SLOVENSKI STANDARD
oSIST prEN IEC 61967-8:2022

01-oktober-2022

Integrirana vezja - Meritve elektromagnetnega sevanja - 8. del: Merjenje sevanega oddajanja - Metoda z IC na tračnem valovodu

Integrated circuits - Measurement of electromagnetic emissions - Part 8: Measurement of radiated emissions - IC stripline method

Integrierte Schaltungen - Messung von elektromagnetischen Aussendungen - Teil 8: Messung der abgestrahlten Aussendungen - IC-Streifenleiterverfahren

Circuits intégrés - Mesure des émissions électromagnétiques - Partie 8: Mesure des émissions rayonnées - Méthode de la ligne TEM à plaques (stripline) pour CI

Ta slovenski standard je istoveten z: **prEN IEC 61967-8:2022**

ICS:

31.200	Integrirana vezja, mikroelektronika	Integrated circuits. Microelectronics

oSIST prEN IEC 61967-8:2022 **en**

47A/1141/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 61967-8 ED2**	
DATE OF CIRCULATION: **2022-07-29**	CLOSING DATE FOR VOTING: **2022-10-21**
SUPERSEDES DOCUMENTS: **47A/1136/CD, 47A/1139A/CC**	

IEC SC 47A : INTEGRATED CIRCUITS

SECRETARIAT: Japan	SECRETARY: Mr Yoshinori FUKUBA
OF INTEREST TO THE FOLLOWING COMMITTEES:	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

☒ SUBMITTED FOR CENELEC PARALLEL VOTING ☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

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.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Integrated circuits - Measurement of electromagnetic emissions - Part 8: Measurement of radiated emissions - IC stripline method

PROPOSED STABILITY DATE: 2028

NOTE FROM TC/SC OFFICERS:

The comments for 47A/1136/CD were reviewed in SC 47A WG 9 meeting which was held in 2022-05-30 and all technical issues were resolved and addressed in 47A/1139A/CC, so the project will move forward as CDV.

CONTENTS

FIGURES

TABLES

INTERNATIONAL ELECTROTECHNICAL COMMISSION

____

INTEGRATED CIRCUITS – MEASUREMENT OF ELECTROMAGNETIC EMISSIONS

Part 8: Measurement of radiated emissions – IC stripline method

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61967-8 has been prepared by subcommittee 47A: Integrated circuits, of IEC technical committee 47: Semiconductor devices.

This second edition cancels and replaces the first edition published in 2011. This edition constitutes a technical revision.

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

a) frequency range of 150 kHz to 3 GHz was deleted from the scope;
b) extension of upper usable frequency to 6 GHz or higher as long as the defined requirements are fulfilled

It bears the edition number 2.

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

FDIS	Report on voting
47A/XXX/FDIS	47A/XXX/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61967 series, under the general title *Integrated circuits – Measurement of electromagnetic emissions* can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

INTEGRATED CIRCUITS – MEASUREMENT OF ELECTROMAGNETIC EMISSIONS

Part 8: Measurement of radiated emissions – IC stripline method

1 Scope

This measurement procedure defines a method for measuring the electromagnetic radiated emission from an integrated circuit (IC) using an IC stripline. The IC being evaluated is mounted on an EMC test board (PCB) between the active conductor and the ground plane of the IC stripline arrangement.

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.

IEC 60050(131), *International Electrotechnical Vocabulary (IEV) – Part 131: Circuit theory*

IEC 60050(161), *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*

IEC 61967-1, *Integrated circuits – Measurement of electromagnetic emissions – Part 1: General conditions and definitions*

IEC 61000-4-20, *Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides*

3 Terms and definitions

For the purposes of this document, the definitions in IEC 61967-1, IEC 60050(131) and IEC 60050(161), as well as the following, apply.

3.1 Transverse electromagnetic (TEM) mode

waveguide mode in which the components of the electric and magnetic fields in the propagation direction are much less than the primary field components across any transverse cross-section.

3.2 TEM waveguide

open or closed transmission line system, in which a wave is propagating in the transverse electromagnetic mode to produce a specified field for testing purposes.

3.3 IC stripline

TEM waveguide, consisting of an active conductor placed on a defined spacing over an enlarged ground plane, connected to a port structure on either end and an optional shielded enclosure.

NOTE: This arrangement guides a wave propagation in the transverse electromagnetic mode to produce a specific field for testing purposes between the active conductor and the enlarged ground plane. As enlarged ground plane the ground plane of the standard EMC test board according to IEC 61967-1 should be used. An optional shielding enclosure may be used for fixing the IC stripline configuration and for shielding purposes. This leads to a closed version of the IC stripline in opposite to the open version without shielding enclosure. For further information see Annex A.

