

International Telecommunication Union

ITU-R
Radiocommunication Sector of ITU

Recommendation ITU-R BT.1122-2
(03/2011)

**User requirements for codecs for emission
and secondary distribution systems
for SDTV and HDTV**

BT Series
Broadcasting service
(television)



Foreword

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

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Series of ITU-R Recommendations

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

Series	Title
BO	Satellite delivery
BR	Recording for production, archival and play-out; film for television
BS	Broadcasting service (sound)
BT	Broadcasting service (television)
F	Fixed service
M	Mobile, radiodetermination, amateur and related satellite services
P	Radiowave propagation
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.1122-2*

User requirements for codecs for emission and secondary distribution systems for SDTV and HDTV

(1994-1995-2011)

Scope

This Recommendation defines user requirements that should be applied for the specifications, design and testing of systems for the secondary distribution and emission of SDTV and HDTV signals.

The ITU Radiocommunication Assembly,

considering

- a) that Recommendations ITU-R BT.601 and ITU-R BT.709 define the parameters of Y , C_B , C_R -based digital luminance and colour difference signals;
- b) that signals conforming to that standard are required to be transmitted through digital secondary distribution networks or emission systems (terrestrial, satellite, cable, etc.);
- c) that coding algorithms have been devised and standards established or proposed to enable such transmission to be effected using bit rate reduction techniques;
- d) that general advice on methods of assessment is contained within ITU-R texts, and that, in particular, subjective evaluation methods are defined in Recommendations ITU-R BT.500, ITU-R BT.710, and ITU-R BT.1129;
- e) that such assessment will need to take account of basic picture quality and the failure characteristic in the presence of errors on the transmission and emission link;
- f) that both the design of codecs and their assessment will need to take account of user requirements;
- g) that in order to be complete, the user requirements should specify the test procedures and test material that should be used to check that the requirements are being met,

noting

- a) that Recommendation ITU-R BS.1548 specifies the requirements for audio source coding systems used for sound and television broadcasting;
- b) that Recommendation ITU-R BT.1203 provides user requirements for video bit-rate reduction coding of digital TV signals for an end-to-end television system;
- c) that Recommendation ITU-R BT.1868 describes user requirements for codecs for contribution, primary distribution and SNG networks,

recommends

- 1** that the following user requirements should be applied for the specifications, design and testing of systems for the secondary distribution and emission of SDTV and HDTV signals.

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

TABLE 1

User requirements for secondary distribution and emission codecs

Item		Specification
Input video signal format		Sampling: 4:2:2 (Y, C_B, C_R) 8 or 10 bits per sample for each component
Input audio signal format		Sampling: 48 kHz 16 bits or more
Number of audio channels		Six channels for a main audio service (typical, including LFE). Additional channels for a multilingual service and audio services for the hearing and visually impaired may be provided
Maximum relative sound/vision delay		± 2 ms per codec
Basic picture quality (in error-free condition) ⁽¹⁾	Single codec	Quality difference: $\leq 12\%$ with DSCQS method using at least four sequences taken from Recommendation ITU-R BT.1210, at least half of which should be high-activity sequences. The given quality grade should be met using at least 75% of the sequences chosen; the rest must achieve $\leq 30\%$.
	Codecs in cascade	Cascade of one contribution codec, one primary distribution codec and one secondary distribution codec. Quality difference: $\leq 18\%$ with DSCQS method using at least four sequences taken from Recommendation ITU-R BT.1210, at least half of which should be high-activity sequences. The given quality grade should be met using at least 75% of the sequences chosen; the rest must achieve $\leq 36\%$.
Basic sound quality		See Recommendation ITU-R BS.1548, Annex 2
Failure characteristics/error performance		Quasi-error-free at decoder input for normal condition Error-concealment functionality is desirable for decoders
Vision/audio failure characteristics		Vision failure first
Recovery time		500 ms after a break of 50 ms
Change in overall delay after signal interruption/major disturbance		Less than 20 μ s
Auxiliary signal		Auxiliary signals may be provided for data services and access control.

DSCQS: double stimulus continuous quality scale.

⁽¹⁾ Subjective assessment of picture quality should be carried out in accordance with Recommendations ITU-R BT.500, ITU-R BT.710 and ITU-R BT.1129.