
radiotéléphoniques mobiles en présence
de bruit impulsif -
Méthodes d'appréciation de la
dégradation et mesures pour améliorer
le fonctionnement
(CISPR 21:1999)

Störung von Mobilfunkübertragungen
in Gegenwart von Impulsstörgrößen -
Verfahren zur Beurteilung der
Beeinträchtigung und Maßnahmen zur
Verbesserung der Übertragungsqualität
(CISPR 21:1999)

ITeH STANDARD PREVIEW
(standards.iteh.ai)

[SIST R210-006:2003](https://standards.iteh.ai/catalog/standards/sist/0112483e-3103-49a6-a600-ffb73f49ff61/sist-r210-006-2003)

<https://standards.iteh.ai/catalog/standards/sist/0112483e-3103-49a6-a600-ffb73f49ff61/sist-r210-006-2003>

This CENELEC Report has been prepared by IEC/CISPR/SC D, Interference relating to motor vehicles and internal-combustion engines. It was approved by CENELEC on 2000-01-01.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document CISPR/D/230/FDIS, future edition 2 of CISPR 21, prepared by CISPR/SC D, Interference relating to motor vehicles and internal-combustion engines, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as R210-006 on 2000-01-01.

Endorsement notice

The text of the International Standard CSIPR 21:1999 was approved by CENELEC as a CENELEC Report without any modification.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST R210-006:2003

<https://standards.iteh.ai/catalog/standards/sist/0112483e-3103-49a6-a600-ffb73f49ff61/sist-r210-006-2003>

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

CISPR
21

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

Deuxième édition
Second edition
1999-10

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

**Perturbations des communications
radiotéléphoniques mobiles
en présence de bruit impulsif –**

**Méthodes d'appréciation de la dégradation et
mesures pour améliorer le fonctionnement**
(standards.iteh.ai)

**Interference to mobile radiocommunications
in the presence of impulsive noise –**
<https://standards.iteh.ai/en/standard/IEC-61024-4-1999/ff73f49ff61/sist-r210-006-2003>

**Methods of judging degradation
and measures to improve performance**

© IEC 1999 Droits de reproduction réservés — Copyright - all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photo-copie et les microfilms, sans l'accord écrit de l'éditeur.

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission
Telefax: +41 22 919 0300

3, rue de Varembe Geneva, Switzerland
e-mail: inmail@iec.ch IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE

H

Pour prix, voir catalogue en vigueur
For price, see current catalogue

CONTENTS

	Page
FOREWORD	5
Clause	
1 Scope	7
2 Normative references	7
3 Survey of methods of judging degradation to radio channel	7
3.1 Subjective tests	9
3.1.1 Subjective tests of annoyance	9
3.1.2 Subjective tests of intelligibility	9
3.2 Objective tests	11
3.2.1 General	11
3.2.2 Objective test method	11
3.3 Conclusions relating to judgement of degradation	13
4 Improvement of performance of mobile radio communication	13
5 Conclusion	15
Bibliography	15

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST R210-006:2003

<https://standards.iteh.ai/catalog/standards/sist/0112483e-3103-49a6-a600-ffb73f49ff61/sist-r210-006-2003>

INTERFERENCE TO MOBILE RADIOCOMMUNICATIONS IN THE PRESENCE OF IMPULSIVE NOISE –

METHODS OF JUDGING DEGRADATION AND MEASURES TO IMPROVE PERFORMANCE

FOREWORD

- 1) The formal decisions or agreements of the CISPR on technical matters, prepared by sub-committees on which all the National Committees and other Member Organizations of the CISPR having a special interest therein are represented, express, as nearly as possible, an international consensus on the subject dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees and other Member Organizations of the CISPR in that sense.
- 3) In order to promote international unification, the CISPR expresses the wish that all National Committees should adopt the text of the CISPR recommendation for their national rules in so far as national conditions will permit. Any divergence between the CISPR recommendations and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

This publication has been prepared by CISPR, subcommittee D: Interference relating to motor vehicles and internal-combustion engines.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

This second edition of CISPR 21 cancels and replaces the first edition published in 1985.

