SLOVENSKI STANDARD

SIST EN 55016-1-1:2005/A1:2005

november 2005

Specifikacija za merilne naprave in metode za merjenje radijskih motenj in odpornosti – 1-1. del: Merilne naprave za merjenje radijskih motenj in odpornosti – Merilne naprave (CISPR 16-1-1:2003/A1:2005)

Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus (CISPR 16-1-1:2003/A1:2005)

ICS 17.220.20; 33.100.20

Referenčna številka
SIST EN 55016-1-1:2005/A1:2005(en)

EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 55016-1-1/A1

August 2005

ICS 33.100.10; 33.100.20

English version

Specification for radio disturbance and immunity measuring apparatus and methods
Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus
(CISPR 16-1-1:2003/A1:2005)

Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques
Partie 1-1: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Appareils de mesure
(CISPR 16-1-1:2003/A1:2005)

Anforderungen an Geräte und Einrichtungen sowie Festlegung der Verfahren zur Messung der hochfrequenten Störaussendung (Funkstörungen) und Störfestigkeit
Teil 1-1: Geräte und Einrichtungen zur Messung der hochfrequenten Störaussendung (Funkstörungen) und Störfestigkeit – Messgeräte
(CISPR 16-1-1:2003/A1:2005)

This amendment A1 modifies the European Standard EN 55016-1-1:2004; it was approved by CENELEC on 2005-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 amendment 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.

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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/A/579/FDIS, future amendment 1 to CISPR 16-1-1:2003, prepared by CISPR SC A, Radio-interference measurements and statistical methods, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 55016-1-1:2004 on 2005-07-01.

The following dates were fixed:

– latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2006-04-01

– latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2008-07-01

Endorsement notice

The text of amendment 1:2005 to the International Standard CISPR 16-1-1:2003 was approved by CENELEC as an amendment to the European Standard without any modification.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

CISPR 16-1-1

2003

AMENDMENT 1
2005-06

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

Amendment 1

Specification for radio disturbance and immunity measuring apparatus and methods –

Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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FOREWORD

This amendment has been prepared by CISPR subcommittee A: Radio interference measurements and statistical methods.

The text of this amendment is based on the following documents:

FDIS	Report on voting
CISPR/A/579/FDIS	CISPR/A/593/RVD

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

Page 59

8.2 Spectrum analysers and scanning receivers for the frequency range 1 GHz to 18 GHz

Add, after item g) on page 61, the following new item:

h) **Amplitude probability distribution (APD) measuring function**

APD of disturbance is defined as the cumulative distribution of the “probability of time that the amplitude of disturbance exceeds a specified level”.

APD can be measured at the output of the envelope detector or the succeeding circuits of an RF measuring receiver or a spectrum analyzer. The amplitude of disturbance should be expressed in terms of the corresponding field strength or voltage at the receiver input. Usually, an APD measurement is carried out at a fixed frequency.

The APD measuring function will be an additional function of the measuring apparatus and may be attached to, or incorporated in the measuring instrument.

The APD measuring function can be implemented using the following methods. One approach uses comparators and counters (Figure G.1). The equipment determines the probabilities of exceeding a set of pre-assigned amplitude (i.e. voltage) levels. The number of levels equals the number of comparators. Another possible method involves the use of an analog-to-digital converter, a logic circuit, and memory (Figure G.2). The equipment can also provide the APD figure for a set of pre-assigned amplitude levels. The number of levels depends on the resolution of the analog-to-digital converter (e.g. 256 levels for an 8-bit converter).

APD measurements using the aforementioned function are applicable to products or product families if their potential to cause interference to digital communication systems is to be determined (see CISPR 16-3, Amendment 1 [1)], subclause 4.7, for background material to amplitude probability distribution (APD) specifications).

The following specifications apply to the APD measuring function. A rationale for these specifications is provided in Annex G.

- **Specifications**

a) The dynamic range of the amplitude shall be greater than 60 dB.

b) The amplitude accuracy, including threshold level setting error, shall be better than ±2,7 dB.

c) The maximum measurable time of a disturbance shall be longer than or equal to 2 min. The intermittent measurement can be used if the dead time is less than 1 % of the total measurement time.

d) The minimum measurable probability shall be 10^{-7}.

e) The APD measuring function shall be capable of assigning at least two amplitude levels. The probabilities corresponding to all pre-assigned levels shall be measured simultaneously. The resolution of the pre-assigned amplitude levels shall be 0,25 dB at a minimum or better

f) The sampling rate shall be greater than or equal to 10 million samples per second when using a resolution bandwidth of 1 MHz.

- **Recommended specification**

g) The amplitude resolution of the APD display should be less than 0,25 dB for APD measuring equipment with an A/D converter.

NOTE APD measurements may also be applicable in the frequency range below 1 GHz.

Page 129

Add the following new Annex G after the existing Annex F:

1) In preparation.

Annex G
(informative)

Rationale for the specifications of the APD measuring function

The specifications are based on the following definitions and considerations:

a) **Dynamic range of the amplitude**

The dynamic range of the amplitude is defined as the range necessary to obtain the APD. The upper limit of the dynamic range shall be greater than the peak level of disturbance to be measured and the lower limit shall be lower than the level of disturbance limit specified by the product committees.

