

# SMPTE RECOMMENDED PRACTICE

## Standard Definition Evaluation Materials for Digital Television



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### 1 Scope

**1.1** This practice specifies standard definition (BT.601-5) video materials that are available at reproduction and administrative cost from SMPTE for use in evaluating digital television technology and processing.

**1.2** It describes the attributes of the materials, which have made them valuable in systems evaluation. Such description is not intended to suggest these materials may not be valuable in other aspects of evaluation.

**1.3** It describes, to the extent they are known, the conditions under which the materials were captured and the post-processing which was applied. The materials were originally archived in D-1 tape format.

**1.4** Materials are separately available in 525-line and 625-line digital video standards. The materials are archived on digital data media. Distribution is designed to provide consistent, high quality delivery of the materials.

**1.5** This practice presents representative pictures from the materials.

### 2 Normative reference

The following standard contains provisions that, through reference in this text, constitute provisions of this practice. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based in this practice are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

ITU-R BT.601-5 (1995), Studio Encoding Parameters of Digital Television for Standard 4:3 and Wide-Screen 16:9 Aspect Ratios

### 3 Description of materials

The standard definition materials described herein are derived principally from vintage sources, the ITU test tapes (BT.802-1). The tapes were obtained from the CBC Engineering Department in Montreal, Canada. They have been augmented with 625-line scenes numbered 13 – 18, which were contributed by Radio Televisione Italiana (RAI.) The current materials were selected to be the most useful of the originals, to represent the range of attributes in the originals, and to fit on a 20-minute video tape. In many cases the pedigree of the older materials is not complete.

The information contained in tables 1 and 2 summarizes the characteristics of the 525-line and 625-line materials, respectively. This practice relies on the descriptions contained in previous documentation, where available. The data in tables 1 and 2 is defined as follows.

#### 3.1 Material identifiers

Columns in tables 1 and 2 labeled **Scene index**, **Title**, and **Starting time code of scene** are self-explanatory. **Starting/ending filename of scene** are the data media filenames of the first picture in the scene, which immediately follows the title and picture immediately following the scene.

#### 3.2 Attributes of source

The selection of materials of particular video scenes for inclusion is based on a list of desirable attributes. The **Attributes to be examined** and **Motion** are based on the original documentation of the ITU test materials, where available, and on the review by SMPTE. **Attributes to be examined in scene** indicates those properties which may make the material useful in evaluating digital systems. Other uses of these materials are to be expected. The degree of **Motion** in the scene is noted.

#### 3.3 Source of scene

In the **Source** column of tables 1 and 2, six identifiers are used. In the interpretation of this practice, these terms are best defined as:

- Slide                      film-based material scanned, filtered, and sampled to ITU-R BT.601 resolution
- Video                     existing video scene
- Component             RGB component signals
- Camera                  generated by camera
- Camera/CG             generated by camera and character generator
- Camera/SE             generated by camera with special effects

All of the 525-line materials (scenes 01 - 20) and scenes 01 - 12 of the 625-line materials are derived from ITU test tapes. For historical and archival purposes, the corresponding scenes on the ITU tapes are designated as **ITU index**. Scenes numbered 13 –18 for the 625-line system were obtained from RAI and are not indexed to prior standards.

Some of the original scenes were mildly corrupted on the available copies, but were still regarded as potentially useful. To improve the utility of the selected scenes, they have been restored to be free from any visible dropouts or other errors. Although these scenes may differ from other copies of the ITU tapes, the only differences apparent to a subjective viewer should be potential defects in other versions of the tape. No other processing or lossy compression has been applied to these materials.

### 4 Archiving and distribution

#### 4.1 Production of archived data

All video materials described in clause 3 were delivered to SMPTE on D-1 format tape. The archival tapes were produced using ITU-R BT.601 format. They were recorded on digital tape format (DTF) as defined

in 4.2. The best professional effort was used to insure the digital video ITU-R BT.601 samples were accurately reproduced from the D-1 tapes. VTR playback was without the need to apply the error concealment function.

Most of the video scenes are 40 seconds in length: 5 seconds of black, 5 seconds of title slate, and 30 seconds of active picture. Some of the scenes are expanded with black frames to fit on 5-second boundaries.

## 4.2 Data format

Tables 1 and 2 describe sequentially named files organized into scenes. **Starting/ending filename of scene** identify the in-point and out-point for the pictures in each scene. Five seconds of scene title precedes the **Starting filename**.

Each file contains an individual picture. Each 525-line frame is designated, **525.XXXXX.yuv** and each 625-line file is designated **625.XXXXX.yuv**, where **XXXXX** is a five-digit file sequence number. There is a one-to-correspondence between pictures on the video tape and in data. Each picture is stored as a file in 8-bit YUV format having 720 samples per line. Error checking and correction is that provided by the data system or media.

