



DPC: 24 / 30497861 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 01 August 2024

Origin: International

Latest date for receipt of comments: 16 October 2024

Project No. 2024/02151

Responsible committee: EPL/47 Semiconductors

Interested committees:

Title: BS EN IEC 63551-1 Semiconductor devices - Detection modules of autonomous land vehicle

Part 1: Testing methods of detection performance for LiDAR

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

**WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD.
THIS DRAFT IS NOT CURRENT BEYOND 16 October 2024**

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <http://standardsdevelopment.bsigroup.com>

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



47/2864/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 63551-1 ED1

DATE OF CIRCULATION:

2024-07-26

CLOSING DATE FOR COMMENTS:

2024-11-15

SUPERSEDES DOCUMENTS:

47/2818/NP, 47/2834/RVN

IEC TC 47 : SEMICONDUCTOR DEVICES

SECRETARIAT:

Korea, Republic of

SECRETARY:

Mr Cheolung Cha

OF INTEREST TO THE FOLLOWING COMMITTEES:

HORIZONTAL FUNCTION(S):

ASPECTS CONCERNED:

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

Semiconductor devices - Detection modules of autonomous land vehicle - Part 1: Testing methods of detection performance for LiDAR

NOTE FROM TC/SC OFFICERS:

Copyright © 2024 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

CONTENTS

FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	7
3 Terms, definitions and abbreviated terms	7
3.1 Terms and definitions	7
3.2 Abbreviated terms	8
4 Standard testing conditions	8
4.1 General	8
4.2 Standard testing environmental conditions	9
4.3 Standard testing room conditions	9
4.4 Standard DUT conditions	9
5 Standard testing equipment	9
5.1 Standard target requirements	9
5.2 Standard LMD requirements	10
6 Standard testing setup and coordinate system	10
7 Testing methods	11
7.1 General	11
7.2 Detection distance	12
7.3 Radial resolution	12
7.4 Angular resolution	13
7.5 Field of view	13
7.6 Response time	14
7.7 Position accuracy	14
7.8 Linearity	15
7.9 Frequency	15
7.10 Optical interference	15
Annex A (informative) Application per type of detection system	17
A.1 Application per type of detection system	17
Annex B (informative) Objectives of standardization	18
B.1 Testing optical performance of LiDAR device (or Boundary of test)	18
B.2 Three test level	18
Annex C (informative) Automated test facility	20
Annex D (informative) Justification of system level test	21
Bibliography	22
Figure 1 – Target testing coordinate system	10
Figure 2 – Point target testing coordinate system	11
Figure 3 – Angular resolution testing coordinate system	11
Figure B.1 – Functional structure of a LiDAR-Sensor	18
Figure C.1 – Automated Motion detector test facility that is built based on IEC 63180	20
Figure D.1 – Operating schemes:(a) Rotating 2D LiDAR, (b)rotating 3D LiDAR, (c) solid state 3D LiDAR	24

Table A.1 – Application per type of detection system	17
--	----

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SEMICONDUCTOR DEVICES - DETECTION MODULES OF AUTONOMOUS
LAND VEHICLE****Part 1: Testing methods of detection performance for LiDAR**

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/IEC and ISO] [draws/draw] attention to the possibility that the implementation of this document may involve the use of (a) patent(s). [IEC/IEC and ISO] [takes/take] 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/IEC and ISO] [had/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> [and/or] www.iso.org/patents. [IEC/IEC and ISO] shall not be held responsible for identifying any or all such patent rights.

IEC 63551-1 has been prepared by subcommittee WG6: Incubating Working Group, of IEC technical committee TC47: Semiconductor devices. It an International Standard.

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

Draft	Report on voting
XX/XX/FDIS	XX/XX/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.

54 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
55 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
56 at https://www.iec.ch/members_experts/refdocs. The main document types developed by IEC
57 are described in greater detail at <https://www.iec.ch/standardsdev/publications>.

58 The committee has decided that the contents of this document will remain unchanged until the
59 stability date indicated on the IEC website under webstore.iec.ch in the data related to the
60 specific document. At this date, the document will be

- 61 • reconfirmed,
- 62 • withdrawn,
- 63 • replaced by a revised edition, or
- 64 • amended.

65

INTRODUCTION

66 The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed
67 that compliance with this document may involve the use of a patent. IEC takes no position
68 concerning the evidence, validity, and scope of this patent right.

69 The holder of this patent right has assured IEC that s/he is willing to negotiate licences under
70 reasonable and non-discriminatory terms and conditions with applicants throughout the world.
71 In this respect, the statement of the holder of this patent right is registered with IEC. Information
72 may be obtained from the patent database available at <https://patents.iec.ch/>.

73 Attention is drawn to the possibility that some of the elements of this document may be the
74 subject of patent rights other than those in the patent database. IEC shall not be held
75 responsible for identifying any or all such patent rights.