

This is a preview of "BS EN 62753:2015". Click here to purchase the full version from the ANSI store.

**BS EN 62753:2015**



**BSI Standards Publication**

# **Digital terrestrial television receivers for the DTMB system**

**bsi.**

...making excellence a habit.™

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

This British Standard is the UK implementation of EN 62753:2015. It is identical to IEC 62753:2015.

The UK participation in its preparation was entrusted to Technical Committee EPL/100, Audio, video and multimedia systems and equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2015.

Published by BSI Standards Limited 2015

ISBN 978 0 580 80683 4

ICS 33.160; 33.170

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2015.

#### **Amendments/corrigenda issued since publication**

<b>Date</b>	<b>Text affected</b>
-------------	----------------------

---

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

## EUROPÄISCHE NORM

October 2015

ICS 33.160; 33.170

English Version

## Digital terrestrial television receivers for the DTMB system (IEC 62753:2015)

Récepteurs de Télévision Numérique Terrestre destiné  
au système DTMB  
(IEC 62753:2015)

Digitale terrestrische Fernsehempfänger  
für das DTMB-System  
(IEC 62753:2015)

This European Standard was approved by CENELEC on 2015-07-10. 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

The text of document 100/2108/CDV, future edition 1 of IEC 62753, prepared by Technical Area 1 "Terminals for audio, video and data services and contents" of IEC/TC 100 "Audio, video and multimedia systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62753:2015.

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) 2016-04-10
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-07-10

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

### **Endorsement notice**

The text of the International Standard IEC 62753:2015 was approved by CENELEC as a European Standard without any modification.

This is a preview of "BS EN 62753:2015". Click here to purchase the full version from the ANSI store.

(normative)

### Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When 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](http://www.cenelec.eu)

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61937-12	-	Digital audio - Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 - Part 12: Non-linear PCM bitstreams according to the DRA formats	EN 61937-12	-
ISO/IEC 13818-1	-	Information technology - Generic coding of moving pictures and associated audio information - Part 1: Systems	-	-
ISO/IEC 13818-2	-	Information technology - Generic coding of moving pictures and associated audio information - Part 2: Video	-	-
ISO/IEC 13818-3	-	Information technology - Generic coding of moving pictures and associated audio information - Part 3: Audio	-	-
ETSI ETR 154	-	Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 Systems, Video and Audio in satellite, cable and terrestrial broadcasting applications	-	-
ETSI TS 102 366	-	Digital Audio Compression (AC-3, Enhanced AC-3) Standard	-	-

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

## CONTENTS

FOREWORD.....	7
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references.....	10
3 Abbreviations and symbols .....	10
4 Summary of DTMB transmission system.....	12
4.1 General.....	12
4.2 Processing of DTMB transmitter .....	12
4.3 Processing of DTMB receiver .....	13
5 Receiver capabilities.....	13
5.1 Frequency spectrum.....	13
5.1.1 Frequency range.....	13
5.1.2 Channel bandwidth .....	13
5.1.3 Frequency acquisition range.....	13
5.2 Power supply requirements .....	13
5.3 Interface requirements .....	13
5.4 Working modes .....	14
5.5 Program search and tuning.....	14
5.5.1 General .....	14
5.5.2 Receive quality display.....	14
5.5.3 Automatic search .....	15
5.5.4 Manual search .....	15
5.5.5 Modulation parameters change.....	15
5.6 Demultiplex characteristics.....	15
5.6.1 General .....	15
5.6.2 TS data rate.....	15
5.6.3 STC recovery.....	15
5.6.4 Error control.....	15
5.6.5 PID filters .....	15
5.6.6 Multi-component programs .....	15
5.7 Transport stream decoding characteristics.....	16
5.7.1 Service and program information .....	16
5.7.2 EPG .....	18
5.7.3 Presentation of subtitle .....	18
5.8 Function requirements.....	18
5.8.1 General .....	18
5.8.2 Software version update.....	19
5.8.3 Chinese graphical operation interface.....	19
5.8.4 Service list.....	19
5.8.5 Status bar .....	20
5.8.6 User parameter settings and storage .....	20
5.8.7 Power failure memory .....	20
5.8.8 Restore factory settings .....	21
5.8.9 Real time clock .....	21
6 Video and audio system characteristics.....	21

