# IEC 62037-8

Edition 2.0 2025-03

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

## Passive RF and microwave devices, intermodulation level measurement – Part 8: Measurement of passive intermodulation generated by objects exposed to RF radiation

## Dispositifs RF et à micro-ondes passifs, mesure du niveau d'intermodulation – Partie 8: Mesure de l'intermodulation passive générée par des objets exposés au rayonnement RF





IEC 62037-8:2025-03(en-fr)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 33.120.01

ISBN 978-2-8327-0313-7

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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IEC 62037-8 has been prepared by 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 2022. This edition constitutes a technical revision.

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

a) added safety warning to verify that transmitters are switched off before connecting or disconnecting any component;
b) corrected formula for calculating directivity;
c) corrected antenna orientation labels in Figure 6;
d) added clarification that PIM tests reports shall include maximum PIM and VSWR values.

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

| Draft | Report on voting |
|---|---|
| 46/1039/FDIS | 46/1045/RVD |

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

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

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



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

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

- reconfirmed,
- withdrawn, or
- revised.

# PASSIVE RF AND MICROWAVE DEVICES, INTERMODULATION LEVEL MEASUREMENT –

# Part 8: Measurement of passive intermodulation generated by objects exposed to RF radiation

## 1 Scope

This part of IEC 62037 defines a radiated passive intermodulation (PIM) test to determine PIM levels generated by a device or object when it is exposed to RF radiation. This test can be conducted on any material or object and is not limited to devices designed to propagate RF signals. This test can be conducted as either a near field or far field test as defined by the test specification in an outdoor test site or in an anechoic test chamber.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.



IEC 62037-1, *Passive RF and microwave devices, intermodulation level measurement – Part 1: General requirements and measuring methods*



## 3 Terms, definitions and abbreviated terms

### 3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
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### 3.2 Abbreviated terms

AIM active intermodulation
DUT device under test
IM intermodulation
PIM passive intermodulation
VSWR voltage standing wave ratio

# 4 General considerations

## 4.1 Test environment

When applicable, radiated PIM measurements can be accomplished outdoors. These measurements can be subject to regulatory requirements with regard to authorized RF radiation levels. Also, the RF energy radiated by the test antenna can generate PIM in surrounding structures other than the device under test (DUT) which can couple back into the test antenna resulting in invalid PIM test results. Additionally, external sources of RF radiation can interfere with the test measurements. A survey of the frequencies and power magnitude locally in use is recommended prior to testing. External sources of PIM in the test environment can be minimized or eliminated by performing the test within an anechoic test chamber providing a low PIM test environment. More information on the construction of anechoic test chambers suitable for PIM testing is provided in IEC 62037-6:2021, 6.8.

## 4.2 Safety

Performing PIM tests with antenna products can be dangerous. Potentially high voltages and high levels of RF energy can be present within the test environment. The DUT should be positioned such that personnel are not exposed to unsafe levels of electromagnetic fields, the maximum acceptable levels of which can be subject to governmental specifications. Personnel should verify that the transmitters are switched off before connecting or disconnecting any component.

# 5 Test set-up



## 5.1 Test configurations

### 5.1.1 General



A typical test set-up for radiated PIM testing is shown in Figure 1. Low PIM components should be used to construct the test system and the overall cable or waveguide lengths should be minimized to deliver maximum power to the transmitting antenna. Sufficient isolation shall be provided between the transmit (Tx) and receive (Rx) paths to prevent active intermodulation (AIM) within the test system receiver.

A second set-up for radiated PIM testing is shown in Figure 2. This configuration can be used to measure intermodulation (IM) products that are outside of the operating bandwidth of the transmitting antenna.

A third set-up for radiated PIM testing is shown in Figure 3. This configuration can be used when the residual PIM of the test antenna is higher than desired, preventing accurate measurement of the DUT.

