

International Telecommunication Union

**ITU-R**  
Radiocommunication Sector of ITU

**Recommendation ITU-R BT.1299-1**  
**(03/2010)**

**The basic elements of a worldwide common  
family of systems for digital terrestrial  
television broadcasting**

**BT Series**  
**Broadcasting service**  
**(television)**



## Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

## Policy on Intellectual Property Right (IPR)

ITU-R policy on IPR is described in the Common Patent Policy for ITU-T/ITU-R/ISO/IEC referenced in Annex 1 of Resolution ITU-R 1. Forms to be used for the submission of patent statements and licensing declarations by patent holders are available from <http://www.itu.int/ITU-R/go/patents/en> where the Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC and the ITU-R patent information database can also be found.

### Series of ITU-R Recommendations

(Also available online at <http://www.itu.int/publ/R-REC/en>)

Series	Title
<b>BO</b>	Satellite delivery
<b>BR</b>	Recording for production, archival and play-out; film for television
<b>BS</b>	Broadcasting service (sound)
<b>BT</b>	<b>Broadcasting service (television)</b>
<b>F</b>	Fixed service
<b>M</b>	Mobile, radiodetermination, amateur and related satellite services
<b>P</b>	Radiowave propagation
<b>RA</b>	Radio astronomy
<b>RS</b>	Remote sensing systems
<b>S</b>	Fixed-satellite service
<b>SA</b>	Space applications and meteorology
<b>SF</b>	Frequency sharing and coordination between fixed-satellite and fixed service systems
<b>SM</b>	Spectrum management
<b>SNG</b>	Satellite news gathering
<b>TF</b>	Time signals and frequency standards emissions
<b>V</b>	Vocabulary and related subjects

*Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.*

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## RECOMMENDATION ITU-R BT.1299-1\*

**The basic elements of a worldwide common family of systems  
for digital terrestrial television broadcasting\*\***

(1997-2010)

**Scope**

This Recommendation describes principles of the common elements, including baseband source coding, multiplexing, and modulation and channel coding, for digital terrestrial television broadcasting systems.

The ITU Radiocommunication Assembly,

*considering*

- a) the many benefits of common television broadcasting standards;
- b) that ITU-R has produced a series of Recommendations on video and audio source coding, data coding, multiplexing, and modulation and channel coding for digital terrestrial television broadcasting;
- c) that transition from analogue to digital terrestrial television continues to be implemented around the world;
- d) that differing regulatory, marketing, and delivery environments exist in different parts of the world and that these and other factors will influence the choice of systems,

*recommends*

that the elements of a worldwide common family of systems for digital terrestrial television broadcasting should be based on the following:

**1 Systems principles**

**1.1** The terrestrial system should have maximum commonality with other digital television delivery systems, such as satellite, cable, etc.

**1.2** The broadcast systems should be designed as a “container”, able to transport video and audio, and/or other data services, in a transparent and flexible way (see Recommendations ITU-R BT.1207 and ITU-R BT.1209).

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\* Radiocommunication Study Group 6 made editorial amendments to this Recommendation in 2002 in accordance with Resolution ITU-R 44.

\*\* This Recommendation should be brought to the attention of Telecommunication Standardization Study Group 9.

**1.3** The systems should permit statistical multiplexing<sup>1</sup>.

**1.4** The base system should be a single layer system capable of conveying, for example, one HDTV service or a number of SDTV quality services. The number of services per channel will depend on the available total data rate, quality required, programme content and on whether statistical multiplexing is used.

**1.5** A service information and header descriptor system should be implemented (see Recommendation ITU-R BT.1300).

## **2 Baseband coding principles**

**2.1** The image coding system should be as given in Recommendation ITU-R BT.1870 (see following Note 1).

NOTE 1 – Recommendation ITU-R BT.1870 recommends use of the ITU-T Recommendation H.262 (ISO/IEC 13818-2 (MPEG-2 Video)) and ITU-T Recommendation H.264 (ISO/IEC 14496-10 (MPEG-4 AVC)).

**2.2** The sound coding system should be as given in Recommendation ITU-R BS.1196 (see following Note 1).

NOTE 1 – Recommendation ITU-R BS. 1196 recommends use of ISO/IEC 11172-3 (MPEG-1 Audio) Layer II, ISO/IEC 13818-7 (MPEG-2 AAC) LC or LC with SBR, ISO/IEC 14496-3 (MPEG-4 Audio) AAC-LC, HE-AAC or HE-AACv2, or ETSI TS 102 366 (AC 3 or E-AC-3) for digital television broadcasting emission.

**2.3** The quality requirements for the video and audio coding system performance given in Recommendations ITU-R BT.1122 and ITU-R BS.1548 should be duly taken into account (see following Note 1).

NOTE 1 – The basic audio and video coding specifications are of syntax only, and leave room for improvement in quality due to improvements in encoder design.

## **3 Modulation and channel coding principles**

**3.1** The modulation and channel coding should be selected to allow implementation of the required delivery approach. Possible delivery approaches include single-transmitter-per-channel (as in conventional analogue TV), on-channel repeaters (OCR), gap-fillers (GF), single frequency networks (SFN) at the local and regional levels. Orthogonal frequency division multiplexing (OFDM) or 8-VSB (vestigial sideband) should be used depending, among other things, on the delivery environment (see Recommendation ITU-R BT.1306).

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<sup>1</sup> Statistical multiplexing is a technique used for multi-programme transmission in a single channel to improve the overall programme quality or to effectively use the available channel capacity by dynamically allocating the bit-rate to each programme that shares a given channel capacity.