

RECOMMENDATION ITU-R BT.1128-2

SUBJECTIVE ASSESSMENT OF CONVENTIONAL TELEVISION SYSTEMS

(Question ITU-R 211/11)

(1994-1995-1997)

The ITU Radiocommunication Assembly,

considering

- a) that a number of administrations and organizations throughout the world are currently using analogue conventional television systems (NTSC, PAL, SECAM);
- b) that subjective assessments are a vital element in analogue and conventional quality television system design and selection;
- c) that Recommendation ITU-R BT.500 outlines a number of recommended subjective assessment methods, many of the methodological details of which are appropriate for assessing conventional television quality;
- d) that conventional television systems may be used as a reference for comparison with the newly developed systems;
- e) that the results of subjective tests can be analysed, presented and interpreted in many different ways and therefore it is highly desirable to increase the degree of standardization in the methods of analysis, presentation and interpretation of the results of subjective tests so that comparison may be made between results obtained by different workers;
- f) that Recommendation ITU-R BT.500 has been modified to provide only general information on methodology for the subjective assessment of the quality of television pictures,

recommends

- 1 that subjective assessment of image quality of conventional television systems should be made following the general methodology given in Recommendation ITU-R BT.500;
- 2 that subjective assessments of the overall quality and of the failure characteristics of conventional systems should use the specific viewing conditions and the subjective assessment methods described in Annex 1.

ANNEX 1

**The subjective quality of conventional television systems:
Parameters for application of Recommendation ITU-R BT.500****1 Viewing conditions**

The assessors' viewing conditions should be arranged as follows:

1.1 Selection of viewing conditions

One particular set of viewing conditions should be used in assessments of conventional television. However, different viewing distances may be used for normal and critical assessments (see Table 1).

TABLE 1

Assessment problem	Viewing conditions
Assess conventional systems	Viewing at 6 H
Assess conventional systems under critical conditions	Viewing at 4 H for 625-line systems and at 4 H or 5 H for 525-line systems

1.2 Specific conditions for conventional television

These viewing conditions are specific to conventional systems. Supplementary more general viewing conditions are given in Recommendation ITU-R BT.500.

- | | |
|---|---|
| a) Ratio of viewing distance to picture height | 4 H and 6 H (see Note 1) |
| b) Peak luminance | 70 cd/m ² |
| c) Monitor (see Note 2) | High quality ≥ 22 in screen size (≥ 56 cm) |
| d) Viewing angle subtended by that part of the background that satisfies specifications | $\geq 43^\circ$ high \times 57° wide |

NOTE 1 – A distance of six times the height of the picture (6 H) is the preferred distance for assessments of conventional systems (625/50, 525/60), however using assessors at 4 H also is acceptable, provided the results are given separately.

NOTE 2 – Where more than one viewing room is used, monitors should be carefully matched. Because there is some evidence that display size may influence the results of subjective assessments experimenters are requested to explicitly report the screen size and make, and model of displays used in any experiments.

2 Assessment methods

Subjective assessments of the overall quality of an image of conventional quality delivered by an emission system should be made using a double-stimulus continuous quality-scale method (Recommendation ITU-R BT.500) with studio quality images as reference.

Assessments of the failure characteristics of an emission system delivering conventional quality should be made using a double-stimulus impairment scale method (Recommendation ITU-R BT.500) with either a studio quality image or unimpaired image from an emission system as reference.

When performance over the range of programme content and transmission conditions likely to be encountered in practice is of issue, it is recommended that the description of failure characteristics as in Appendices 1 and 2 to Annex 1 of Recommendation ITU-R BT.500 be considered.

Using these methods, care must be taken to distinguish the influence of the display format from that of the basic system format (e.g. display of a 4:3 image on a 16:9 monitor). Assessments may be performed in order to take account of the different display formats if applicable and appropriate.

3 Test material

A number of approaches have been taken into account in establishing the kinds of test material required in television assessments. A survey of typical assessment problems and of test materials used to address these problems is given in Table 2 of Recommendation ITU-R BT.500.

A number of organizations have already developed test still pictures and sequences. The test material listed in Annex 2 of this Recommendation should be preferred to assess the quality achieved by the system under evaluation, in regard to the type of degradation considered. The list given in Annex 2 includes critical material which may be used following Recommendation ITU-R BT.500. According to Recommendation ITU-R BT.500, test material is chosen according to the following criteria:

- to be representative of variety of typical programming and current production techniques;
- to cover a wide range of criticality levels;
- to include still pictures.

To ensure the optimum quality of source signals, and therefore avoid any biasing in the evaluation, digitally stored pictures and sequences are the preferred type. The D-1 4:2:2 tape format (Recommendation ITU-R BR.657) should provide a basis for the exchange of source pictures and sequences between laboratories, to make comparison between systems more meaningful. Computer tape formats are also possible.

