



IEC/TR 62002-4

Edition 1.0 2009-04

# TECHNICAL REPORT

---

**Mobile and portable DVB-T/H radio access –  
Part 4: Measurement methods for total radiated sensitivity in hand-held  
broadcast terminals**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

PRICE CODE

**M**

---

ICS 33.060.29 33.170

ISBN 978-2-88910-603-5

## CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references .....	6
3 Abbreviations .....	7
4 Basic concepts .....	7
4.1 Effective Isotropic Sensitivity ( <i>EIS</i> ) .....	7
4.2 Total Radiated Sensitivity ( <i>TRS</i> ).....	7
5 Measurement conditions.....	8
5.1 Initial conditions .....	8
5.2 Measurement chamber .....	9
5.3 Frequencies .....	9
5.4 Sampling grid .....	9
6 Measurement procedure.....	9
6.1 Set-up .....	9
6.2 Calibration.....	9
6.3 <i>TRS</i> measurements.....	10
6.4 <i>EIS</i> measurement .....	10
6.5 Calculation of the <i>TRS</i> at other channels.....	10
Annex A (informative) <i>TRS</i> and the peak antenna gain defined in IEC 62002-1.....	11
Bibliography.....	12
Table A.1 – Typical <i>TRS</i> for terminal category c for QPSK 1/2, MPE-FEC 3/4.....	11

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## MOBILE AND PORTABLE DVB-T/H RADIO ACCESS –

**Part 4: Measurement methods for total radiated sensitivity  
in hand-held broadcast terminals**

## 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 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.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 62002-4, which is a technical report, has been prepared by technical area 1: Terminals for audio, video and data services and content, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
100/1498/DTR	100/1525/RVC

Full information on the voting for the approval of this technical report 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 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.

## INTRODUCTION

This Technical Report describes a measurement method to assess the radio performance of a DVB-T/H hand-held terminal by measuring the radiated sensitivity of the terminal. It is a simplified version of the method described in 3GPP TR 25.914 [1]<sup>1</sup>, and is adopted to be suitable for a broadcast receiver supporting a wide range of reception frequencies.

---

<sup>1</sup> The figure in square brackets refers to the Bibliography.

## MOBILE AND PORTABLE DVB-T/H RADIO ACCESS –

### Part 4: Measurement methods for total radiated sensitivity in hand-held broadcast terminals

#### 1 Scope

This part of IEC 62002 gives a standard method to test Total Radiated Sensitivity (*TRS*) of a category c) terminal specified in IEC 62002-1. This is a practical measure of the radiated sensitivity as it takes into account both the terminal antenna efficiency and possible terminal generated additional noise. Moreover, it can be used directly in the link budget calculations for the network coverage predictions. The motivation for the TR has been the lack of suitable measurement methods to characterise the terminal antenna in a common and practical way. As the 3GPP TR 25.914 method is in many ways suitable for the task, it was decided to develop a simplified version of this method by taking into account the special requirements for broadcast terminals. The test method applies to terminals in terminal category c) with either internal or external antennas. The effect of the user on the antenna radiation pattern is not taken into account.

The method is based on a 3-D radiation pattern measurement. At first a full 3-D  $4\pi$  sensitivity measurement is performed at three frequencies with both polarisations. From this measurement the *TRS* at these frequencies can be calculated. The best direction for sensitivity at the middle frequency is observed and then the Effective Isotropic Sensitivity (*EIS*) is measured in this direction at all specified reception channels. It is assumed that the average difference between the measured *EIS* and *TRS* is valid also for the other frequencies and thus the *TRS* at all specified channels can be calculated.

#### 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 62002-1:2008, *Mobile and portable DVB-T/H radio access – Part 1: Interface specification*

IEC 62002-2:2008, *Mobile and portable DVB-T/H radio access – Part 2: Interface conformance testing*

IEC/TR 62002-3, *Mobile and portable DVB-T/H radio access – Part 3: Measurement interface*