

INTERNATIONAL STANDARD

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**Home and building electronic systems (HBES) and building automation and control systems (BACS) –
Part 5-1: EMC requirements, conditions and test set-up**

**Systèmes électroniques pour les foyers domestiques et les bâtiments (HBES) et systèmes de gestion technique du bâtiment (SGTB) –
Partie 5-1: CEM Exigences générales, condition et montage d'essais**



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HOME AND BUILDING ELECTRONIC SYSTEMS (HBES) AND BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS) –

Part 5-1: EMC requirements, conditions and test set-up

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IEC 63044-5-1 edition 1.1 contains the first edition (2017-01) [documents 23/736/CDV and 23/748/RVC] and its amendment 1 (2022-06) [documents 23/1001/FDIS and 23/1007/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 63044-5-1 has been prepared by IEC technical committee 23: Electrical accessories.

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

A list of all parts in the IEC 63044 series, published under the general title *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)*, can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under webstore.iec.ch in the data related to the specific publication. At this date, the publication will be

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INTRODUCTION

The IEC 63044 series deals with developing and testing Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS).

The IEC 63044-5 series ensures a common level of EMC requirements for HBES/BACS devices.

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HOME AND BUILDING ELECTRONIC SYSTEMS (HBES) AND BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS) –

Part 5-1: EMC requirements, conditions and test set-up

1 Scope

~~This part of IEC 63044 is a product family standard that sets the minimum level of EMC performance for the HBES/BACS network in addition to the product EMC standards for HBES/BACS devices.~~

~~It also applies to devices used within an HBES/BACS network for which no specific HBES/BACS product EMC standard exists.~~

This product family standard specifies the EMC requirements for HBES/BACS devices.

In addition, it defines EMC requirements for the interface of equipment intended to be connected to an HBES/BACS network. It does not apply to interfaces to other networks.

NOTE An example of other networks is a dedicated ICT network covered by ~~CISPR 22 and 23~~ CISPR 32.

This document provides general performance requirements, standard test conditions and test set-ups.

~~This document is applicable (but not limited) to~~

- ~~— operator stations and other human-system interface devices,~~
- ~~— devices for management functions,~~
- ~~— control devices, automation stations and application-specific controllers,~~
- ~~— field devices and their interfaces,~~
- ~~— cabling and interconnection of devices,~~

~~used within a dedicated HBES/BACS network.~~

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 61000-3-2, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-3-3, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3 : Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 63044-1, *General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 1: General requirements*

IEC 63044-3, *General requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 3: Electrical safety requirements*

CISPR 22, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

CISPR 32, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63044-1 and IEC 63044-3 and the following apply.