3.4 Two-port TEM waveguide

TEM waveguide with input/output measurement ports at both ends.

3.5 Characteristic impedance

magnitude of the ratio of the voltage between the active conductor and the corresponding ground plane to the current on either conductor for any constant phase wave-front.

NOTE: The characteristic impedance is independent of the voltage/current magnitudes and depends only on the cross sectional geometry of the transmission line. TEM waveguides are typically designed to have a *50* Ω characteristic impedance. For further information and equation to stripline arrangements see Annex A.

3.6 Primary (field) component

electric field component aligned with the intended test polarization.

NOTE: For example, in IC stripline, the active conductor is parallel to the horizontal floor, and the primary mode electric field vector is vertical at the transverse centre of the IC stripline.

4 General

This test method is based on the TEM wave guide measurement principle according to IEC 61000-4-20. A stripline set-up is used to measure the RF emission of ICs. The RF voltage at the stripline port is related to the electromagnetic radiation potential of the IC and will be measured using a spectrum analyzer or measuring receiver. The intent of this test method is to provide a quantitative measure of the RF emissions from ICs for comparison or other evaluation.

5 Test conditions

5.1 General

The test conditions shall meet the requirements as described in IEC 61967-1. In addition, the following test conditions shall apply.

5.2 Supply voltage

The supply voltage shall be as specified by the IC manufacturer. If the users of this procedure agree to other values, they shall be documented in the test report.

5.3 Frequency range

The effective frequency range for the IC stripline is 150 kHz to *6* GHz in combination with the VSWR characteristic ≤ 1,25 *for f ≤ 3 GHz and ≤ 1,4 for f > 3 GHz*. As long as the used IC stripline fulfills the VSWR characteristic, the upper frequency can be extended. In general, the IC stripline shall not exhibit significant higher order modes over the frequency range being measured.

6 Test equipment

6.1 General

The test equipment shall meet the requirements as described in IEC 61967-1. In addition, the following test equipment requirements shall apply.

6.2 RF measuring instrument

A spectrum analyzer or EMI receiver shall be used. The resolution bandwidth shall be 9 kHz for EMI receivers or 10 kHz for spectrum analyzers in the frequency range from 150 kHz to 30 MHz and respectively 120 kHz or 100 kHz above 30 MHz according to IEC 61967-1. Measurements

shall be made with a peak detector and presented in units of dBµV [for 50 Ω system: (dBm readings) + *107* = dBµV]. For spectrum analyzers, the frequency band of interest shall be swept in calibrated or coupled mode (auto sweep).

6.3 Preamplifier

Optionally, a 20 dB to 30 dB gain, low noise preamplifier might be used. If used, the preamplifier shall be connected directly to the measurement port of the IC stripline using the appropriate 50 Ω coaxial adapter.

6.4 IC stripline

TEM waveguide, consisting of an active conductor placed on a defined spacing over an enlarged ground plane, connected to a port structure on either end and an optional shielded enclosure. The spacing between active conductor and ground plane of the IC stripline has a default value of 6,7 mm. Other spacing can be used but has to be noted in the test report.

NOTE: A conversion factor may allow comparisons between IC stripline arrangements with different spacing between active conductor and ground plane (see Annex A).

This IC stripline arrangement guides wave propagation in the transverse electromagnetic mode to produce a specific field for testing purposes between the active conductor and the enlarged ground plane. As enlarged ground plane the ground plane of the standard EMC test board according to IEC61967-1 should be used. The EMC test board controls the geometry and orientation of the operating IC relative to the IC stripline and eliminates any connecting leads within the IC stripline (these are on the backside of the board, which is opposite to the IC stripline). An optional shielding enclosure may be used for fixing the IC stripline configuration and for shielding purposes. This leads to a closed version of the IC stripline as opposed to the open version without shielding enclosure.

For further information see Annex A.

6.5 50 Ohm termination

A 50 Ω termination with a VSWR less than 1,1 for $f \leq 3$ GHz and ≤ 1,2 for $f > 3$ GHz up to the maximum used frequency shall be used for the IC stripline 50 Ω port not connected to the RF measuring instrument.

6.6 System gain

The gain (or attenuation) of the measuring equipment, without the IC stripline, shall be known with an accuracy ±0,5 dB. The gain of the RF measurement system shall remain within a 6 dB envelope for the frequency range of interest.

7 Test set-up

7.1 General

The test set-up shall meet the requirements as described in IEC 61967-1. In addition, the following test set-up requirements shall apply.

7.2 Test configuration

See Figure 1 for IC stripline test configuration. One of the 50 Ω ports is terminated with a 50 Ω load. The remaining 50 Ω port is connected to the spectrum analyzer through the optional preamplifier.