The 525-line and 625-line materials were also produced as a set of DVD-Rs. The data media were written using native system file copy commands. Tables 3 and 4 describe the arrangement of the scenes on the DVD-R discs for 525-line and 625-line pictures, respectively.

## 4.3 Distribution of video tapes

Submasters of the video materials are made from the archived data media. The submasters are SMPTE format D-1 in order to insure the 8-bit data integrity of the original video material. Distribution copies are made by duplication to any appropriate uncompressed video format such as SMPTE D-1 or D-5 using the best professional effort to insure accurate digital video sample reproduction. The distributed video tapes are not guaranteed to be bit-level perfect.

Distribution of these materials is in an uncompressed format. Users should be aware that copies made in lossy compressed formats do not have the original picture quality and the compression method used for recording may interact with the system being evaluated, creating misleading image representations and incorrect evaluation of the system.

## 4.4 Distribution of data media

Data media distribution copies of the materials are produced by copying the archived data to suitable data media. Tables 3 and 4 provide an Index to the SMPTE Test Pictures and Sequences as written to DVD data media, for 525-line and for 625-line materials, respectively. File copy accuracy shall be guaranteed by the verification process appropriate for the distribution media.

## 5 Representative pictures

A picture represents each scene. Thirty-eight figures are presented, one for each of the scenes described in table1 and table2 (excepting color bars and title.) The pictures are presented at quarter-resolution (half-resolution, both horizontally and vertically.) Each figure is labeled with the corresponding scene index and title. The figure index is the scene index followed by -N for 525-line and -P for 625-line formats. There are twenty 525-line and eighteen 625-line pictures.



Figure 01-N – Formal Pond



Figure 01-P – Formal Pond



Figure 02-N – Clown



Figure 02-P – Clown



Figure 03-N – Boy with Toys



Figure 03-P – Boy with Toys





**Figure 04-N –Young Couple**



**Figure 04-P – Young Couple**



**Figure 05-N – Blackboard**



**Figure 05-P – Blackboard**



**Figure 06-N – Flower Garden**



**Figure 06-P – Flower Garden**



**Figure 07-N – Susie**



**Figure 07-P – Susie**



**Figure 08-N – Kiel Harbour – 4**



**Figure 08-P – Kiel Harbour – 4**



**Figure 09-N – Balls of Wool**



**Figure 09-P – Balls of Wool**





Figure 10-N – Popple



Figure 10-P – Popple



Figure 11-N – Table Tennis



Figure 11-P – Table Tennis



Figure 12-N – Mobile and Calendar



Figure 12-P – Mobile and Calendar



**Figure 13-N – Birches**



**Figure 13-P – Bicycle Race**



**Figure 14-N – Bicycles**



**Figure 14-P – Kayaks 1**



**Figure 15-5 – Carnival Ride**



**Figure 15-P – Kayaks**





Figure 16-N – Football



Figure 16-P – Cross Country Race



Figure 17-N – Cheerleaders.



Figure 17-P – Arrivederci a New York.



Figure 18-N – Diva



Figure 18-P – Formula 1 Race



Figure 19-N – Tempête

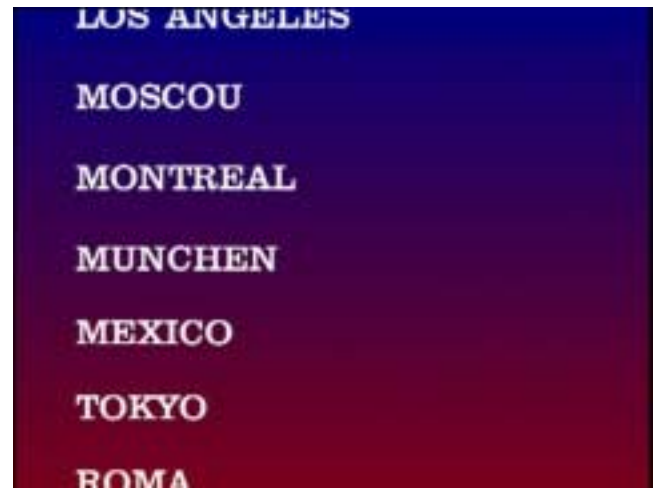


Figure 20-N – Un Générique

## 6 Tables of evaluation materials

Table 1 – SMPTE 525-line test pictures and sequences derived from CCIR test tape, ITU-R BT.802

