IEC 61967-8

Edition 2.0 2023-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

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



IEC 61967-8:2023-05(en-fr)



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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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ICS 31.200

ISBN 978-2-8322-6932-9

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CONTENTS

FOREWORD 4
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 General 7
5 Test conditions 7
5.1 General 7
5.2 Supply voltage 7
5.3 Frequency range 7
6 Test equipment 8
6.1 General 8
6.2 RF measuring instrument 8
6.3 Preamplifier 8
6.4 IC stripline 8
6.5 50 Ω termination 8
7 Test set-up 8
7.1 General 8
7.2 Test configuration 9
7.3 EMC test board (PCB) 9
8 Test procedure 9
8.1 General 9
8.2 Ambient conditions 9
8.3 Operational check 10
8.4 Verification of IC stripline RF characteristic 10
8.5 Test technique 10
9 Test report 11
9.1 General 11
9.2 Measurement conditions 11
10 IC Emissions reference levels 11
Annex A (normative) IC stripline description 12
A.1 General 12
A.2 Characteristic impedance of stripline arrangements 13
A.3 Conversion for different active conductor heights 14
A.4 Example for IC stripline arrangement 14
Annex B (informative) Specification of emission levels 15
B.1 Scope 15
B.2 General 15
B.3 Specification of emission levels 15
B.4 Presentation of results 15
Bibliography 17

Figure 1 – IC stripline test set-up 9
Figure A.1 – Cross-section view of an example of an unshielded IC stripline 12
Figure A.2 – Cross-section view of an example of an IC stripline with housing 12
Figure A.3 – Example of IC stripline with housing 14

Figure B.1 – Emission characterization levels 16

Table A.1 – Maximum DUT dimensions for 6,7 mm IC stripline open version..... 13
Table A.2 – Maximum DUT dimensions for 6,7 mm IC stripline closed version 13

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTEGRATED CIRCUITS – MEASUREMENT OF ELECTROMAGNETIC EMISSIONS –

Part 8: Measurement of radiated emissions – IC stripline method

FOREWORD

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

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.

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

Draft	Report on voting
47A/1152/FDIS	47A/1153/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 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 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,
- replaced by a revised edition, or
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INTEGRATED CIRCUITS – MEASUREMENT OF ELECTROMAGNETIC EMISSIONS –

Part 8: Measurement of radiated emissions – IC stripline method

1 Scope

This part of IEC 61967 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 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 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 terms and definitions given in IEC 61967-1, IEC 60050-131 and IEC 60050-161, and the following apply.

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

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
transverse electromagnetic mode
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 1 to entry: 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 1 to entry: 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 1 to entry: 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 described in 5.2 and 5.3 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. The upper frequency can be extended if the IC stripline does not exhibit significant higher order modes over the frequency range being measured.

NOTE The given VSWR value of 1,4 is based on evolving technical solutions for IC striplines. For accuracy reasons the VSWR value is targeted as low as possible (e.g. 1,3).