



**Recommendation ITU-R BT.2026**  
(08/2012)

**Guidelines on the implementation of  
systems for in-service objective  
measurement and monitoring  
of perceptual transparency  
for the distribution chain of  
SDTV and HDTV programmes**

**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.2026

**Guidelines on the implementation of systems for in-service<sup>1</sup> objective measurement and monitoring of “perceptual transparency<sup>2</sup>” for the distribution chain of SDTV and HDTV programmes<sup>3</sup>**

(2012)

**Scope**

This Recommendation specifies provisions to be taken into account when implementing an in-service method to measure and monitor the impairments to the perceptual quality of television programmes introduced in the television distribution chain.

The ITU Radiocommunication Assembly,

*considering*

- a) that broadcasters may wish or they may need to confirm that their programmes are delivered to their audiences at an appropriate perceptual quality level;
- b) that such wish or need concerns the distribution of both SDTV and HDTV programmes to broadcasters' audiences;
- c) that the programme distribution chain may impact on the perceptual quality of delivered television programmes through various processes, e.g.: use of downsampling (temporal or spatial), or of inadequate source coding, statistical multiplexing or channel coding, etc.,

*recognizing*

- a) that Recommendation ITU-R BT.1122 – User requirements for codecs for emission and secondary distribution systems for SDTV and HDTV specifies the maximum tolerable loss of perceived quality caused by source coding applied in a distribution chain, based on an assumed number and types of source codecs in the chain;

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<sup>1</sup> In-service testing is the ability to measure transmission performance parameters without disrupting normal transmission of programme signals.

<sup>2</sup> For the purpose of this Recommendation, the term “transparent distribution chain” is defined as “a television distribution chain that does not adversely impact on the subjective quality of the television programme sequences that it carries”.

<sup>3</sup> The scope of Study Group 6 states, *inter alia*, that “The Study Group, recognizing that radiocommunication broadcasting extends from the production of programmes to their delivery to the general public, as detailed above, studies those aspects related to production and radiocommunication, including the international exchange of programmes as well as the overall quality of service.”

- b) that Recommendation ITU-R BT.1203 – User requirements for generic video bit-rate reduction coding of digital TV signals for an end-to-end television system provides user requirements for video bit-rate reduction coding of digital TV signals for an end-to-end television system (from programme production to programme presentation at the end user premises), with respect to picture formats, coding schemes, picture quality, etc. when using codecs complying with Recommendations ITU-T H.262 (MPEG-2 Video) or H.264 (MPEG-4 AVC);
- c) that Recommendation ITU-R BT.1737 – Use of the Recommendation ITU-T H.264 (MPEG-4/AVC) video source-coding method to transport high definition TV programme material provides an indication of the source-coding parameters and minimal tools for various members of the HDTV image family specified in Part 2 of Recommendation ITU-R BT.709, and of the bit rate required to transport programmes so coded, in various applications related to broadcasting;
- d) that Recommendation ITU-R BT.1790 – Requirements for monitoring of broadcasting chains during operation provides a useful overview of broadcasters’ requirements for operational monitoring in digital broadcasting chains, identifying the performance areas that should be investigated;
- e) that Recommendation ITU-R BT.1865 – Metadata to monitor errors of SDTV and HDTV signals in the broadcasting chain specifies a method to remotely monitor errors of audio, video and data signals at arbitrary monitoring points in an SDTV or HDTV digital broadcasting chain through the use of appropriate metadata packetized into ancillary data packets;
- f) that Recommendation ITU-R BT.1870 – Video coding for digital television broadcasting emission specifies that the video source-coding methods specified in Recommendations ITU-T H.262 (MPEG-2 Video) and H.264 (MPEG-4 AVC) should be used for digital broadcasting emission of SDTV or HDTV programmes;
- g) that Recommendation ITU-R BT.1885 – Objective perceptual video quality measurement techniques for standard definition digital broadcast television in the presence of a reduced bandwidth reference specifies a model to measure perceptual quality loss due to SDTV programme distribution, based on a comparison of a number of features of the SDTV programme sequences, measured at the input and at the output of the distribution chain;
- h) that Recommendation ITU-R BT.1908 – Objective video quality measurement techniques for broadcasting applications using HDTV in the presence of a reduced reference signal specifies a model to measure perceptual quality loss due to HDTV programme distribution, based on a comparison of a number of features of the HDTV programme sequences, measured at the input and at the output of the distribution chain,

*recommends*

- 1 that Recommendations ITU-R BT.1203 and ITU-R BT.1790 should be taken into account in the design of in-service systems intended to measure and monitor the transparency of SDTV and HDTV distribution chain by measuring the objective perceptual quality<sup>4</sup> of the SDTV or HDTV programmes at appropriate points along the chain;
- 2 that the models specified in Recommendations ITU-R BT.1885 and ITU-R BT.1908 should be used to measure the objective perceptual quality of respectively SDTV and HDTV programmes delivered through distribution chains;

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<sup>4</sup> For the purpose of this Recommendation, the term “objective perceptual quality” is defined as “the quality of television programme sequences measured by an objective measurement method to obtain an indication that approximates the rating that would be obtained from a subjective assessment test”.

3 that, when the results of measurements taken at appropriate points along a distribution chain are sent to a downstream monitoring point in the form of metadata packetized into ancillary data packets, this should be done in compliance with Recommendation ITU-R BT.1865;

4 that, in setting acceptance limits for the transparency of distribution chains used for broadcasting, the indications on the transparency required for such chains and of the related data rates given in Recommendations ITU-R BT.1122, ITU-R BT.1203 and ITU-R BT.1737 should be taken into account.

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