Scene index	Material identifiers			Attributes of source		Source of scene	
	Title	Starting/ending filename of scene	Starting timecode	Attributes to be examined in scene	Motion	Source	ITU index
00	Color bars, Title	525.00000.yuv / *00899*	01:00:00:00				
01	Formal Pond	525.01200.yuv / *02097*	01:00:40:00	Luminance resolution	Still	Slide	1
02	Clown	525.02400.yuv / *03299*	01:01:20:00	Horizontal resolution	Still	Slide	3
03	Boy With Toys	525.03600.yuv / *04499*	01:02:00:00	Skin and color edges	Still	Slide	4
04	Young Couple	525.04800.yuv / *05699*	01:02:40:00	Fine detail, NTSC luma/chroma crosstalk	Still	Slide	6
05	Blackboard	525.06000.yuv / *06899*	01:03:20:00	Color, vertical resolution	Still	Slide	7
06	Flower Garden	525.07200.yuv / *08097*	01:04:00:00	Color details	Slow pan	Video	15
07	Susie	525.08400.yuv / *09297*	01:04:40:00	Skin tones	Slow	Video	16
08	Kiel Harbour - 4	525.09600.yuv / *10499*	01:05:20:00	High resolution in horizontal, vertical, and temporal dimensions	Five cuts, slow pan/zoom	Component	26
09	Balls of Wool	525.10800.yuv / *11697*	01:06:00:00	Moving colors	Medium	Video	27
10	Popple	525.12000.yuv / *12888*	01:06:40:00	Moving colors	Pan/rotate	Video	28
11	Table Tennis	525.13200.yuv / *14057*	01:07:20:00	Multiple rapid motions	Pan/zoom/cut	Video	29
12	Mobile and Calendar	525.14400.yuv / *15295*	01:08:00:00	Random motion of objects	Slow	Video	30
13	Birches	525.15600.yuv / *16497*	01:08:40:00	Luminance details, sky	Slow tilt down	Camera	33
14	Bicycles	525.16800.yuv / *17397*	01:09:20:00	Bicycle wheels	Complex, fast	Camera	35
15	Carnival Ride	525.17700.yuv / *18597*	01:09:50:00	Luminance and color details	Fast, complex	Camera	36
16	Football	525.18900.yuv / *19797*	01:10:30:00	Sports	Rapid motion	Camera	38
17	Cheerleaders	525.20100.yuv / *20997*	01:11:10:00	Fast, complex	Zoom	Camera	39
18	Diva	525.21300.yuv / *22197*	01:11:50:00	Cuts on titles/busy scene	Cuts	Camera/SE	43
19	Tempête	525.22500.yuv / *23397*	01:12:30:00	Horizontal and vertical luminance, color details	Random motion	Camera	44
20	Un Générique	525.23700.yuv / *24597*	01:13:10:00	Rolling and crawling titles	Crawl/roll	Camera/CG	50



Table 2 – SMPTE 625-line test pictures and sequences derived from CCIR test tape ITU-R BT.802 and RAI test tape

Material identifiers				Attributes of source		Source of scene	
Scene index	Title	Starting and ending filenames of scene	Starting timecode of scene	Attributes to be examined	Motion	Source	ITU index
00	Color bars, Title	625.00000.yuv / *00624*	01:00:00:00				
01	Formal Pond	625.00875.yuv / *01624*	01:00:40:00	Luminance resolution	Still	Slide	1
02	Clown	625.01875.yuv / *02624*	01:01:20:00	Horizontal resolution	Still	Slide	3
03	Boy With Toys	625.02875.yuv / *03624*	01:02:00:00	Skin and color edges	Still	Slide	4
04	Young Couple	625.03875.yuv / *04624*	01:02:40:00	Fine detail, PAL luma/chroma crosstalk	Still	Slide	6
05	Blackboard	625.04875.yuv / *05624*	01:03:20:00	Color, vertical resolution	Still	Slide	7
06	Flower Garden	625.05875.yuv / *06623*	01:04:00:00	Color details	Slow pan	Video	15
07	Susie	625.06875.yuv / *07624*	01:04:40:00	Skin tones	Slow	Video	16
08	Kiel Harbour - 4	625.07875.yuv / *08624*	01:05:20:00	High resolution in horizontal, vertical, and temporal dimensions	Slow pan / zoom / cuts	Component	26
09	Balls of Wool	625.08875.yuv / *09623*	01:06:00:00	Moving colors	Medium	Video	27
10	Popple	625.09875.yuv / *10616*	01:06:40:00	Moving colors	Pan/rotate	Video	28
11	Table Tennis	625.10875.yuv / *11574*	01:07:20:00	Multiple rapid motions	Pan/zoom/cut	Video	29
12	Mobile and Calendar	625.11875.yuv / *12619*	01:08:00:00	Random motion of objects, detail	Slow	Video	30
13	Bicycle Race	625.12875.yuv / *13248*	01:08:40:00	Saturated colors	Fast motion/ 1 Cut (5, 10 s)	Video	RAI
14	Kayaks 1	625.13500.yuv / *14248*	01:09:05:00	Water flow, bright reds, Background detail	Moderate, Water flow	Video	RAI
15	Kayaks 2	625.14500.yuv / *15247*	01:09:45:00	Bright reds, background detail	Moderate, Water flow	Video	RAI
16	Cross Country Race	625.15500.yuv / *16247*	01:10:25:00	Three cuts, detail in background	Moderate/ 3 cuts	Video	RAI
17	Arrividerci a NY	625.16500.yuv / *17247*	01:11:05:00	Three cuts, colors, faces, lettering	Fast, 3 cuts	Video	RAI
18	Formula 1 Race	625.17500.yuv / *17998*	01:11:45:00	Saturated colors, motion, lettering	Fast	Video	RAI

