

RECOMMENDATION ITU-R BT.1127*

Relative quality requirements of television broadcast systems

(1994)

The ITU Radiocommunication Assembly,

considering

- a) that there is considerable discussion throughout the world on quality requirements of high definition television, enhanced definition television, standard definition television, and limited definition television;
- b) that it may assist users in evaluating an appropriate system or systems if there are guidelines on the relative quality requirements of such broadcast systems,

recommends

1 that the quality requirements applicable to high definition, enhanced definition, standard definition, and limited definition television are specified by a quality-space representation associated with design viewing distances in accordance with Annex 1.

ANNEX 1

The relative quality requirements of television broadcast systems

The ITU-R has considered alternative means of classifying television systems as a tool for decision making and to assist studies. Having a well-defined way to describe the systems is a necessary prerequisite to classification.

The most practical approach seems to be via a quality-space representation, of the kind shown in Fig. 1. The systems will have many facets; basic picture quality, transmission ruggedness, sound capacity etc. However, the core feature, which can be used to best describe and delineate systems, and agreed criteria, is probably associated with basic picture quality.

1 Example of the classification of television systems**1.1 High definition television**

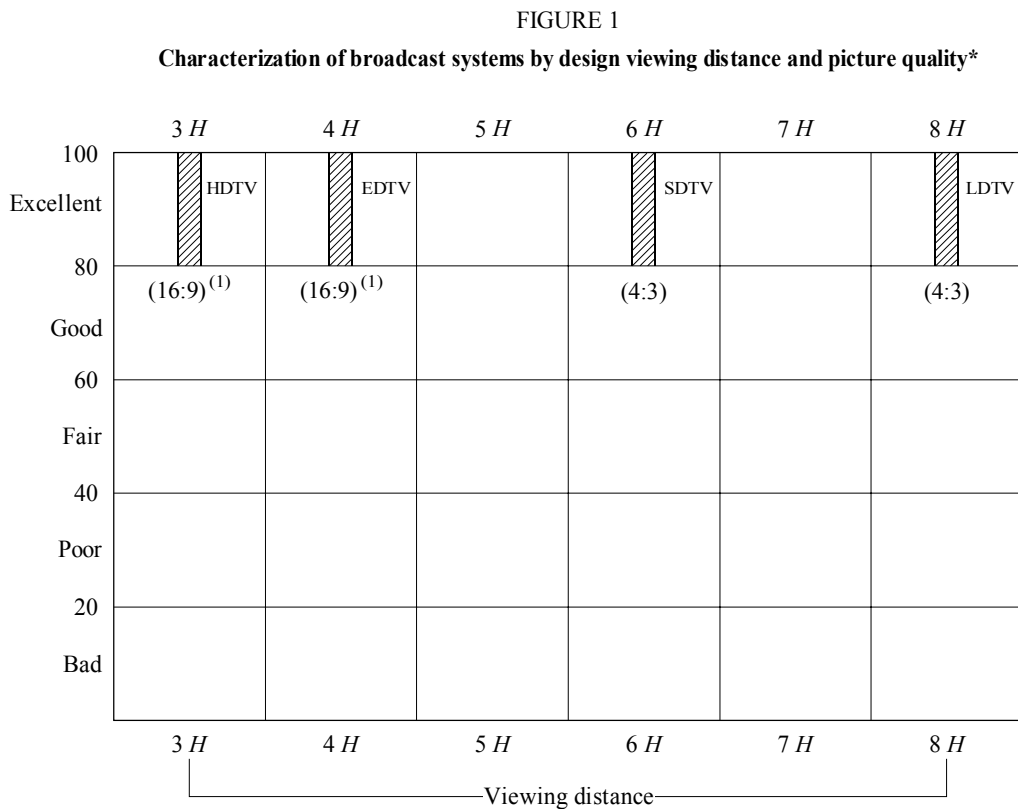
HDTV systems are described in Report ITU-R BT.801 as those systems which are essentially transparent to a bi-dimensional representation of the real world, when the picture is seen at three times the height of the screen ($3H$). There is no unique psycho-physical basis for translating this

* Radiocommunication Study Group 6 made editorial amendments to this Recommendation in 2002 in accordance with Resolution ITU-R 44.

definition into quantitative subjective assessment terms. However, this Recommendation proposes that this can be interpreted to mean that subjective assessment results should always fall into the “excellent” band in evaluations using the double stimulus continuous quality scale method as described in Recommendation ITU-R BT.500. Quality evaluation results should include compensation for the residual error of the reference. The quality (and therefore definition of HDTV) could lie in a requirement for the quality to be always in this (excellent) band.

1.2 Enhanced definition television

EDTV systems can be classified as a system capable of results in the excellent band when the picture is seen at a distance of four times the height of the screen ($4H$) as shown in Fig. 1.



* To be confirmed by future experiments.

⁽¹⁾ Studies carried out by Cablelabs in the United States of America describe viewer reaction when TV pictures transmitted in an aspect ratio of 4:3 are reproduced in various forms on a 16:9 display.

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1.3 Standard definition television

It is proposed that standard definition television (625/525-line) systems can be characterized by quality requirements associated with a viewing distance of $6H$.

1.4 Limited definition television

It is proposed that limited definition television systems can be characterized by quality requirements associated with a viewing distance of $8H$.

2 Design viewing distance and preferred viewing distance

The design viewing distance (DVD) is the distance at which the subjective assessment of the system should be performed. Figure 1 shows the partitioning in terms of DVD for the quality levels described above.

Associated with this classification of systems by quality and DVD, it may be helpful to be aware of the relationship between preferred viewing distance (PVD) and screen size. Studies show that PVD is related to the degree of motion, the absolute eye-screen distance, screen size and programme content among other factors. Figure 2 shows the results of studies carried out in Italy. These results are in close agreement with those obtained from similar studies carried out in the United States of America by SMPTE. Further studies may indicate that the PVD could differ to those in Fig. 2 due to viewing conditions and experiences in different countries.

Therefore, both concepts should be combined to ensure the fair evaluation of the systems concerned, and for a fixed PVD, the size of the display used for evaluation – using the methodology described in Recommendation ITU-R BT.500 – should be enlarged to meet the required DVD, if possible.

FIGURE 2
Preferred viewing distance relationship to 16:9 screen size.
The experiments used high definition sources, and are
averaged for a range of programme material