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

6.1	Video system characteristics .....	21
6.1.1	General .....	21
6.1.2	Fast acquisition.....	21
6.1.3	Still images.....	21
6.1.4	Baseband video input format .....	21
6.2	Audio system characteristics .....	22
7	RF part and channel decoder .....	22
7.1	RF port .....	22
7.1.1	RF input port.....	22
7.1.2	RF loop output port .....	22
7.2	Performance .....	23
7.2.1	Failure point criteria .....	23
7.2.2	Carrier to noise ratio threshold .....	23
7.2.3	Minimum signal input levels.....	23
7.2.4	Maximum signal input level .....	23
7.2.5	Immunity to analogue signals in an adjacent channel .....	23
7.2.6	Immunity to co-channel analogue signals.....	24
7.2.7	Immunity to digital signals in an adjacent channel.....	24
7.2.8	Immunity to co-channel digital signals .....	25
7.2.9	Resistance to 0 dB echo.....	25
7.2.10	Resistance to dynamic multipath channel .....	26
7.2.11	Resistance to pulse noise interference .....	26
8	Test method .....	26
8.1	RF demodulation and channel decoding.....	26
8.1.1	General .....	26
8.1.2	Frequency range.....	27
8.1.3	Frequency acquisition range.....	27
8.1.4	Program search and tuning .....	27
8.1.5	Return loss of RF input port.....	28
8.1.6	C/N threshold of Gaussian .....	29
8.1.7	Signal input level range.....	29
8.1.8	Immunity to analogue signals in adjacent channels .....	30
8.1.9	Immunity to analogue signals in a co-channel .....	30
8.1.10	Immunity to digital signals in adjacent channels .....	31
8.1.11	Immunity to digital signals in a co-channel.....	31
8.1.12	Resistance to 0 dB echo.....	32
8.1.13	Resistance to a dynamic multipath channel.....	32
8.1.14	Resistance to pulse noise interference .....	33
8.2	Demultiplex characteristics.....	33
8.2.1	TS data rate.....	33
8.2.2	STC recovery.....	34
8.2.3	Error control.....	34
8.2.4	PID filters .....	35
8.2.5	Multi-component programs processing.....	35
8.3	Transport stream decoding.....	35
8.3.1	Service and program information .....	35
8.3.2	EPG .....	36
8.3.3	Presentation of text.....	36
8.4	Power endurance .....	36