Table 3 – Index to SMPTE test pictures and sequences on DVD data media, 525-line materials

DVD Title	Frame range	Scene name	Frame In	Frame Out
SMPTE525_1	525.00000.yuv – 525.05999.yuv	Color Bars Title Formal Pond Clown Boy With Toys Young Couple	525.00000.yuv 525.00600.yuv 525.01200.yuv 525.02400.yuv 525.03600.yuv 525.04800.yuv	525.00450.yuv 525.00900.yuv 525.02097.yuv 525.03300.yuv 525.04500.yuv 525.05700.yuv
SMPTE525_2	525.06000.yuv - 525.11999.yuv	Blackboard Flower Garden Susie Kiel Harbour – 4 Balls of Wool	525.06000.yuv 525.07200.yuv 525.08400.yuv 525.09600.yuv 525.10800.yuv	525.06899.yuv 525.08098.yuv 525.09298.yuv 525.10500.yuv 525.11698.yuv
SMPTE525_3	525.12000.yuv - 525.17999.yuv	Popple Table Tennis Mobile and Calendar Birches Bicycles Carnival Ride (part 1)	525.12000.yuv 525.13200.yuv 525.14400.yuv 525.15600.yuv 525.16800.yuv 525.17700.yuv	525.12889.yuv 525.14058.yuv 525.15296.yuv 525.16498.yuv 525.17398.yuv 525.17999.yuv
SMPTE525_4	525.18000.yuv - 525.24598.yuv	Carnival Ride (part 2) Football Cheerleaders Diva Tempête Un Générique	525.18000.yuv 525.18900.yuv 525.20100.yuv 525.21300.yuv 525.22500.yuv 525.23700.yuv	525.18598.yuv 525.19798.yuv 525.20998.yuv 525.22198.yuv 525.23398.yuv 525.24598.yuv

**Table 4 – Index to SMPTE test pictures and sequences on DVD data media, 625-line materials**

<b>DVD Title</b>	<b>Frame range</b>	<b>Scene name</b>	<b>Frame In</b>	<b>Frame Out</b>
SMPTE625_1	625.00000.yuv – 625.05499.yuv	Color Bars Title Formal Pond Clown Boy With Toys Young Couple Blackboard	625.00000.yuv 625.00500.yuv 625.00875.yuv 625.01875.yuv 625.02875.yuv 625.03875.yuv 625.04875.yuv	625.00375.yuv 625.00625.yuv 625.01625.yuv 625.02625.yuv 625.03625.yuv 625.04625.yuv 625.05499.yuv
SMPTE625_2	625.05500.yuv – 625.10999.yuv	Blackboard Flower Garden Susie Kiel Harbor - 4 Balls of Wool Popple Table Tennis	625.05500.yuv 625.05875.yuv 625.06875.yuv 625.07875.yuv 625.08875.yuv 625.09875.yuv 625.10875.yuv	625.05625.yuv 625.06624.yuv 625.07625.yuv 625.08625.yuv 625.09624.yuv 625.10617.yuv 625.10999.yuv
SMPTE625_3	625.11000.yuv – 625.16499.yuv	Table Tennis Mobile and Calendar Bicycle Race Kayaks 1 Kayaks 2 Cross Country Race Title (Arrividerci a NY)	625.11000.yuv 625.11875.yuv 625.12875.yuv 625.13500.yuv 625.14500.yuv 625.15500.yuv 625.16375.yuv	625.11575.yuv 625.12620.yuv 625.13249.yuv 625.14249.yuv 625.15248.yuv 625.16248.yuv 625.16499.yuv
SMPTE625_4	625.16500.yuv – 625.18023.yuv	Arrividerci a NY Formula 1 Race	625.16500.yuv 625.17500.yuv	625.17248.yuv 625.17999.yuv



## **Annex A** (informative)

### **Bibliography**

SMPTE RP 165-1994. Error Detection Checkwords and Status Flags for Use in Bit-Serial Digital Interfaces for Television

ITU-R BT.802-1, Test Pictures and Sequences for Subjective Assessments of Digital Codecs Conveying Signals Produced According to Recommendation ITU-R BT.601