Further studies are necessary to determine the criticality of the test pictures and sequences listed in Annex 2.

ANNEX 2

This Annex provides lists of available test pictures and sequences for the assessment of conventional picture quality, together with information concerning their characteristics and formats.

TABLE 2
Conventional television test pictures and sequences

Title	Contents	Representative of	Attributes to be examined	Availability (o: available)		Criticality
				525	625	
<i>Stills</i>						
Formal pond			Luminance resolution	o	o	
Boats with lighthouse			Luminance and colour resolution	o	o	
Clown	Clown making up		Horizontal resolution	o	o	
Boy with toys	Boy playing with several coloured toys	Skin and colour edges		o	o	
Girl with toys	Girl playing with several coloured toys	Skin and colour edges		o	o	
Young couple	Man and woman with striped clothes	Fine detail	Luminance resolution	o	o	
Toys and blackboards			Colour, vertical resolution	o	o	
Tree	Luminance patterns			o	o	
Male head						
Kiel harbour	Detailed view of the Kiel harbour	Fine resolution	Spatial resolution	o	o	
Latin text						
Graph						
Test card						
Zone plate						

TABLE 2 (continued)

Title	Contents	Representative of	Attributes to be examined	Availability (o: available)		Criticality
				525	625	
<i>Stills – Chroma key</i>						
Comb and pencil						
Twigs and ribbon						
Old master – Foreground		Chroma key FG		–	o	
Old master – Background		Chroma key BG		–	o	
Dummy with comb						
<i>Moving sequences</i>						
BBC disc 1	Rotating disc with several features attached on it. The axis of rotation is parallel to the viewing axis	Circular motion		–	o	
BBC disc 2	Idem. Increased speed	Circular motion				
BBC disc 3	Idem. Increased speed	Circular motion				
BBC drum 1	Rotating drum with shop pictures attached on it. The axis of rotation is vertical	Circular motion				
BBC drum 2	Idem. Increased speed	Circular motion				
Clown	Clown making up. Artificially moving slide	Pan (H, V)		–	o	
Boy with toys	Boy playing with several coloured toys. Artificially moving slide	Pan (H, V)		–	o	
Kiel harbour	View on the detailed harbour	Rapid rocking		o	o	
Table tennis	Play and detailed background	Pan/zoom/cut		o	o	
Mobile and calendar	Miniature train circulating in front of a coloured setting	Slow motion		o	o	
Renata and scarf	Young woman moving slowly in front of detailed setting	Circular motion				
Renata and butterflies	Young woman moving slowly in front of a detailed setting and cut on coloured drawing of butterflies	Circular motion				
Sailboat	Old four-masted ship alongside the quay	Slow motion		o	o	
Flower garden	Panning on detailed coloured flowers and houses	Slow pan		o	o	
Susie	Young woman telephoning	Slow		o	o	
Diva with titles	Diva singing in a church with titles	Cuts			o	
Diva with noise	Diva singing in a church with increasing noise area	Prod. wipe		o	o	
Commercial						
Family portrait	Old fashion dressed family	Wipe		o	–	
Tempest	Wind on a miniature garden	Random motion		o	o	
Tempest with noise	Wind on a miniature garden with added noise	Random motion		o	o	
Titles						
Cruising	Frozen dancing scenes	2-10 freezes		o	o	

TABLE 2 (continued)

Title	Contents	Representative of	Attributes to be examined	Availability (o: available)		Criticality
				525	625	
<i>Moving sequences – Chroma key</i>						
Balls of wool	Moving ball of wool	Medium Pan/rotate	Colour motion Motion rendition	o	o	
Popple				o	o	
Cactus and comb						
Cactus						
Old master – Foreground	Chroma key – Foreground	Slow pan		–	o	
Old master – Background	Chroma key – Background	Slow pan		–	o	
Ciao – Foreground	CK, FG, luminance, colour details	Slow pan/zoom		o	o	
Ciao – Background	CK, BG, luminance, colour details	Slow pan/zoom		o	o	
Ciao, foreword via PAL code/decode	Cross luminance colour	Slow pan/zoom		–	o	

NOTE 1 – Contents of the EBU library tape. The duration of each sequence is 30 s.

NOTE 2 – The content of the library list will be updated from time to time; the tape is available in the D1 digital format (Recommendation ITU-R BR.657), all *segments* of the library tape are in the public domain and may be used freely for evaluations and demonstrations. Requests should be addressed to the European Broadcasting Union (EBU) through the Radiocommunication Bureau of the ITU.

