

STN	Spínacie a riadiace zariadenia a ich zostavy pre nízke napätie Integrácia rádiokomunikačného zariadenia nad 380 MHz do zariadenia	STN EN IEC 63404 35 4113
------------	--	--

Switchgear and controlgear and their assemblies for low voltage - Integration of radiocommunication device above 380 MHz into an equipment

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 03/25

Obsahuje: EN IEC 63404:2024, IEC 63404:2024

140265



Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2025
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii v znení neskorších predpisov.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN IEC 63404

December 2024

ICS 29.130.20

English Version

**Switchgear and controlgear and their assemblies for low voltage
- Integration of radiocommunication device above 380 MHz into
an equipment
(IEC 63404:2024)**

Appareillages et ensembles d'appareillages à basse tension
- Intégration d'un dispositif de radiocommunication de plus
de 380 MHz à un équipement
(IEC 63404:2024)

Niederspannungsschaltgeräte und deren Niederspannungs-
Schaltgerätekombinationen - Integration einer
Funkkommunikationseinrichtung oberhalb 380 MHz in ein
Gerät
(IEC 63404:2024)

This European Standard was approved by CENELEC on 2024-10-16. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 63404:2024 (E)**European foreword**

The text of document 121/151/FDIS, future edition 1 of IEC 63404, prepared by TC 121 "Switchgear and controlgear and their assemblies for low voltage" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 63404:2024.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2025-12-31
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2027-12-31

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 63404:2024 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60947-5-2 NOTE Approved as EN IEC 60947-5-2

IEC 61439-1:2020 NOTE Approved as EN IEC 61439-1:2021 (not modified)

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60417	-	Graphical symbols for use on equipment. Index, survey and compilation of the single sheets.	-	-
IEC 61000-4-39	2017	Electromagnetic compatibility (EMC) - Part 4-39: Testing and measurement techniques - Radiated fields in close proximity - Immunity test	EN 61000-4-39	2017
IEC 62479	-	Assessment of the compliance of low-power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)	EN 62479	-
IEC 62657-2	-	Industrial communication networks - Coexistence of wireless systems - Part 2: Coexistence management	EN IEC 62657-2	-
ISO 7000	-	Graphical symbols for use on equipment - Registered symbols	-	-



IEC 63404

Edition 1.0 2024-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Switchgear and controlgear and their assemblies for low voltage – Integration of radiocommunication device above 380 MHz into an equipment

Appareillages et ensembles d'appareillages à basse tension – Intégration d'un dispositif de radiocommunication de plus de 380 MHz à un équipement

**THIS PUBLICATION IS COPYRIGHT PROTECTED****Copyright © 2024 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -**webstore.iec.ch/advsearchform**

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications, symboles graphiques et le glossaire. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 500 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 25 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 63404

Edition 1.0 2024-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Switchgear and controlgear and their assemblies for low voltage – Integration of radiocommunication device above 380 MHz into an equipment

Appareillages et ensembles d'appareillages à basse tension – Intégration d'un dispositif de radiocommunication de plus de 380 MHz à un équipement

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.130.20

ISBN 978-2-8322-8281-6

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Implementation categories.....	10
5 Characteristics	13
5.1 Radiocommunication.....	13
5.2 Radiocommunication device interfaces	13
5.3 Radiofrequency capability profile of the host equipment.....	14
6 Product information and marking	15
6.1 General.....	15
6.2 Identification	15
6.3 Characteristics.....	15
6.4 Instruction for the upgrade of the radiocommunication device	15
7 Normal service, mounting and transport conditions.....	16
8 Constructional and performance requirements	16
8.1 General.....	16
8.2 Constructional.....	16
8.2.1 Upgrade of the radiocommunication device.....	16
8.2.2 Addition of an antenna port.....	17
8.2.3 Electromagnetic field	17
8.3 Radio communication performance	17
8.4 EMC	17
8.4.1 Radiocommunication	17
8.4.2 Radiofrequency capability profile	18
8.4.3 Addition or withdrawal of antenna port.....	18
9 Tests	18
9.1 Capability profile test procedure.....	18
9.2 Evaluation procedure for assemblies.....	19
9.3 Constructional.....	19
9.3.1 Upgrade of the radiocommunication device.....	19
9.3.2 Electromagnetic field	19
9.4 Performance	19
9.4.1 EMC immunity performance criteria	19
9.4.2 Radiocommunication performance	20
9.5 EMC	21
9.5.1 Radiated emissions	21
9.5.2 Conducted emissions.....	21
9.5.3 Immunity.....	22
Annex A (informative) Radiocommunication device integration use cases	23
A.1 General.....	23
A.2 Use case A – Wireless & battery-less position switch.....	23
A.3 Use case B – Proximity switch according to IEC 60947-5-2 with external voltage supply or integrated battery and integrated universal radio module and antenna.....	25

