



SLOVENSKI STANDARD

SIST EN 50131-5-3:2005

01-oktober-2005

Alarmni sistemi – Sistemi za javljanje vloma – 5-3 del: Zahteve za povezovalno opremo, ki uporablja radio-frekvenčno tehniko

Alarm systems - Intrusion systems -- Part 5-3: Requirements for interconnections equipment using radio frequency techniques

Alarmanlagen - Einbruchmeldeanlagen -- Teil 5-3: Anforderungen an Übertragungsgeräte, die Funkfrequenz-Techniken verwenden

Systèmes d'alarme - Systèmes d'alarme intrusion -- Partie 5-3: Exigences pour les équipements d'alarme intrusion utilisant des techniques radio

<https://standards.iteh.ai/catalog/standards/sist/1acb65cf-3b3e-45cf-b58c-a0a76a625510/sist-en-50131-5-3-2005>

Ta slovenski standard je istoveten z: EN 50131-5-3:2005

ICS:

13.310	Varstvo pred kriminalom	Protection against crime
13.320	Alarmni in opozorilni sistemi	Alarm and warning systems

SIST EN 50131-5-3:2005

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 50131-5-3:2005

<https://standards.iteh.ai/catalog/standards/sist/1acb65cf-3b3e-45cf-b58c-a0a76a625510/sist-en-50131-5-3-2005>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 50131-5-3

May 2005

ICS 13.310

English version

**Alarm systems -
Intrusion systems
Part 5-3: Requirements for interconnections equipment
using radio frequency techniques**

Systèmes d'alarme -
Systèmes d'alarme intrusion
Partie 5-3: Exigences pour les équipements
d'alarme intrusion utilisant
des techniques radio

Alarmanlagen -
Einbruchmeldeanlagen
Teil 5-3: Anforderungen an
Übertragungsgeräte,
die Funkfrequenz-Techniken verwenden

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 50131-5-3:2005](https://standards.iteh.ai/catalog/standards/sist/1acb65cf-3b3e-45cf-b58c-7da44623310c/sist-en-50131-5-3-2005)

<https://standards.iteh.ai/catalog/standards/sist/1acb65cf-3b3e-45cf-b58c-7da44623310c/sist-en-50131-5-3-2005>
This European Standard was approved by CENELEC on 2005-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, 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

This European Standard was prepared by the Technical Committee CENELEC TC 79, Alarm systems.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50131-5-3 on 2005-03-01.

The following dates were fixed:

- | | | |
|------------------------------------------------------------------------------------------------------------------------------------------|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2006-03-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2010-03-01 |
-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 50131-5-3:2005](https://standards.iteh.ai/catalog/standards/sist/1acb65cf-3b3e-45cf-b58c-a0a76a625510/sist-en-50131-5-3-2005)

<https://standards.iteh.ai/catalog/standards/sist/1acb65cf-3b3e-45cf-b58c-a0a76a625510/sist-en-50131-5-3-2005>

Contents

1	Scope	5
2	Normative references	5
3	Definitions and abbreviations	5
3.1	Definitions.....	5
3.2	Abbreviations	7
4	General requirements	7
4.1	Immunity to attenuation	7
4.2	Immunity to collision	7
4.2.1	Requirement for collision rate	7
4.2.2	Requirement for throughput ratio	8
4.3	Immunity to unintentional and intentional component and message substitution.....	8
4.3.1	Immunity to unintentional and intentional components substitution	9
4.3.2	Immunity to intentional message substitution.....	9
4.4	Immunity to interference.....	9
4.4.1	Interference outside of the assigned band for grades 1 and 2 equipment.....	9
4.4.2	Interference within the assigned band for grades 1 and 2 equipment.....	10
4.4.3	Interference for grades 3 and 4	10
4.5	Requirement for RF links monitoring.....	10
4.5.1	Requirement for the detection of a failure of periodic communication.....	10
4.5.2	Requirement for the detection of interference.....	11
4.6	Requirements for antennas.....	12
5	Tests.....	13
5.1	RF disturbance tests.....	13
5.1.1	Reference level determination.....	13
5.1.2	Test for immunity to attenuation	13
5.1.3	Verification of immunity to collision.....	14
5.1.4	Test for throughput ratio.....	14
5.1.5	Test for immunity to unintentional and intentional component and message substitution.	14
5.1.6	Tests for immunity to interference	15
5.1.7	Tests for RF link monitoring.....	16
5.2	Tests for antennas on grades 1 and 2 equipment.....	17
5.3	Environmental tests	17
Annex A	(normative) Generic test arrangement for receiver	18
Annex B	(normative) Test arrangement for interference tests	19
Annex C	(informative) Signal levels diagram.....	20
Annex D	(normative) Test arrangement for transmitter.....	22
Annex E	(normative) Calculation for immunity to message substitution.....	23
Annex F	(normative) Interference timing diagrams	25
Annex G	(normative) Test arrangement for detection of interference	26

