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INTERNATIONAL STANDARD

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Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-1: Particular requirements – Test configurations, operational conditions and performance criteria for sensitive test and measurement equipment for EMC unprotected applications

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE – EMC REQUIREMENTS –

Part 2-1: Particular requirements – Test configurations, operational conditions and performance criteria for sensitive test and measurement equipment for EMC unprotected applications

FOREWORD

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International Standard IEC 61326-2-1 has been prepared by subcommittee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement, control and automation.

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

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

– update with respect to IEC 61326-1:2020.

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

FDIS	Report on voting
65A/976/FDIS	65A/987/RVD

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

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

This part of IEC 61326 is to be used in conjunction with IEC 61326-1:2020 and follows the same numbering of clauses, subclauses, tables and figures.

When a particular subclause of IEC 61326-1 is not mentioned in this part, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text in IEC 61326-1 is to be adapted accordingly.

NOTE The following numbering system is used:

– subclauses, tables and figures that are numbered starting from 101 are additional to those in IEC 61326-1;

– unless notes are in a new subclause or involve notes in IEC 61326-1, they are numbered starting from 101 including those in a replaced clause or subclause;

– additional annexes are lettered AA, BB, etc.

A list of all parts of IEC 61326 series, under the general title *Electrical equipment for measurement, control and laboratory use – EMC requirements,* 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 "http://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
- amended.

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ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE – EMC REQUIREMENTS –

Part 2-1: Particular requirements – Test configurations, operational conditions and performance criteria for sensitive test and measurement equipment for EMC unprotected applications

1 Scope

In addition to the scope of IEC 61326-1, this part of IEC 61326 specifies more detailed test configurations, operational conditions and performance criteria for equipment with test and measurement circuits (~~both~~ internal ~~and/~~or, external to the equipment, or both) that are not EMC protected for operational and/or functional reasons, as specified by the manufacturer.

The manufacturer specifies the environment for which the product is intended to be used and selects the appropriate test level specifications of IEC 61326-1:2020.

NOTE Examples of equipment include, but are not limited to, oscilloscopes, logic analysers, spectrum analysers, network analysers, analogue instruments, digital multimeters (DMM) and board test systems.

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.

Clause 2 of IEC 61326-1:2020 applies except as follows:

Addition:

IEC 61326-1:~~2012~~2020, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61326-1:2020 and IEC 60050-161 apply.

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

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

4 General

Clause 4 of IEC 61326-1:2020 applies.

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5 EMC test plan

5.1 General

Subclause 5.1 of IEC 61326-1:2020 applies.

5.2 Configuration of EUT during testing

Subclause 5.2 of IEC 61326-1:2020 applies, except as follows:

Addition:

5.2.4.101 I/O ports for test and measurement purposes

Test and measurement input ports shall be ~~capped and shorted~~ covered and terminated with an appropriate impedance unless this leads to an operating condition unsuitable for measuring the emission and immunity performance of the product. If an input signal is needed, an appropriate input signal shall be applied using test leads or probes as specified by the manufacturer.

Test and measurement output ports not needed to evaluate the essential functions of the EUT shall be ~~capped~~ covered and/or terminated.

Electrostatic discharges shall be applied to the ~~housing shield~~ mated connector or the shield of the unmated port, but not to the inner pins of shielded port or cable connectors.

Examples include but are not limited to: USB, BNC, D-subminiature~~, IEEE 488 (IEC 60488)~~, GPIB, RS232 and IEEE 1284-B (parallel printer port), etc.

NOTE 1 Probes and/or test leads not used to apply an input signal during test to the test and measurement ports do not need to be connected. Such test leads can vary substantially from one application to another and are often connected to equipment that has the covers removed and ~~may~~ can be in various stages of disassembly to provide access to test points inside. Connected test leads ~~may~~ could increase emissions and/or reduce immunity in certain applications.

NOTE 2 ~~Capped~~ Covered means locally covered with a screen or shield.

5.3 Operation conditions of EUT during testing

Subclause 5.3 of IEC 61326-1:2020 applies, except as follows:

Addition:

5.3.101 Operational conditions

When both battery and ~~a.c.~~ mains options are available, both modes of operation shall comply.

5.3.102 Oscilloscopes

The oscilloscope ports shall be set for maximum sweep speed, maximum sensitivity and continuous acquisition mode unless other modes are known to provide worst-case emission or immunity results within normal applications.

5.3.103 Logic analysers

The logic analyser shall be set for data analysis modes during emission measurement and continuous data acquisition mode during immunity testing unless other modes are known to provide worst-case emission or immunity results within normal applications.

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5.3.104 Digital multimeters (DMM)

Typical set-ups include: peak detect, maximum sensitivity (usually auto-range, if available, will suffice) and continuous acquisition mode.

5.3.105 Other equipment

For equipment not mentioned in 5.3.102 to 5.3.104, the following philosophy shall apply.

A selection of representative operation modes shall be made, taking into account that not all functions, but only the most typical functions of the equipment can be tested. The estimated worst-case operating modes for normal application shall be selected.

5.4 Specification of FUNCTIONAL PERFORMANCE

Subclause 5.4 of IEC 61326-1:2020 applies.

5.5 Test description

Subclause 5.5 of IEC 61326-1:2020 applies.

6 Immunity requirements

6.1 Conditions during the tests

Subclause 6.1 of IEC 61326-1:2020 applies.

6.2 Immunity test requirements

Subclause 6.2 of IEC 61326-1:2020 applies.

6.3 Random aspects

Subclause 6.3 of IEC 61326-1:2020 applies.

6.4 Performance criteria

Subclause 6.4 of IEC 61326-1:2020 applies, except as follows:

Addition:

6.4.101 Tests with transient electromagnetic phenomenon

During testing with transient electromagnetic phenomena that are assigned to performance criteria B in Table 1, 2 or 3 of IEC 61326-1:2020, the EUT may have temporary degradation or loss of function or performance which is self-recovering. Self-recovery times greater than 10 s shall be specified by the manufacturer in the equipment documentation for the user. Trigger functions need not be evaluated. No change in actual operating state or loss of stored data is allowed.

7 Emission requirements

Clause 7 of IEC 61326-1:2020 applies.

8 Test results and test report

Clause 8 of IEC 61326-1:2020 applies.

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9 Instructions for use

Clause 9 of IEC 61326-1:2020 applies, except as follows:

Addition:

9.101 Additional instructions

The manufacturer shall give information that the equipment ~~may~~ might not meet the immunity requirements of this document when test leads and/or test probes are connected and shall give guidance on how to use test leads and/or test probes to minimize the impact of disturbances.

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Annex A
(normative)

Immunity test requirements for PORTABLE TEST AND MEASUREMENT EQUIPMENT powered by battery or from the circuit being measured

Annex A of IEC 61326-1:2020 does not apply.

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