



SLOVENSKI STANDARD
oSIST prEN IEC 62037-1:2024
01-maj-2024

Pasivne radiofrekvenčne (RF) in mikrovalovne naprave, meritve intermodulacijskega nivoja - 1. del: Splošne zahteve in merilne metode

Passive RF and microwave devices, intermodulation level measurement - Part 1: General requirements and measuring methods

Passive HF- und Mikrowellenbauteile, Messung des Intermodulationspegels - Teil 1: Allgemeine Anforderungen und Messverfahren

Dispositifs RF et à micro-ondes passifs, mesure du niveau d'intermodulation - Partie 1: Exigences générales et méthodes de mesure

Ta slovenski standard je istoveten z: prEN IEC 62037-1:2024

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ICS:

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| 33.040.20 | Prenosni sistem | Transmission systems |
| 33.120.30 | Radiofrekvenčni konektorji (RF) | RF connectors |

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United States of America

SECRETARY:

Mr David Hess

OF INTEREST TO THE FOLLOWING COMMITTEES:

SC 46A, SC 46F

PROPOSED HORIZONTAL STANDARD:

Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

 EMC

 ENVIRONMENT

 QUALITY ASSURANCE

 SAFETY

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 NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

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Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Passive RF and microwave devices, intermodulation level measurement - Part 1: General requirements and measuring methods

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NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**PASSIVE RF AND MICROWAVE DEVICES,
INTERMODULATION LEVEL MEASUREMENT –****Part 1: General requirements and measuring methods****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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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IEC 62037-1 has been prepared by IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories. It is an International Standard.

This second edition cancels and replaces the first edition published in 2012. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) clarification added that test equipment may utilize pulsed generators to reduce power consumption;
- b) heating effect differences in the device under test noted in Annex B for tests conducted using pulsed generators;

97 c) guidance added in Annex B to improve probability of detection of short duration PIM events
98 while dynamic testing.

99 The text of this International Standard is based on the following documents:

| Draft | Report on voting |
|-------------|------------------|
| 46/834/FDIS | 46/855/RVD |

100
101 Full information on the voting for its approval can be found in the report on voting indicated in the
102 above table.

103 The language used for the development of this International Standard is English.

104 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
105 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at
106 www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described
107 in greater detail at www.iec.ch/standardsdev/publications.

108 This International Standard is to be used in conjunction with IEC 62037 (all parts).

109 A list of all the parts in the IEC 62037 series, published under the general title *Passive RF and*
110 *microwave devices, intermodulation level measurement*, can be found on the IEC website.

111 The committee has decided that the contents of this document will remain unchanged until the
112 stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific
113 document. At this date, the document will be

- 114 • reconfirmed,
- 115 • withdrawn,
- 116 • replaced by a revised edition, or
- 117 • amended.

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PASSIVE RF AND MICROWAVE DEVICES, INTERMODULATION LEVEL MEASUREMENT –

Part 1: General requirements and measuring methods

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128 **1 Scope**

129 This part of IEC 62037 deals with the general requirements and measuring methods for
130 intermodulation (IM) level measurement of passive RF and microwave components, which can be
131 caused by the presence of two or more transmitting signals.

132 The test procedures given in this document give the general requirements and measurement
133 methods required to characterize the level of unwanted IM signals using two transmitting signals.

134 The IEC 62037 series addresses the measurement of PIM, but does not cover the long-term
135 reliability of a product with reference to its performance.

136 **2 Normative references**

137 The following documents are referred to in the text in such a way that some or all of their content
138 constitutes requirements of this document. For dated references, only the edition cited applies. For
139 undated references, the latest edition of the referenced document (including any amendments)
140 applies.

141 IEC 62037 (all parts), *Passive RF and microwave devices, intermodulation level measurement*

<https://standards.iteh.ai/catalog/standards/sist/bf4342c6-793f-48fc-aac6-e5bf034c26e0/osist-pren-iec-62037-1-2024>

142 **3 Terms, definitions and abbreviated terms**

143 **3.1 Terms and definitions**

144 No terms and definitions are listed in this document.

145 ISO and IEC maintain terminological databases for use in standardization at the following
146 addresses:

- 147 • IEC Electropedia: available at <http://www.electropedia.org/>
- 148 • ISO Online browsing platform: available at <http://www.iso.org/obp>

149 **3.2 Abbreviated terms**

150 CATV Community antenna television
151 CFEC Carbon fibre epoxy composite
152 CW Continuous wave
153 DUT Device under test
154 IM Intermodulation
155 PCB Printed circuit board
156 PIM Passive intermodulation

157 RBW Resolution bandwidth
158 VDA Vacuum deposited aluminium

159 **4 Characteristics of intermodulation products**

160 PIM interference is caused by sources of non-linearity of mostly unknown nature, location and
161 behaviour. A few examples are inter-metallic contacts, choice of materials, corrosion products, dirt,
162 etc. Most of these effects are subject to changes over time due to mechanical stress, temperature
163 changes, variations in material characteristics (cold flow, etc.) and climatic changes.

164 The generation of intermodulation products originates from point sources inside a DUT and
165 propagates equally in all available directions.

166 The generation of passive intermodulation (PIM) products does not necessarily follow the law of
167 the usual non-linear equation of quadratic form. Therefore, accurate calculation to other power
168 levels causing the intermodulation is not possible and PIM comparisons should be made at the
169 same power level.

170 Furthermore, PIM generation is typically frequency dependent and shall be investigated over the
171 specified frequency band. Testing with swept or multiple fixed frequencies often provides more
172 accurate results. See Annex B for additional information.

173 **5 Principle of test procedure**

174 Test signals of frequencies f_1 and f_2 with equal specified test port power levels are combined and
175 fed to the DUT. The test signals should contain a harmonic or self-intermodulation signal level at
176 least 10 dB lower than the expected level generated in the DUT.

177 The PIM is measured over the specified frequency range. The intermodulation products of order
178 $(2f_1 \pm f_2)$, $(2f_2 \pm f_1)$, etc., are measured.

179 In most cases, the third order intermodulation signals represent the worst-case condition of
180 unwanted signals generated; therefore, the measurement of these signals characterizes the DUT
181 in a sufficient way. However, the test set-ups given in Clause 6 are suitable for measuring other
182 intermodulation products.

183 In other systems (such as CATV), the third order may not be as applicable in characterizing the
184 DUT.

185 Intermodulation can be measured in the reverse and forward direction. Reverse and forward refer
186 to the direction of propagation of the most powerful carrier.

187 **6 Test set-up**

188 **6.1 General**

189 Experience shows that the generation of intermodulation products originates from point sources
190 inside a device under test (DUT) and propagates equally in all available directions. Therefore,
191 either the reverse (reflected) or the forward (transmitted) intermodulation signal can be measured.