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

8.4.1	Power voltage endurance .....	36
8.4.2	Power frequency endurance .....	37
Annex A (normative)	Acceptable error free .....	38
Annex B (normative)	Multipath channel models .....	39
B.1	Rayleigh channel model .....	39
B.2	Rice channel model .....	39
B.3	Dynamic multipath channel model .....	40
Annex C (informative)	Guide to the implementing of a DRA audio decoder in a DTMB receiver .....	41
C.1	General .....	41
C.2	Outline, terms and definitions .....	41
C.2.1	Outline .....	41
C.2.2	Terms and definitions .....	43
C.3	DRA syntax structure .....	45
C.3.1	General .....	45
C.3.2	DRA bit stream .....	45
C.3.3	Frame .....	45
C.3.4	Frame header .....	46
C.4	Semantic .....	47
C.4.1	General .....	47
C.4.2	Bit stream .....	47
C.4.3	Frame .....	47
C.4.4	Frame header .....	48
C.4.5	Unpacking window sequence bits .....	52
C.4.6	Unpacking Huffman code book selection and application range bits .....	54
C.4.7	Unpacking quantization index bits of subband samples .....	54
C.4.8	Unpacking quantization stepsize index bits .....	54
C.4.9	Unpacking sum/difference coding decision bits .....	54
C.4.10	Unpacking joint intensity coding scale factor bits .....	55
C.4.11	Unpacking padding bits .....	55
C.4.12	Unpacking auxiliary data .....	55
C.5	Decoding .....	55
C.5.1	Channel arranging and configuration .....	55
C.5.2	Downmixing .....	57
C.5.3	De-interleaving .....	58
C.5.4	Reconstruction of the number of quantification units .....	59
C.5.5	Dequantizer .....	59
C.5.6	Joint intensity decoding .....	60
C.5.7	Sum/difference decoding .....	60
C.5.8	Variable resolution synthesis filter bank .....	60
C.5.9	Reconstruction of the short/brief window function sequence .....	63
Bibliography	.....	64
Figure 1	– Diagram of DTMB transmitter processing .....	12
Figure 2	– Diagram of DTMB receiver processing .....	13
Figure 3	– Test set-up for frequency range .....	27
Figure 4	– Test set-up for program search and tuning .....	28
Figure 5	– Test set-up for return loss .....	29



This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

Figure 6 – Test set-up for C/N threshold of Gaussian.....	29
Figure 7 – Test set-up for signal input level range .....	29
Figure 8 – Test set-up for immunity to analogue signals in adjacent channels .....	30
Figure 9 – Test set-up for immunity to digital signals in adjacent channels .....	31
Figure 10 – Test set-up for resistance to 0 dB echo .....	32
Figure 11 – Test set-up for immunity to pulse noise interference .....	33
Figure 12 – Test set-up for TS data rate .....	33
Figure 13 – Test set-up for STC recovery .....	34
Figure 14 – Test set-up for power voltage and frequency endurance .....	36
Figure C.1 – Decoder.....	42
Table 1 – Power supply requirements.....	13
Table 2 – Requirements of interface.....	14
Table 3 – Required working modes .....	14
Table 4 – Requirements of EPG supporting .....	18
Table 5 – Supporting functions.....	19
Table 6 – Video parameters .....	21
Table 7 – Video format.....	22
Table 8 – C/N for reference AEF .....	23
Table 9 – Minimum received signal level .....	23
Table 10 – Immunity to analogue signals in a $N - 1$ adjacent channel .....	24
Table 11 – Immunity to analogue signals in a $N + 1$ adjacent channel .....	24
Table 12 – Immunity to co-channel analogue signals .....	24
Table 13 – Immunity to digital signals in an adjacent channel .....	25
Table 14 – Immunity to co-channel digital signals .....	25
Table 15 – Requirements of delay to 0 dB echo.....	25
Table 16 – Requirements of C/N thresholds to 30 $\mu$ s echo .....	26
Table 17 – Resistance to dynamic multipath channel .....	26
Table 18 – Requirements of pulse noise interference length .....	26
Table B.1 – Rayleigh channel model (static).....	39
Table B.2 – Rice channel model (static) .....	40
Table B.3 – Dynamic multipath channel model.....	40
Table C.1 – Frame structure.....	47
Table C.2 – Data structure of a normal channel.....	48
Table C.3 – Data structure of LFE channel .....	48
Table C.4 – Frame header type.....	49
Table C.5 – Difference between two types of frame headers .....	49
Table C.6 – Number of bits used for decoding the length of audio data frame.....	49
Table C.7 – Sampling frequency supported by this annex .....	50
Table C.8 – Number of bits used for decoding the number of normal channels .....	50
Table C.9 – Number of bits used for decoding the number of LFE channels .....	51
Table C.10 – Channel configuration auxiliary information decision .....	51
Table C.11 – Sum/difference coding decision .....	51

