SLOVENSKI STANDARD
SIST EN 61843:2002

01-september-2002

Measuring method for the level of intermodulation products generated in a gyromagnetic device (IEC 61843:1997)

Measuring method for the level of intermodulation products generated in a gyromagnetic device

Meßverfahren zur Bestimmung des Pegels von Intermodulationsprodukten, erzeugt in einem gyromagnetischen Bauelement

Méthode de mesure du niveau des produits d'intermodulation générés dans un dispositif gyromagnétique

Ta slovenski standard je istoveten z: **EN 61843:1997**

ICS:

29.100.10 Magnetne komponente Magnetic components

SIST EN 61843:2002 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61843

August 1997

ICS 29.100.10

Descriptors: Gyromagnetic device, level of intermodulation products, principle of measurement, measuring arrangement, measuring procedure, expression of results

English version

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(IEC 61843:1997)

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(CEI 61843:1997)

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This European Standard was approved by CENELEC on 1997-07-01. 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.

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CENELEC

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

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Foreword

The text of document 51/440/FDIS, future edition 1 of IEC 61843, prepared by IEC TC 51, Magnetic components and ferrite materials, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61843 on 1997-07-01.

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) 1998-04-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-04-01

Endorsement notice

The text of the International Standard IEC 61843:1997 was approved by CENELEC as a European Standard without any modification.

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
61843

Première édition
First edition
1997-05

Méthode de mesure du niveau des produits d'intermodulation générés dans un dispositif gyromagnétique

Measuring method for the level of intermodulation products generated in a gyromagnetic device

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE G

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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MEASURING METHOD FOR THE LEVEL OF INTERMODULATION PRODUCTS GENERATED IN A GYROMAGNETIC DEVICE

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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International Standard IEC 61843 has been prepared by IEC technical committee 51: Magnetic components and ferrite materials.

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

FDIS	Report on voting
51/440/FDIS	51/459/RVD

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

MEASURING METHOD FOR THE LEVEL OF INTERMODULATION PRODUCTS GENERATED IN A GYROMAGNETIC DEVICE

1 Scope and object

This International Standard describes the measuring method for the level of intermodulation products generated in a gyromagnetic device.

When two or more signals of different frequencies enter into a device and/or equipment having non-linear characteristics (contact point, flexible waveguide, ferrite device, etc.), harmonics are generated in that device and/or equipment. Moreover, differential or added frequencies occur in the device due to mixing of harmonics or a harmonic and the fundamental frequency. These resultant frequencies create noise causing interference.

In transmitter/receiver duplexing systems and radio relay systems, many frequencies are allocated to a specified band so that combinations of transmitting frequencies and harmonics may fall on the receiving band. This causes deterioration of communication quality due to intermodulation.

Since the intermodulation interferences cannot be prevented by filtering, it is important to evaluate the intermodulation products level of the device to be employed in such a system.

2 Principle of measurement

When a number of different frequencies, denoted by subscript i, exist, intermodulation frequency (f_{out}) is represented as follows:

$$f_{out} = \pm n_1 f_1 \pm n_2 f_2 \pm \ldots \pm n_i f_i$$

where n_1, n_2, ... , n_i are integers.

Since, in many cases, third order intermodulation products are the most probable, the measuring method for third order intermodulation will be described hereinafter.

Two signals of specified power levels and frequencies (f_1 and f_2) are combined utilizing a power combiner.

The residual intermodulation product ($2f_1 - f_2$ or $2f_2 - f_1$) of the measuring system by connecting the combined signal directly to receiver should be less than –90 dBm.Then the intermodulation product of device under test is determined by connecting the device between the signal source and receiver.

3 Measuring arrangement

The measuring arrangement is shown in figure 1.

It comprises two generators with specified power levels and frequencies, a power combiner, a low-pass filter, band-pass filters, a receiver and other components.

Use of components with low insertion loss, lowest possible intermodulation product and adequate power handling capability is recommended.

Requirements for the individual components are as follows:

3.1 *Generators (1 and 2)*

It is required that power levels at port A and frequencies are specified to simulate practical conditions causing intermodulation products. The recommended conditions are shown on table 1.

Table 1 – Recommended conditions for generators

Application	Frequency band	Power	Separation of frequency
Land mobile system	400 MHz, 800 MHz 1,5 GHz	1 W to 40 W	4 MHz to 130 MHz
Microwave relay system	4, 5, 6, 11, 15, 20 GHz	1 W to 4 W	160 MHz
Satellite broadcast and communication system	4, 6, 12, 14, 20, 30 GHz	30 W to 300 W	160 MHz

3.2 *Directional couplers*

3.2.1 *Directional couplers (1, 2 and 3)*

These couplers are used to provide partial power from the generator to the frequency meter and the power meter for monitoring.

3.2.2 *Directional coupler (4)*

This coupler is used to reduce the power entering the receiver and to suppress the influence of fundamental signal reflection from the band-pass filter 3.

3.3 *Frequency meters (1 and 2)*

These frequency meters are used to monitor the frequencies of the generators.

A resonant cavity type wave meter or digital frequency counter is recommended.

3.4 *Power meters*

3.4.1 *Power meters (1 and 2)*

These power meters are used to monitor the power levels of the generators.

3.4.2 *Power meter (3)*

This power meter is used to set the output level at port A.

3.5 *Band-pass filters*

3.5.1 *Band-pass filters (1 and 2)*

These filters are used to eliminate unwanted spectra of the fundamental signals. Attenuation of 40 dB or more is required in the out of band range.