INTERNATIONAL STANDARD

IEC 61108-1

Second edition
2003-07

Maritime navigation and radiocommunication equipment and systems – Global navigation satellite systems (GNSS) –

Part 1: Global positioning system (GPS) – Receiver equipment – Performance standards, methods of testing and required test results

Matériels et systèmes de navigation et de radiocommunication maritimes – Système mondial de navigation par satellite (GNSS) –

Partie 1: Système de positionnement par satellite GPS – Matériel de réception – Normes de fonctionnement, méthodes d'essai et résultats d'essai exigibles

© IEC 2003 — Copyright - all rights reserved

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 the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE U

For price, see current catalogue

CONTENTS

FOREWORD 3

1 Scope 5
2 Normative references 5
3 Terms, definitions and abbreviations 6
3.1 Definitions 6
3.2 Abbreviations 6
4 Minimum performance standards 7
4.1 Object 7
4.2 GPS receiver equipment 7
4.3 Performance standards for GPS receiver equipment 8
5 Methods of testing and required test results 15
5.1 Test sites 15
5.2 Test sequence 15
5.3 Standard test signals 15
5.4 Determination of accuracy 16
5.5 Test conditions 16
5.6 Methods of test and required test results 17
5.7 Typical interference conditions 24
5.8 Performance checks under IEC 60945 conditions 28

Figure 1 – Broadband interference environment 25
Figure 2 – CW interference mask 25

Table 1 – Acquisition time limits 10
Table 2 – Accuracy of COG 14

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) –

Part 1: Global positioning system (GPS) – Receiver equipment – Performance standards, methods of testing and required test results

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, 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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
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.

International Standard IEC 61108-1 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This second edition cancels and replaces the first edition published in 1996.

This edition of the IEC standard for GPS, compared to the previous edition, includes the following technical changes:

a) it reflects the changes brought about by IMO adopting GPS as part of the carriage requirement on ships defined in SOLAS Chapter V;
b) the new IMO performance standard, resolution MSC.112(73), replaced the previous issue, A.819(19), for new installations on the 1st of July 2002. This second edition of IEC 61108-1 incorporates revised tests for type approvals to the new performance standard;

c) changes include the need for a data output to the IEC 61162 series giving COG SOG and UTC with validity marking, operation during interference conditions and improved failure warnings.

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

FDIS	Report on voting
80/371/FDIS	80/373/RVD

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.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

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

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

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) –

Part 1: Global positioning system (GPS) – Receiver equipment – Performance standards, methods of testing and required test results

1 Scope

This part of IEC 61108 specifies the minimum performance standards, methods of testing and required test results for GPS shipborne receiver equipment, based on IMO Resolution MSC.112(73), which uses the signals from the United States of America, Department of Defence (US DOD), Global Positioning System (GPS) in order to determine position. A description of the GPS SPS is given in the normative reference – GPS, SPS signal specification – USA Department of Defence – 3rd Edition October 2001. This receiver standard applies to phases of the voyage "other waters" as defined in IMO Resolution A.529(13).

All text of this standard, whose meaning is identical to that in IMO Resolution MSC.112(73), is printed in *italics* and the Resolution and paragraph number indicated between brackets i.e. (M.112/A1.2).

The requirements in clause 4 are cross-referenced to the tests in clause 5 and vice versa.

2 Normative references

The following referenced documents are indispensable for the application 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 60721-3-6:1987, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Ship environment*

IEC 60945, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61162 (all parts), *Maritime navigation and radiocommunication equipment and systems – Digital interfaces*

IMO Resolution A.529(13):1983, *Accuracy standards for navigation*

IMO Resolution A.694(17):1991, *General requirements for shipborne radio equipment forming part of the Global maritime distress and safety system (GMDSS) and for electronic navigational aids*

IMO Resolution A.815(19):1995, *Worldwide radionavigation system*

IMO Resolution MSC.112(73):2000, *Performance standards for shipborne global positioning system (GPS) receiver equipment*

IMO Resolution MSC.114(73):2000, *Performance standards for shipborne DGPS and DGLONASS maritime radio beacon receiver equipment*

ITU-R Recommendation M.823-1:1995, *Technical characteristics of differential transmissions for global navigation satellite systems (GNSS) from maritime radio beacons in the frequency band 285 kHz-325 kHz (283,5 kHz-315 kHz in Region 1)*

ITU-R Recommendation M.823-2:1997, *Technical characteristics of differential transmissions for Global Navigation Satellite Systems from maritime radio beacons in the frequency band 283.5-315 kHz in Region 1 and 285-325 kHz in Regions 2 and 3*

ITU-R Recommendation M.1477:2000, *Technical and performance characteristics of current and planned radionavigation-satellite service (space-to-Earth) and aeronautical radio-navigation service receivers to be considered in interference studies in the band 1 559-1 610 MHz*

Global Positioning System – Standard Positioning Service – Performance Specification – USA Department of Defence – 3rd Edition October 2001