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

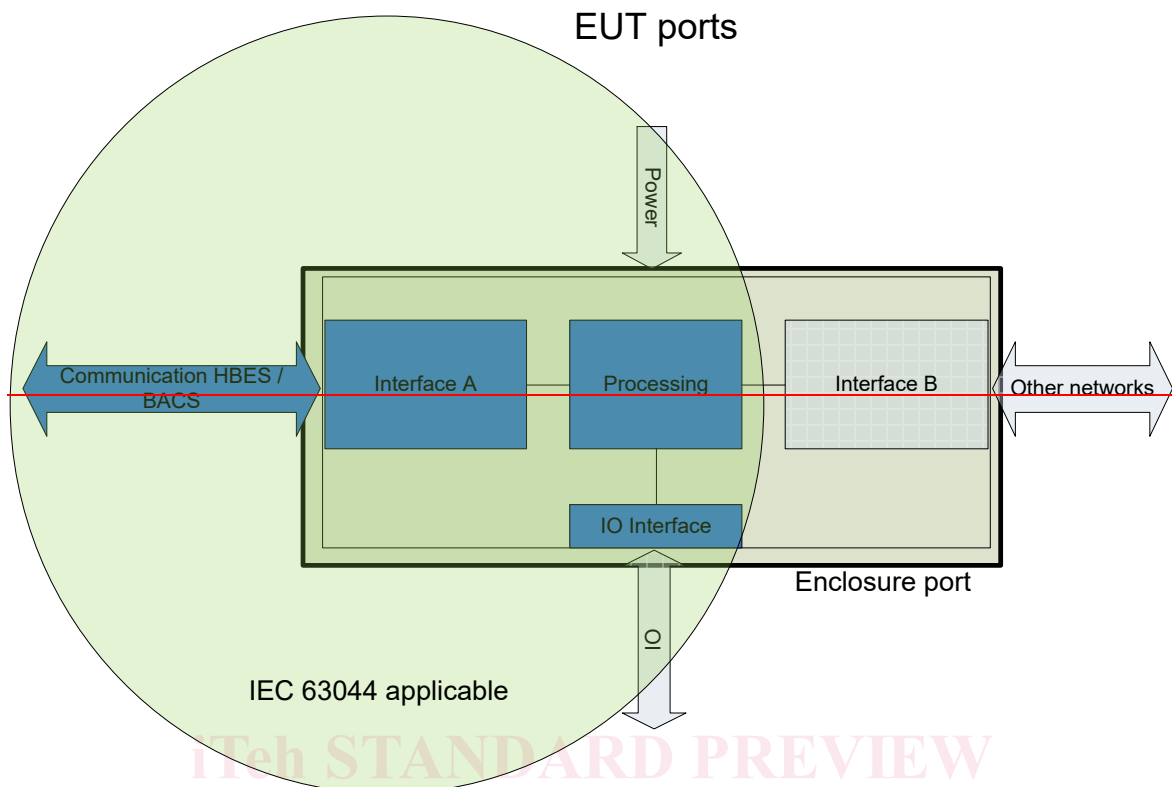
- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.1

port

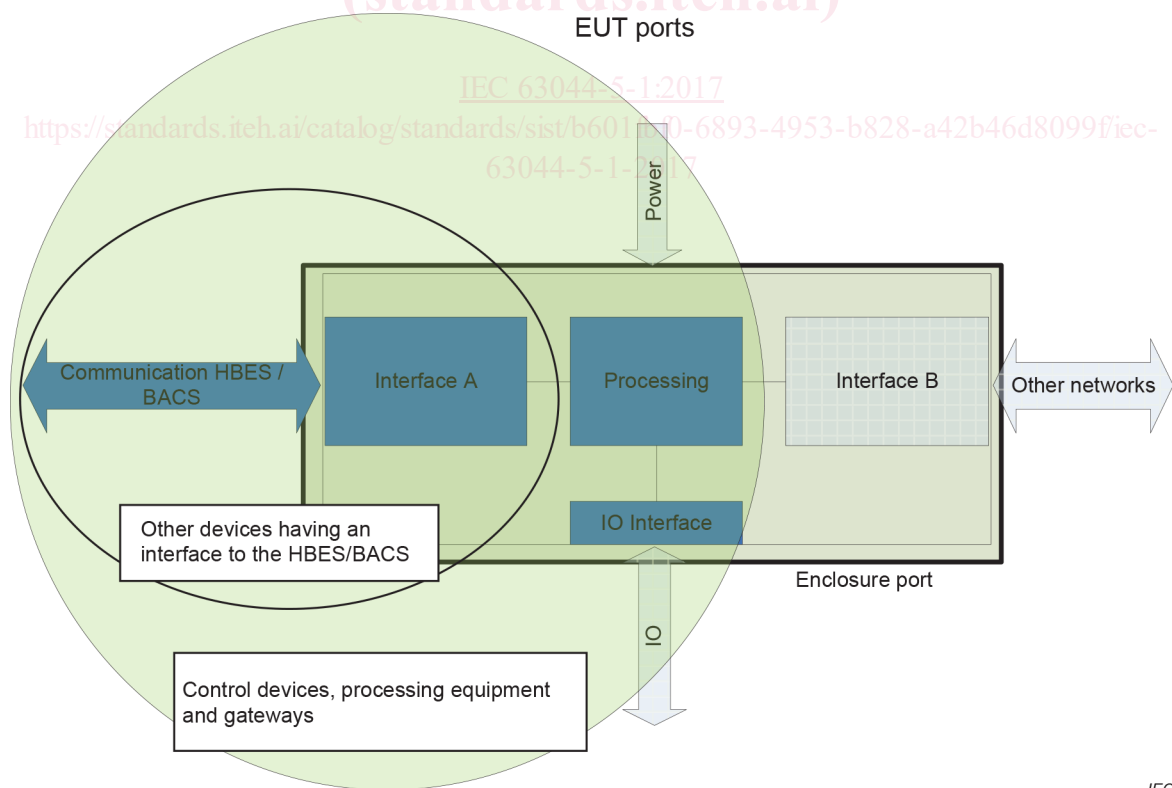
particular interface of the specified device with the external electromagnetic environment

Note 1 to entry: See Figure 1.