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

Table C.12 – Intensity joint coding decision .....	51
Table C.13 – Window function index.....	52
Table C.14 – Number of transient clusters .....	53
Table C.15 – Implicit length of a transient cluster of a stationary frame .....	53
Table C.16 – Starting location of the first transient cluster and the location where the first transient occurs .....	53
Table C.17 – Variables used to decode sum/difference coding decision .....	54
Table C.18 – All unused sum/difference coding decision.....	55
Table C.19 – Sum/difference coding decision .....	55
Table C.20 – Default normal channel configuration .....	56
Table C.21 –Presentation of a normal channel configuration .....	56
Table C.22 – Audio data arranging the order of each channel in the audio frame.....	56
Table C.23 – Arranging the order of audio data for 5.1 channel surround sound in the audio frame .....	57
Table C.24 – Subband samples arranged in a natural order .....	58
Table C.25 – Subband samples arranged in interleaving order .....	59
Table C.26 – Optional window function around the transient location .....	63

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### DIGITAL TERRESTRIAL TELEVISION RECEIVERS FOR THE DTMB SYSTEM

#### 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.

International Standard IEC 62753 has been prepared by technical area 1: Terminals for audio, video and data services and contents of IEC technical committee 100: Audio, video and multimedia systems and equipment.

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

CDV	Report on voting
100/2108/CDV	100/2429A/RVC

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.

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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.

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

## INTRODUCTION

This International Standard contains baseline specifications and test methods of receivers for the DTMB system. The DTMB (Digital Terrestrial/Television Multimedia Broadcasting) is the digital television terrestrial broadcasting standard of China published in August 2006. The main technologies adopted in this standard are: frame header design and guard interval padding with pseudo-random noise sequences, which can be used for fast synchronization and high-efficiency channel estimation/equalization, low-density parity-check channel coding, spread spectrum transmission of system information. This standard can support payload data rate ranging from 4,813 Mbit/s to 32,486 Mbit/s, standard-definition TV and high-definition TV services, mobile and stationary receptions, multiple frequency network and single frequency network.

- Digital television, as a new generation of TV technology, can improve the transmission quality and make it possible to provide more services. With the worldwide transition from the analogue TV to digital TV, the developing prospect of the DTMB system can be expected in the future.

This is a preview of "BS EN 62753:2015". [Click here to purchase the full version from the ANSI store.](#)

## DIGITAL TERRESTRIAL TELEVISION RECEIVERS FOR THE DTMB SYSTEM

### 1 Scope

This International Standard specifies the basic functions, interfaces, performance requirements and test methods of the receivers for the Digital Terrestrial/Television Multimedia Broadcasting (DTMB) system. This standard can be applied to digital television terrestrial receivers carrying multiple SDTV programs or HDTV programs for both mobile and stationary receptions.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61937-12, *Digital audio –Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 – Part 12: Non-linear PCM bitstreams according to the DRA formats*

ISO/IEC 13818-1, *Information technology – Generic coding of moving pictures and associated audio information: Systems*

ISO/IEC 13818-2, *Information technology – Generic coding of moving pictures and associated audio information: Video*

ISO/IEC 13818-3, *Information technology – Generic coding of moving pictures and associated audio information –Part 3: Audio*

ETSI ETR 154, *Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 Systems, Video and Audio in satellite, cable and terrestrial broadcasting applications*

ETSI TS 102 366, *Digital Audio Compression (AC-3, Enhanced AC-3) Standard*

### 3 Abbreviations and symbols

For the purposes of this document, the following abbreviations apply.

AEF	Acceptable Error Free
BCH	Bose-Chaudhuri-Hocquenghem code
CA	Conditional Access
CAT	Conditional Access Table
C/N	Carrier-Noise ratio
Demux	Demultiplexer
DRA	Dynamic Resolution Adaptation
DTMB	Digital Terrestrial/Television Multimedia Broadcasting
ECM	Entitlement Control Message
EIT	Event Information Table