According to CISPR 11, the peak limit for group 2, class B, for ISM equipment is set at 110 dBμV/m, and the weighted limit is specified as 60 dBμV/m. Therefore, a dynamic range of greater than 60 dB is proposed, with a 10 dB margin.

b) **Sampling rate**

Ideally, the APD of disturbances is measured using the equivalent bandwidth of the radio service to be protected. However, the spectrum analyzer's resolution bandwidth is specified as 1 MHz for the frequency range above 1 GHz. The sampling rate shall therefore be greater than 10 million samples per second.

c) **Maximum measurable time**

CISPR 11 specifies the maximum hold time as a 2 min period for peak measurements of microwave cooking appliances above 1 GHz. Therefore, the measurable time for an APD measurement shall be 2 min minimum. Because the size of the counter or memory is limited, continuous measurements may be difficult for long measurement periods. Therefore, intermittent measurements are allowed under the condition that the dead time is less than 1 % of the total measurement time.

d) **Minimum measurable probability**

About 100 occurrences may be necessary to obtain a meaningful result. Therefore, the minimum measurable probability is calculated as follows:

assuming 2 min for the measuring time and a 10 million samples per second sampling rate, the probability is determined as:

$$100/(120 \times 10 \times 10^6) \sim 10^{-7}$$

e) **Display of APD measurement data**

The amplitude resolution for the display of APD results depends on the dynamic range and the resolution of the A/D converter. For example, the resolution of the display comes to less than 0,25 dB (~ 60 dB/256) when an 8-bit A/D converter is applied to a dynamic range of 60 dB.

Figures G.1 and G.2 show block diagrams of implementations of the APD measurement function.

An example of an APD measurement result is depicted in Figure G.3.

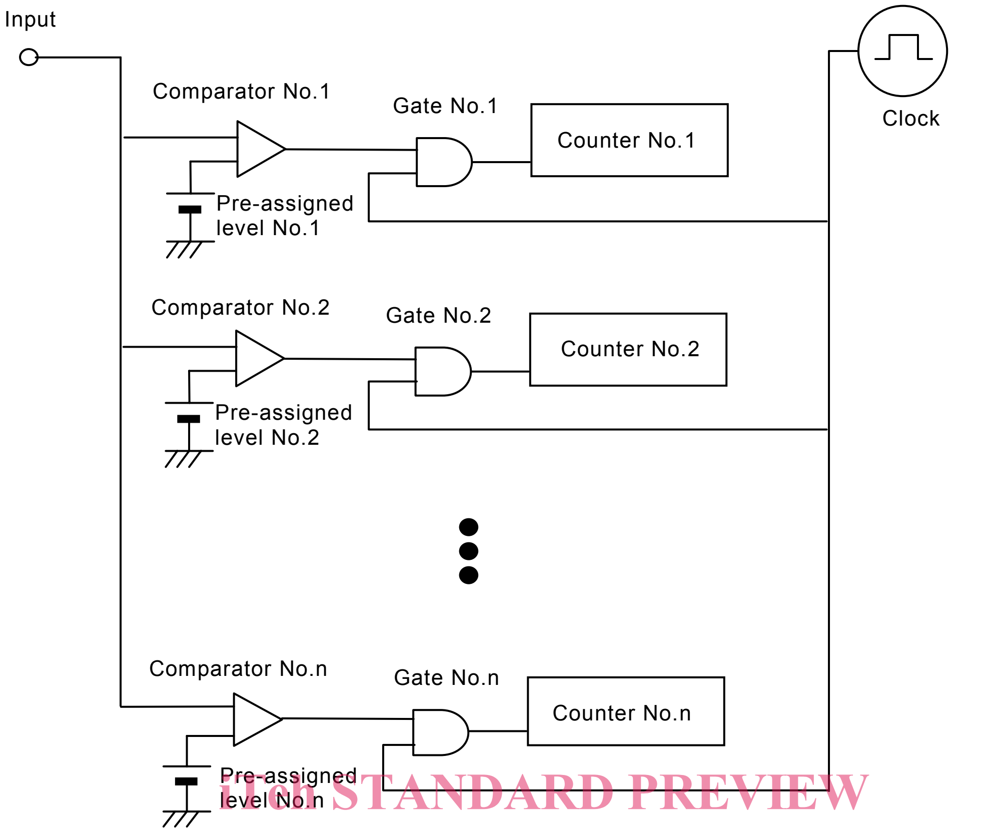

Figure G.1 – Block diagram of APD measurement circuit without A/D converter

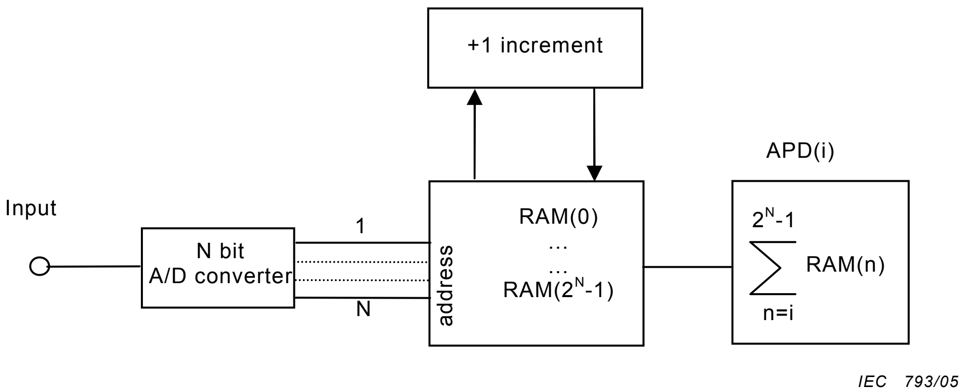

Figure G.2 – Block diagram of APD measurement circuit with A/D converter