Figures

Figure A.1 – Generic test arrangement for receiver	18
Figure B.1 – Test arrangement for interference tests	19
Figure C.1 – Signal levels diagram	20
Figure D.1 – Test arrangement for transmitter	22
Figure F.1 – Interference timing diagrams	25
Figure G.1 – Test arrangement for detection of interference	26

Tables

Table 1 – Immunity to attenuation	7
Table 2 – Equipment occupation of the medium	8
Table 3 – Throughput ratio	8
Table 4 – Identification codes	8
Table 5 – Message substitution	9
Table 6 – Interference outside of the assigned band for grades 1 and 2	9
Table 7 – Interference within the assigned band for grades 1 and 2	10
Table 8 – Interference for grades 3 and 4	10
Table 9 – Periodic communication	11
Table 10 – Periodic communication before setting	11
Table 11 – Detection of interference	11
Table 12 – Detection of interference for equipment	12
Table 13 – Level of interference signal	12
Table 14 – Requirements for antennas	12
Table 15 – Duration of interference signals	17

1 Scope

This European Standard applies to intrusion alarm equipment using radio frequency (RF) links and located on protected premises. It does not cover long range radio transmissions.

This standard defines the terms used in the field of intrusion alarm equipment using radio frequency links as well as the requirements relevant to the equipment.

It shall be used in conjunction with the other parts of the EN 50131 series that define the functional requirements of the equipment regardless of the type of interconnections used.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>
EN 50131-1	1997	Alarm systems – Intrusion systems – Part 1: General requirements
EN 50131-6	1997	Alarm systems – Intrusion systems – Part 6: Power supplies
EN 301489-1	1999	Electromagnetic compatibility and Radio Spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services – Part 1: Common technical requirements

3 Definitions and abbreviations

For the purposes of this document, the following terms and definitions apply.

3.1 Definitions

3.1.1

alarm message

message conveying information regarding intruder, tamper or fault alarms

3.1.2

assigned band

frequency band within which the equipment is authorized to operate

3.1.3

attenuation

degradation of the RF signal due to a change in the passive environment of the system after its installation (e.g. creation, relocation or reflection or absorption materials)

3.1.4

collision

simultaneous transmissions from two or more RF communication devices belonging to the same system, of sufficient signal strength to cause corruption or obliteration of the RF signals

3.1.5

collision rate

probability of two or more messages having part or all of their information coincident on the RF link leading to a collision

3.1.6**communication link**

all local equipment, media and protocols used to route messages

3.1.7**disturbance**

event originating internally or externally to the system and liable to impair transmission and/or processing of data in the system

NOTE 1 It can be unintentionally or intentionally harmful.

Causes of disturbance are attenuation, collision, unintentional or intentional message substitution and other RF interference.

NOTE 2 The different effects which disturbances may have on the signals are

- no corruption of the RF signal,
- corruption of the RF signal with no message corruption,
- corruption of the RF signal with partial message corruption,
- total obliteration of the RF signal (inability to receive).

3.1.8**failure of periodic communication**

inability to pass a message on an RF link

3.1.9**identification code**

part of a message used to identify a transmitting RF communication device belonging to the system

3.1.10**intentional message substitution**

deliberate transmissions from an RF communication device using the correct protocol with the intention of reducing the security of the system

3.1.11**message authentication**

exchange of codes to validate the uniqueness of a transmitting device to a receiving device

3.1.12**monitoring message**

message used to check the integrity of the communication link

3.1.13**RF interference**

RF emissions from any other source, that may cause corruption or obliteration of wanted signals and do not conform to the definition of collision or message substitution

3.1.14**RF communication device**

device using RF transmission links

3.1.15**throughput ratio**

ratio of the total number of messages sent by the transmitting device to the total number of messages correctly interpreted by the receiving device

3.1.16**unintentional message substitution**

non-deliberate transmissions from an RF communication device using the correct protocol emanating from another system with no intention of reducing the security

3.2 Abbreviations

For the purpose of this document, the following abbreviations apply:

ATE: alarm transmission equipment

CIE: control and indicating equipment

RF: radio frequency

RL: reference level

TL: transmitted level

WD: warning device

4 General requirements**4.1 Immunity to attenuation**

Due to the fact there may be changes in the passive environment after installation, it shall be possible to temporarily attenuate the RF link during installation or maintenance according to the values given in Table 1.

