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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**

IEC 63044-5-1:2017
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IEC 63044-5-1:2017
**Systemes Electroniques pour les Foyers Domestiques et les Bâtiments (HBES) et Systemes de Gestion Technique du Bâtiment (SGTB) –
Partie 5-1: CEM Exigences générales, condition et montage d’essais**



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et Systèmes de Gestion Technique du Bâtiment (SGTB) –
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BUILDING AUTOMATION AND CONTROL SYSTEMS (BACS) –****Part 5-1: EMC requirements, conditions and test set-up**

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

CDV	Report on voting
23/736/CDV	23/748/RVC

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 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 this publication will remain unchanged until the stability date indicated on the IEC website under "<http://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.

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.

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

This document is applicable (but not limited) to

- operator stations and other human–system interface devices,
- devices for management functions, [IEC 63044-5-1:2017](https://standards.iteh.ai/catalog/standards/sist/b601fbf0-6893-4953-b828-a42646d8099f/iec-63044-5-1-2017)
- 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*

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3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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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.

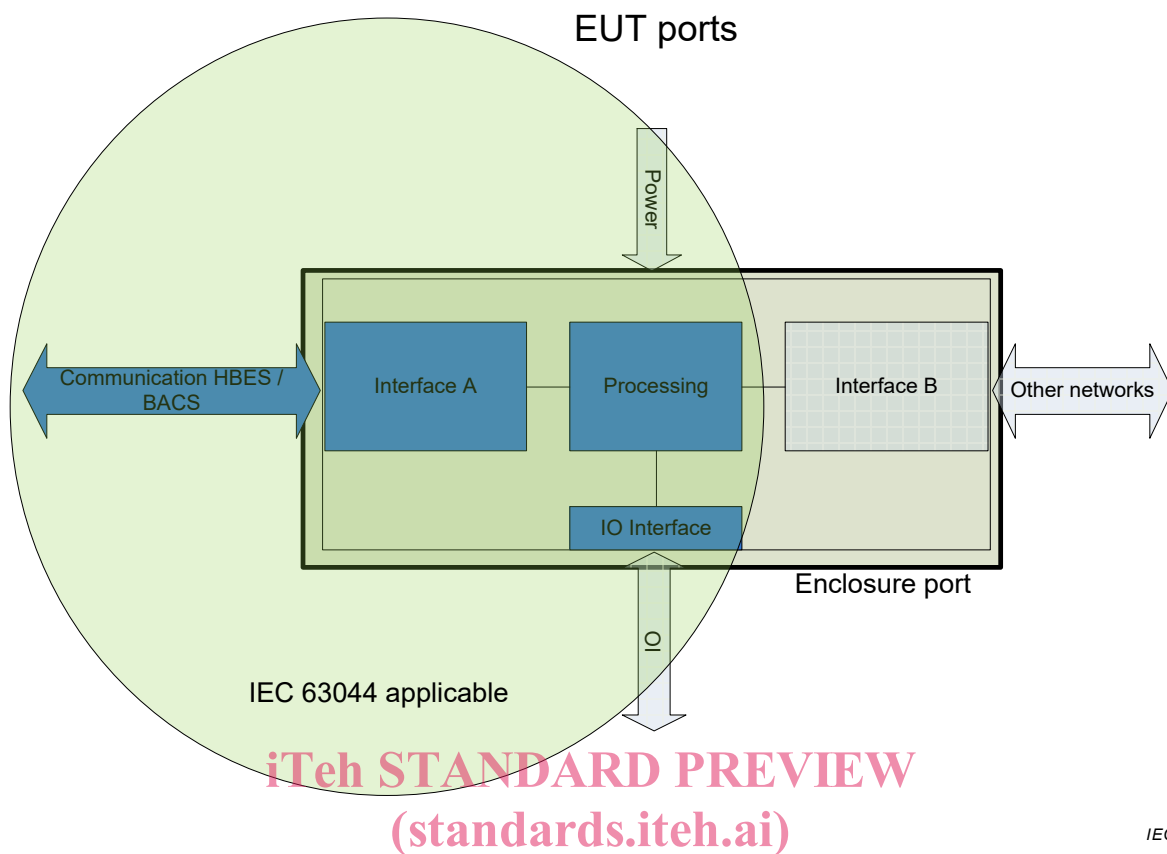


Figure 1 – EUT ports

[IEC 63044-5-1:2017](https://standards.iteh.ai/catalog/standards/sist/b601fbf0-6893-4953-b828-a42b46d8099f/iec-63044-5-1-2017)

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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

[IEC 63044-5-1:2017](https://standards.iteh.ai/catalog/standards/sist/b601fbf0-6893-4953-b828-a42b46d8099f/iec-63044-5-1-2017)

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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 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 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.

5.3 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.

5.4 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.

6 Standard test conditions

6.1 General

EMC tests are carried out on a single device (EUT).

All tests shall be done with a minimum test configuration. A minimum test configuration is a set of devices to exercise the fundamental functions of the EUT.

The minimum test configuration adopted for the EUT shall be recorded on the test report.

Examples of test set ups are provided in Annex B.

The minimum test configuration may be different for each test.

Precautions should be taken to prevent auxiliary devices from being disturbed by tests.

In addition:

- Where a relevant International product Standard (IEC) exists, which defines suitable operating condition(s) during EMC tests, the operating condition(s) of the EUT, during the test conditioning, shall be as defined in that Standard.
- Where no relevant International product Standard (IEC) exists, the operating condition(s) of the EUT, during the test conditioning, shall include at least that (those) corresponding to the main functional mode (appropriate to the test being undertaken) of the system which it forms part of.
The configuration and mode(s) of operation during the tests shall be precisely noted in the test report.
- The use of dedicated software for testing purposes is allowed, providing that all significant functions are exercised.
- All I/O signal and HBES/BACS network ports shall be tested, with cables attached. If the EUT has more than five identical ports then at least 10 % of them, with a minimum of five, shall be tested with cables attached.

NOTE The term "identical" means same hardware and software characteristics.