



Recommendation ITU-R BT.2073-2
(01/2022)

**Use of high efficiency video coding
for UHDTV and HDTV broadcasting
applications**

BT Series
Broadcasting service
(television)



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RA	Radio astronomy
RS	Remote sensing systems
S	Fixed-satellite service
SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	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.2073-2

**Use of high efficiency video coding
for UHDTV and HDTV broadcasting applications**

(Question ITU-R 12-3/6)

(2015-2020-2022)

Scope

This Recommendation specifies the use of the high efficiency video coding (HEVC) standard as per Recommendation ITU-T H.265 | ISO/IEC 23008-2 for ultra high definition television (UHDTV) and high definition television (HDTV) broadcasting including high-dynamic range television (HDR-TV).

Keywords

UHDTV, HDR-TV, HDTV, sub-layer coding, parallel coding, sub-bit-stream

The ITU Radiocommunication Assembly,

considering

- a) that there are applications where UHDTV, HDR-TV and HDTV programme material is desired to be transported at a highly reduced bit rates with minimal visible degradation in quality;
- b) that Recommendation ITU-R BT.2020 specifies the parameters for a family of UHDTV video formats;
- c) that Recommendation ITU-R BT.2100 specifies the parameters for HDR-TV video formats;
- d) that Recommendation ITU-R BT.709 specifies the parameters for a family of HDTV video formats;
- e) that Recommendation ITU-T H.265 | ISO/IEC 23008-2 specifies the high efficiency video coding (HEVC) standard that enables significantly improved compression performance relative to former standards;
- f) that HEVC is increasingly adopted for various applications including broadcasting,

recommends

that when it is necessary to transport or record UHDTV, HDR-TV and HDTV programme material at a highly reduced bit rate for broadcasting, the high efficiency video coding (HEVC) standard specified in Recommendation ITU-T H.265 | ISO/IEC 23008-2 should be used.

NOTE 1 – Annex 1 shows basic parameters for UHDTV and HDTV broadcasting including HDR-TV using the HEVC standard.

NOTE 2 – Annex 2 shows a preferred coding scheme for the temporal sub-layer coding of UHDTV at 120 and 100 Hz frame frequencies using the HEVC standard.

NOTE 3 – Annex 3 shows a preferred coding scheme for interlaced video using the HEVC standard.

NOTE 4 – Annex 4 shows a preferred parallel coding scheme for the 7 680 × 4 320 format of UHDTV using the HEVC standard.

Abbreviations

CVS	Coded Video Sequence
DTS	Decoding Time Stamp
GOP	Group of Pictures
HDR	High Dynamic Range
IRAP	Intra Random Access Point
PTS	Presentation Time Stamp
SEI	Supplemental Enhancement Information

Annex 1

Basic parameters for UHDTV and HDTV broadcasting applications including HDR-TV, using the HEVC standard

This Annex shows basic parameters for UHDTV and HDTV broadcasting applications using the HEVC standard.

TABLE 1

Basic parameters for UHDTV and HDTV broadcasting emissions using HEVC standard⁽¹⁾

Video format		Level	Profile	Tier	Maximum bit rate ⁽⁵⁾ (Mbit/s)
Spatial resolution	Frame frequency (Hz)				
7 680 × 4 320	120 ⁽²⁾ , 100 ⁽³⁾	6.2	Main 10	Main	90-120
	60 ⁽²⁾ , 50	6.1	Main 10	Main	80-100
3 840 × 2 160	120 ⁽²⁾ , 100 ⁽³⁾	5.2	Main 10	Main	35-50
	60 ⁽²⁾ , 50	5.1	Main 10	Main	30-40
1 920 × 1 080	60 ⁽²⁾ , 50	4.1	Main 10 or Main	Main	10-15
	30 ⁽²⁾ , 25 (interlaced)	4.1 ⁽⁴⁾	Main 10 or Main	Main	10-15

⁽¹⁾ Video parameters of HDR-TV, including colour primaries and transfer characteristics, can be signalled using the VUI (video usability information) specified in Annex E of ITU T H.265 | ISO/IEC 23008-2.

⁽²⁾ Those divided by 1.001 are also included.

⁽³⁾ The use of temporal sub-layer coding is detailed in Annex 2.

⁽⁴⁾ To enable coding at a sufficient bit rate as needed, level 4.1 (the maximum bit rate is 20 Mbit/s) is preferred to level 4 (the maximum bit rate is 12 Mbit/s).

⁽⁵⁾ The data rates indicated are maximum values for a constant data rate transport for critical test sequences to be rated sufficiently high quality for broadcast emission when assessed by experts. Lower data rates may be used for less critical pictures.