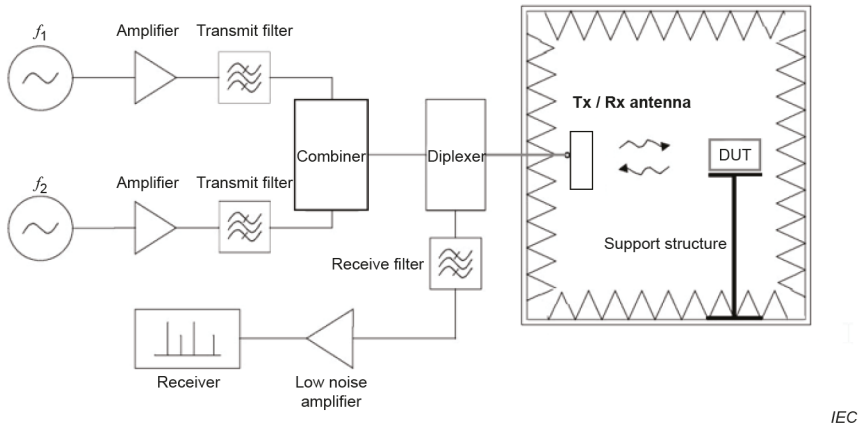


**Figure 1 – Radiated PIM test set-up, single antenna, single band**

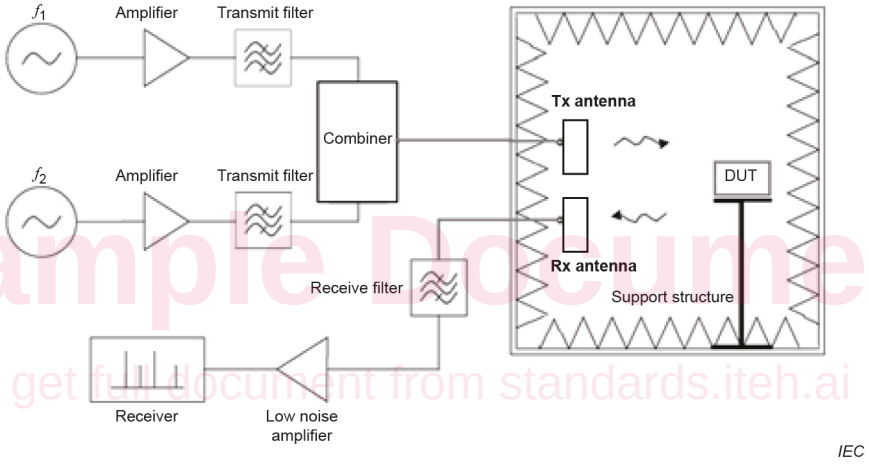




**Figure 2 – Radiated PIM test set-up, dual antenna, dual band**

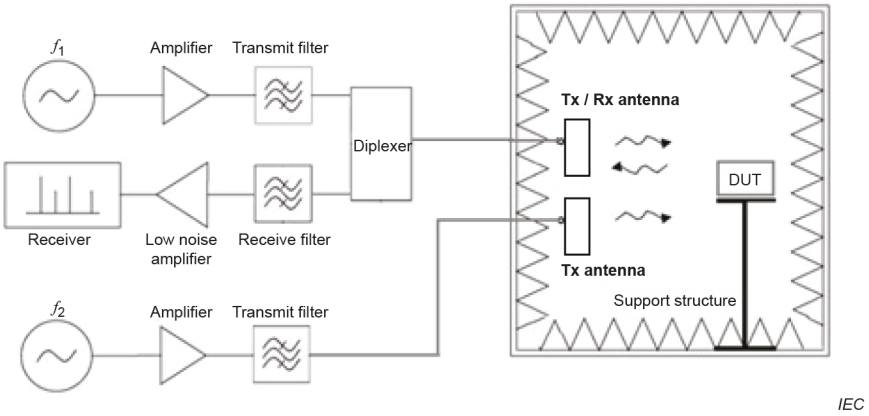


**Figure 3 – Radiated PIM test set-up, dual antenna, single band**

### 5.1.2 Antenna type

The transmit and receive antenna(s) shall be directional panel or horn type antennas.