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Figure 1 – EUT ports

3.1.2 enclosure port

physical boundary of the apparatus which electromagnetic fields may radiate through or impinge on

3.1.3 I/O signal port

port at which a conductor or cable intended to carry auxiliary signals, excluding network signals according to 3.1.4, is connected to the apparatus

EXAMPLES Analogue inputs, outputs and control lines.

3.1.4 power port

port at which a conductor or cable carrying the primary electrical power (AC or DC) needed for the operation (functioning) of an apparatus or associated apparatus is connected to the apparatus

3.1.5 HBES/BACS network port

port at which a conductor or cable intended to carry communication signals between the different devices of the HBES/BACS network is connected to the apparatus

Note 1 to entry: For test purposes, the HBES/BACS network port is equivalent to the telecommunications/network port according to IEC 61000-6-3.

3.2 Abbreviated terms

AE	auxiliary equipment
BACS	building automation and control systems
CDN	coupling de-coupling network
EMC	electromagnetic compatibility
ESD	electrostatic discharge
EUT	equipment under test
HBES	home and building electronic systems
HCP	horizontal coupling plane
RF	radio-frequency

4 General requirements

This document applies in the following way.

- If no applicable EMC product standard exists, the test set-up, test levels and performance criteria of the IEC 63044 series apply.
- If an applicable EMC product standard does not specify requirements for HBES applications, the test set-up, test levels and general performance criteria of the IEC 63044 series apply. The specific performance criteria of the product standard apply.
- If a product standard specifies requirements for HBES ~~(see Annex C for examples)~~, the test levels and general performance criteria of the IEC 63044 series shall be adopted as the minimum level.

5 Performance criteria

5.1 General performance criteria

During and after all tests, independent of the performance criteria, the device shall not block the communication among the other HBES devices or send unintended telegrams.

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be ~~provided by the manufacturer~~ based on intended use and noted in the test report, based on the following criteria.

- Many devices operate using sophisticated protocol services which permit the recovery of data corrupted by interference or cause re-transmission of data in the event of corruption. Transmission errors caused by the application of the tests in this document and which are subsequently corrected by the protocol services are regarded as normal and the equipment is regarded as operating as intended in such circumstances;
- Changes in stored data, such as communication error logs, and which are not directly related to the intended function of the equipment shall be ignored, or recorded ~~on request by the manufacturer~~.

5.2 Specific performance criteria

5.2.1 Performance criterion A

In addition to the general performance criteria in 5.1, the device shall continue to operate ~~according to its product documentation~~ as intended during and after the test. No unintended change of state, stored data directly related to the intended function, unintended or loss of function is allowed.

During the test, audio and/or video signals may be corrupted during the test, providing the information is kept intelligible to a qualitative evaluation.

5.2.2 Performance criterion B

In addition to the general performance criteria in 5.1, the device shall continue to operate ~~according to its product documentation~~ as intended after the test. Unintended change of state, stored data directly related to the intended function, unintended function or loss of function is not allowed after the test.

~~The measurement conditions shall be defined by the manufacturer.~~ During the test, degradation of performance is allowed as follows.

- For analogue I/O signal ports, degradation up to 10 times the tolerance specified in product documentation, with a maximum value of 50 % of full scale, is allowed.
- For digital I/O signal ports, no unexpected change of state or stored data related to the intended function is allowed.
- For HBES/BACS network port, degradation of performance is allowed, ~~but not loss of communication for longer than 1 min~~. Loss of communication is allowed during the application time of the disturbance but the communication shall be restored after application of the disturbance has stopped.

5.2.3 Performance criterion C

In addition to the general performance criteria in 5.1, temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.