

# ITU-R

Radiocommunication Sector of ITU

## Recommendation ITU-R BT.1543-1 (06/2015)

**1 280 × 720, 16:9 progressively-captured  
image format for production and  
international programme exchange  
in the 60 Hz environment**

**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.1543-1

**1 280 × 720, 16:9 progressively-captured image format for production and international programme exchange in the 60 Hz environment**

(Question ITU-R 1/6)

(2001-2015)

**Scope**

This Recommendation defines the digital image parameters for the 1 280 × 720, 16:9 progressively-captured image format for production and international programme exchange in the 60 Hz environment.<sup>1</sup>

**Keywords**

Progressive, 1 280 × 720

The ITU Radiocommunication Assembly,

*considering*

- a) that digital content production will increasingly include a mixture of audio, video, data and interactive content;
- b) that digital production equipment is increasingly designed to operate with a variety of image formats including 1 280 × 720, 16:9, progressively-captured (720/P);
- c) that production-quality conversion from progressive to other formats is easy to achieve;
- d) that 720/P format at 30/60 Hz provides a useful set of vertical-temporal/compressed bit rate options;
- e) that a 720/P production format offers an effective format for high vertical temporal resolution carried within the commonly used 1.5 Gbit/s production serial digital interface;
- f) that a maximum of commonality with the parameter values of Recommendation ITU-R BT.709 is advantageous for interchange;
- g) that the 720/P format provides a set of spatial characteristics between Recommendations ITU-R BT.601 and ITU-R BT.709, which is an efficient option for certain applications of acquisition, production and storage;
- h) that image format interoperability with computer applications is increasingly important, and the 720/P format is well matched to them,

*recommends*

- 1 that, for production and international programme exchange in the 60 Hz environment, in the 1 280 × 720 image format, the parameters in Annex 1 should be used.

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<sup>1</sup> Previous versions of this Recommendation that may contain historic information can be found on the ITU website.

## Annex 1

### 1 280 × 720 progressive capture system

#### Introduction

This image format is defined to have common picture parameter values independent of the picture rate including the common system reference clock frequency of 74.25 MHz. The following picture rates are specified in this Annex: 60 Hz, 60/1.001 Hz, 30 Hz, 30/1.001 Hz.

Pictures are defined for progressive capture (P) only.

#### 1 Opto-electronic conversion

| Item | Parameter                                                                                    | Value                                                                                                                                                                                               |        |
|------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 1.1  | Opto-electronic transfer characteristics before non-linear pre-correction                    | Assumed linear                                                                                                                                                                                      |        |
| 1.2  | Overall opto-electronic transfer characteristics at source <sup>2</sup>                      | $V = 1.099 L^{0.45} - 0.099$ for $1 \geq L \geq 0.018$<br>$V = 4.500 L$ for $0.018 > L \geq 0$<br>where:<br>$L$ : luminance of the image $0 \leq L \leq 1$<br>$V$ : corresponding electrical signal |        |
| 1.3  | Chromaticity coordinates (CIE, 1931)<br>Primary:<br>– Red (R)<br>– Green (G)<br>– Blue (B)   | $x$                                                                                                                                                                                                 | $y$    |
|      |                                                                                              | 0.640                                                                                                                                                                                               | 0.330  |
|      |                                                                                              | 0.300                                                                                                                                                                                               | 0.600  |
|      |                                                                                              | 0.150                                                                                                                                                                                               | 0.060  |
| 1.4  | Assumed chromaticity for equal primary signals (reference white):<br><br>– $E_R = E_G = E_B$ | $D_{65}$                                                                                                                                                                                            |        |
|      |                                                                                              | $x$                                                                                                                                                                                                 | $y$    |
|      |                                                                                              | 0.3127                                                                                                                                                                                              | 0.3290 |

#### 2 Picture characteristics

| Item | Parameter                | Value               |
|------|--------------------------|---------------------|
| 2.1  | Aspect ratio             | 16:9                |
| 2.2  | Samples per active line  | 1 280               |
| 2.3  | Sampling lattice         | Orthogonal          |
| 2.4  | Active lines per picture | 720                 |
| 2.5  | Pixel aspect ratio       | 1:1 (square pixels) |

<sup>2</sup> In typical production practice the encoding function of image sources is adjusted so that the final picture has the desired look, as viewed on a reference monitor having the reference decoding function of Recommendation ITU-R BT.1886, in the reference viewing environment defined in Recommendation ITU-R BT.2035. Although some parameters listed in Recommendation ITU-R BT.2035 are intended for HDTV signal viewing, scaled viewing distances for 1 280 × 720 image format should be used.