<https://standards.iteh.ai/catalog/standards/sist/1acb65cf-3b3e-45cf-b58c-a0a76a625510/sist-en-50131-5-3-2005>

The manufacturer shall specify the means used on its equipment to fulfil this requirement.

Table 1 – Immunity to attenuation

	Attenuation
Grade 1	3 dB
Grade 2	6 dB
Grade 3	9 dB
Grade 4	12 dB

NOTE Grades are defined in EN 50131-1.

4.2 Immunity to collision**4.2.1 Requirement for collision rate**

The objective of the requirement for collision rate is to ensure a high level of confidence in the transmissions of alarm and monitoring messages thus reducing the probability of equipment on the same system causing interference by design and possibly leading to loss or corruption of information. To keep the collision rate as small as possible, the following requirements given in Table 2 shall be fulfilled.

Table 2 – Equipment occupation of the medium

	Maximum occupation (percentage)	In a period of time of
Grade 1	10 %	240 min
Grade 2	10 %	120 min
Grade 3	10 %	100 s
Grade 4	10 %	10 s

In addition, all regulatory requirements concerning the duty cycle shall be complied with. To ensure successful transmissions for grade 3 and 4 equipment, all types of messages (i.e. alarm, monitoring, etc) shall be acknowledged by the receiving equipment to the transmitting equipment. In the case of one alarm message colliding with one monitoring message, the alarm information shall in any case be received in less than 10 s.

4.2.2 Requirement for throughput ratio

The objective of this requirement is to measure the ability of the receiving equipment to accurately interpret and execute correct alarm messages.

Receiving equipment shall comply with the requirements of Table 3.

Table 3 – Throughput ratio
(standards.iteh.ai)

	Minimum number of correctly interpreted messages
Grade 1	999 out of 1 000
Grade 2	999 out of 1 000
Grade 3	9 999 out of 10 000
Grade 4	9 999 out of 10 000

4.3 Immunity to unintentional and intentional component and message substitution

Intentional message substitution generally attempts to reduce the security of the system primarily by falsely unsettling it. Unintentional message substitution generally causes false alarms or tamper alarms and has a nuisance value.

In order to prevent both unintentional and intentional message substitution, each transmitting device shall be identified as belonging to the system by an identification code. The number of identification code possibilities shall be at least equal to those shown in Table 4.

Table 4 – Identification codes

	Identification codes
Grade 1	100 000
Grade 2	1 000 000
Grade 3	10 000 000
Grade 4	100 000 000

4.3.1 Immunity to unintentional and intentional components substitution

For grade 4 equipment, the CIE shall have means to detect substitution.

4.3.2 Immunity to intentional message substitution

To decrease the risk of intentional message substitution, the equipment shall fulfil a requirement given by the probability for an intruder to discover the identification code in less than one hour. The requirements are shown in Table 5.

Table 5 – Message substitution

	Probability lower than
Grade 1	5 %
Grade 2	1 %
Grade 3	0,5 %
Grade 4	0,05 %

For grade 3 and grade 4 equipment, the receiving equipment shall have message authentication.

4.4 Immunity to interference

The purpose of this requirement is to check the ability of the receiving equipment to discriminate between the desired signal and the interfering RF signals.

This immunity to interference requirement applies to all RF receiving equipment. Each of the interference signals defined below shall be applied and shall not cause false alarms or an indication of a failure of periodic communication.

During continuous application of the interfering signals whose levels are defined in subsequent clauses, all of the 20 system relevant messages (sent by the transmitting equipment used for test purposes) shall be correctly received and processed by the receiving equipment.

4.4.1 Interference outside of the assigned band for grades 1 and 2 equipment

The receiving equipment shall be fully functional when the level of interference (defined as Level B in Annex C) is applied at frequency F_1 as stated in 4.4 and subsequently at frequency F_2 and according to the values of Table 6.

F_1 equals $(F_{\min} - 5 \% F_{\min})$ where F_{\min} is the lowest frequency used by the equipment in the assigned band and F_2 $(F_{\max} + 5 \% F_{\max})$ where F_{\max} is the highest frequency used by the equipment in the assigned band.

In the event of the receiving equipment operating in more than one assigned band, the requirement shall be fulfilled for each individual assigned band.

Table 6 – Interference outside of the assigned band for grades 1 and 2

	F_1 Level B	F_2 Level B
Grade 1	10 V/m	10 V/m
Grade 2	10 V/m	10 V/m