A.4	Use case C – Circuit-breaker with an embedded radiocommunication device for wireless interface	28
A.5	Use case D – Upgrade of a low-voltage assembly to become an intelligent assembly	29
Annex B (informative) Example of radiocommunication devices		31
Annex C (informative) Guidance on additional aspects to be considered in product standards		32
C.1	General	32
C.2	Configuration	32
C.3	Information to be provided with the equipment	32
C.4	Integration	32
C.4.1	General	32
C.4.2	Constructional	32
C.4.3	Performance	33
C.4.4	Electromagnetic compatibility	33
C.4.5	Coexistence management and electromagnetic environment	33
C.4.6	Embedded software	34
C.4.7	Security aspects	34
C.4.8	Routine and sampling tests	34
Bibliography		35
Figure 1 – Example of radiocommunication implementation category 1		11
Figure 2 – Example of radiocommunication implementation category 1 with distributed embedded software		11
Figure 3 – Example of radiocommunication implementation category 2		11
Figure 4 – Example of radiocommunication implementation category 2 on two printed circuit boards		12
Figure 5 – Example of radiocommunication implementation category 3		12
Figure 6 – Example of radiocommunication implementation category 4		12
Figure 7 – Examples of radiofrequency capability profile		14
Figure 8 – Example of transmit mask		21
Figure B.1 – Example of integration of a radiocommunication device into a wireless communication interface		31
Table 1 – Performance criterion		20

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SWITCHGEAR AND CONTROLGEAR AND
THEIR ASSEMBLIES FOR LOW VOLTAGE – INTEGRATION OF
RADIOCOMMUNICATION DEVICE ABOVE 380 MHZ INTO AN EQUIPMENT**

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 itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 63404 has been prepared by IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage. It is an International Standard.

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

Draft	Report on voting
121/151/FDIS	121/158/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.

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, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

In the context of the fast evolution of radiocommunication technologies and the long lifetime of low voltage equipment, this document proposes the evaluation and verification of the initial integration and update of radiocommunication devices within host equipment, including the hardware or the software.

The aim of this document is to define the tasks of testing the host equipment when integrating and updating the radiocommunication device into low voltage equipment (e.g. circuit-breaker, sensor, electric actuator, etc.). In general, this document gives requirements for components hosting a radiocommunication device in order to facilitate their integration into an assembly.

This document is intended to be referenced by product standards as common radiocommunication requirements (see Annex C).

The test program has been elaborated based on the result of actual IEC 61000-4-39 testing by equipment manufacturers and test laboratories. This test allows the characterisation of radiofrequency band(s) and amplitude(s) which is called a capability profile. This capability profile can be used to demonstrate the capability of an equipment to host various radiocommunication devices when their characteristics are within the limits given by the capability profile.

The integration of a pre-evaluated radiocommunication device according to its radiotechnology standard into a host equipment can affect its radio transmitter performances. This document includes the verification of the radiocommunication functions after integration following the main guidance from ETSI EG 203 367, FCC KDB 996369 D04, MIIT No.129:2021 and GRFC N 07-20-03-001:2007.

SWITCHGEAR AND CONTROLGEAR AND THEIR ASSEMBLIES FOR LOW VOLTAGE – INTEGRATION OF RADIOCOMMUNICATION DEVICE ABOVE 380 MHZ INTO AN EQUIPMENT

1 Scope

This document defines radiocommunication related requirements for equipment intended to integrate a radiocommunication device. It includes the initial integration and update of a the radiocommunication device, having a carrier frequency greater than 380 MHz, into new or updated host equipment with:

- The classification of integration categories;
- The EMC immunity verification using a capability profile approach;
- The verification of the unwanted emission level of the radio transceiver.

This document also provides typical radiocommunication device integration use cases (see Annex A).

The object of this document is to define the required evaluation when incorporating a radiocommunication device into a new or updated host equipment.

This document is intended to be referred by the product standard of the host equipment for providing additional characteristics, performance, and evaluation regarding the integration and update of a radiocommunication device (see Annex C). It can also be used by the manufacturer of the host equipment when no applicable product standard exists.

In addition, this document provides guidance on considerations to be addressed in product standards including safety and security matter.

This document does not cover:

- The test of the radiocommunication device according to its radiotechnology standard or specification (e.g. IEEE 802.11, IEEE 802.15.4);
- Allocation of radio frequencies;
- The impact on the application of the equipment;
- The safety related requirements of the host equipment (see the applicable product standard)
- Hazards related to remote control operations (see the applicable product standard);
- Over the air software updates (under consideration for the next revision).

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 60417, *Graphical symbols for use on equipment*, available at <http://www.graphical-symbols.info/equipment>

IEC 61000-4-39:2017, *Electromagnetic compatibility (EMC) – Part 4-39: Testing and measurement techniques – Radiated fields in close proximity – Immunity test*

IEC 62479, *Assessment of the compliance of low-power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)*

IEC 62657-2, *Industrial networks – Coexistence of wireless systems – Part 2: Coexistence management*

ISO 7000, *Graphical symbols for use on equipment*, available at <http://www.graphical-symbols.info/equipment>

koniec náhľadu – text ďalej pokračuje v platenej verzii STN