The text of this CISPR publication is based on the following documents:

SIST R210-006:2003	
FDIS https://standards.iteh.ai/catalog/standards/sist/210-006-2003	Report on voting https://standards.iteh.ai/catalog/standards/sist/210-006-2003
CISPR/D/230/FDIS	CISPR/D/234/RVD

Full information on the voting for the approval of this CISPR publication can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

The committee has decided that this publication remains valid until 2005. At this date, in accordance with the committee's decision, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTERFERENCE TO MOBILE RADIOCOMMUNICATIONS IN THE PRESENCE OF IMPULSIVE NOISE –

METHODS OF JUDGING DEGRADATION AND MEASURES TO IMPROVE PERFORMANCE

1 Scope

This standard provides methods of judging the degradation of radio communication in the presence of impulsive noise and recommends ways of improving radio performance.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60489-3:1988, *Methods of measurement for radio equipment used in the mobile services – Part 3: Receivers for A3E or F3E emissions*

[SIST R210-006:2003](https://standards.iteh.ai/catalog/standards/sist/r210-006-2003)

CISPR 12:1997, *Vehicles, motorboats and spark-ignited engine-driven devices – Radio disturbance characteristics – Limits and methods of measurement*

ITU-R Recommendation BS.562-3:1990, *Subjective assessment of sound quality*

3 Survey of methods of judging degradation to radio channel

Test programs have been conducted in the United States of America by the Federal Communications Commission (FCC) and the Motor Vehicle Manufacturers Association (MVMA, later the American Automobile Manufacturers Association, AAMA, now disbanded). These test programs were directed toward providing a better understanding of the effects of motor vehicles on mobile communications reception.

The tests measured the degradation to communications systems subjectively and objectively at numerous receiver frequencies using several classes of automotive ignition noise sources such as a traffic stream and a controlled matrix of vehicles. Correlation between various objective and subjective measures of degradation was studied using rating scales employed by the FCC and MVMA for grading communication quality.

3.1 Subjective tests

3.1.1 Subjective tests of annoyance

Subjective degradation tests were conducted by the FCC using a single vehicle and groups of vehicles simulating traffic patterns. The FCC proposed and used a subjective jury rating scale based upon annoyance which had been used traditionally to determine the effects of ambient noise on job performance, accident rate, and fatigue of personnel.

Grade	Interfering effect was
5	almost nil
4	noticeable
3	annoying
2	very annoying
1	so bad the presence of speech was barely discernible

This grade system is very nearly the same as that given in ITU-R Recommendation BS.562-3 which should be used for future work if annoyance testing is conducted.

Quality	Impairment
5 excellent	5 imperceptible
4 good	4 perceptible, but not annoying
3 fair	3 slightly annoying
2 poor	2 annoying
1 bad	1 very annoying

Annoyance is a highly subjective psychological reaction. The degree of annoyance caused by audible noise has been found to be influenced by a large number of variable physical and psychological factors (including illness, fatigue, status of interpersonal relations, and family problems).

3.1.2 Subjective tests of intelligibility

3.1.2.1 General

Since land mobile communication systems are used primarily to transmit voice messages, the performance of such systems should be based primarily on the intelligibility of the received signal in the presence of ignition noise.

The most common procedure for determining the intelligibility of a voice channel is a subjective method involving trained speakers and listener jury panels that directly score the percentage of speech that is intelligible. These schemes have the merit of producing repeatable results. Unfortunately, subjective scoring methods are expensive and time-consuming. As a result, they are not widely used.

The subjective scale for intelligibility proposed by the MVMA is

Grade	Description
5	could understand the message extremely well
4	could understand the message fairly well
3	think I understood, but had to guess at some words
2	could barely discern the message
1	could not detect speech at all