

TECHNICAL SPECIFICATION



**Measurement procedures of magnetic field levels generated by electronic and electrical equipment in the automotive environment with respect to human exposure –
Part 1: Low frequency magnetic fields**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2019 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.

IEC Central Office
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 It also gives information on projects, replaced and withdrawn publications.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.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

TECHNICAL SPECIFICATION



**Measurement procedures of magnetic field levels generated by electronic and electrical equipment in the automotive environment with respect to human exposure –
Part 1: Low frequency magnetic fields**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 17.220.20

ISBN 978-2-8322-7248-0

Warning! Make sure that you obtained this publication from an authorized distributor.

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 Measurement procedure	8
4.1 Measurement phases.....	8
4.2 Measuring conditions	8
4.3 Test site.....	9
4.4 Vehicle set-up.....	9
4.5 Measurement locations	9
4.5.1 General	9
4.5.2 Inside the vehicle.....	9
4.5.3 Outside the vehicle	10
5 Measurement technique	11
5.1 Measuring equipment.....	11
5.2 Measurement of the magnetic field exposure	11
6 Measurement procedure	11
6.1 Vehicle in stationary mode	11
6.1.1 General	11
6.1.2 Flowchart.....	11
6.1.3 Phase 1: vehicle preparation	12
6.1.4 Phase 2: vehicle set-up	12
6.1.5 Phase 3: vehicle measurement	12
6.2 Vehicle in driving mode.....	13
6.2.1 General	13
6.2.2 Flowchart.....	13
6.2.3 Phase 1: vehicle preparation	13
6.2.4 Phase 2: vehicle set-up	13
6.2.5 Phase 3: vehicle measurement (at constant speed)	13
6.2.6 Phase 4: optional measurements	14
6.3 Vehicle in acceleration mode	14
6.3.1 General	14
6.3.2 Flowchart.....	14
6.3.3 Phase 1: vehicle preparation	14
6.3.4 Phase 2: vehicle set-up	14
6.3.5 Phase 3: vehicle measurement (in acceleration)	14
6.4 Vehicle in plug-in charging mode	15
6.4.1 General	15
6.4.2 Flowchart.....	15
6.4.3 Phase 1: vehicle preparation	15
6.4.4 Phase 2: vehicle set-up	16
6.4.5 Phase 3: vehicle measurement	16
7 Test report.....	16

8	Assessment.....	16
	Annex A (informative) Practical measurement advice.....	17
	A.1 Motivation	17
	A.2 Measurement adaptor	17
	Annex B (informative) Maximum extents of measurement volumes inside the vehicle	18
	B.1 Motivation	18
	B.2 Anthropometrical information	18
	B.3 Maximum extents of measurement volumes	19
	Bibliography.....	20

	Figure 1 – Example of test volumes taking account of all body parts for a left-hand drive vehicle	10
	Figure 2 – Specific stationary mode set-up and test.....	12
	Figure 3 – Specific driving mode set-up and test.....	13
	Figure 4 – Specific acceleration mode set-up and test	14
	Figure 5 – Specific plug-in charging mode set-up and test.....	15
	Figure 6 – Plug-in charging supply cable positioning	16
	Figure A.1 – Disc spacer around two types of measurement probes.....	17
	Figure A.2 – Hemispherical spacer around two types of measurement probes	17
	Figure B.1 – Summary of relevant anthropometrical data	18

Withhold

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MEASUREMENT PROCEDURES OF MAGNETIC FIELD LEVELS
GENERATED BY ELECTRONIC AND ELECTRICAL EQUIPMENT IN THE
AUTOMOTIVE ENVIRONMENT WITH RESPECT TO HUMAN EXPOSURE –****Part 1: Low frequency magnetic fields**

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

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a Technical Specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62764-1, which is a Technical Specification, has been prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure.

The text of this Technical Specification is based on the following documents:

Draft TS	Report on voting
106/477/DTS	106/493/RVDTS

Full information on the voting for the approval of this Technical Specification 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.

A list of all parts in the IEC 62764 series, published under the general title *Measurement procedures of magnetic field levels generated by electronic and electrical equipment in the automotive environment with respect to human exposure*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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

This document specifies a methodology for determining the exposure to multiple magnetic field sources for passenger cars and light commercial vehicles including standardized operating conditions and measurement volumes and/or surfaces.

Withdrawn