RP 96-1993
Revision of RP 96-1988

SMPTE RECOMMENDED PRACTICE

Specifications for Subjective Reference Tapes for Helical-Scan Video Tape Reproducers for Checking Receiver/Monitor Setup

1 Scope

This practice specifies magnetic video reference tapes for subjective evaluation of receiver or monitor setup and overall performance of video and audio derived from 3/4-in type E and 1/2-in types G and H magnetic helical-scan tape reproducers. No test instruments are required.

2 Normative references

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

ANSI/SMPTE 21M-1986 (R1991), Video Recording — 3/4-in Type E Helical Scan — Records

ANSI/SMPTE 22M-1986 (R1991), Video Recording — 3/4-in Type E Helical Scan — Cassette

ANSI/SMPTE 32M-1993, Video Recording — 1/2-in Type H — Cassette, Tape and Records

ANSI/SMPTE 35M-1991, Television Analog Recording — 1/2-in Type G — Cassette and Tape

EIA 189-A, Encoded Color Bar Signal

IEEE Std 202-1954 (R1972), Television: Method of Measurement of Aspect Ratio and Geometric Distortion

SMPTE EG 1-1990, Alignment Color Bar Test Signal for Television Picture Monitors

SMPTE RP 27.3-1989, Specifications for Safe Action and Safe Title Areas Test Pattern for Television Systems

SMPTE RP 87-1991, Reference Carrier Frequencies, Preemphasis Characteristics and Audio and Control Signals for 3/4-in Type E Helical-Scan Video Tape Cassette Recording

3 Reference tapes

3.1 3/4-in type E format

3.1.1 Tape records

The location and dimensions of the video and audio records shall be in accordance with ANSI/SMPTE 21M.

3.1.2 Signal parameters

The video and audio signals shall be recorded in accordance with SMPTE RP 87.

3.1.3 Cassette

The test tape shall be packaged in a cassette made in accordance with ANSI/SMPTE 22M.

3.2 1/2-in type G format

3.2.1 Cassette

The test tape shall be packaged in a cassette made in accordance with ANSI/SMPTE 35M.

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3.3 1/2-in type H format

3.3.1 Tape records

The location and dimensions of the video and audio records shall be in accordance with ANSI/SMPTE 32M.

3.3.2 Signal parameters

The video and audio signals shall be recorded in accordance with ANSI/SMPTE 32M.

3.3.3 Cassette

The test tape shall be packaged in a cassette made in accordance with ANSI/SMPTE 32M.

4 Content of reference tape

4.1 Video information

The video portion shall contain the following scenes:

(a) A color bar signal in accordance with EIA 189-A, as modified by SMPTE EG 1;

(b) A seven-step gray scale signal;

(c) Closeups of female and male models for skin-tone evaluation and general definition;

(d) Selected indoor scenes to show typical indoor color;

(e) Selected outdoor scene showing samples of sky, architecture, and human models with outdoor illumination;

(f) Patterns as specified in SMPTE RP 27.3;

(g) A crosshatch pattern video signal (with color burst) in accordance with IEEE Std 202 to check scanning linearity;

(h) A dot pattern video signal (with color burst) as specified in IEEE Std 202;

(i) A full red field to check picture tube purity having the same luminance and chrominance as the red bar in a 75% color bar signal.

4.2 Audio samples

(a) Commentary, describing the scenes and calling attention to the reference material and its relationship to proper receiver/monitor setup, is recorded on one of the audio channels;

(b) Orchestral music, for evaluation of general audio reproduction, is recorded on the other audio channel.

4.3 General specifications

(a) The main title shall include the issue number of the reference tape;

(b) Each cassette shall be supplied in a case and accompanied by a Wratten 47B blue filter (or equivalent) and an instruction sheet on tape usage;

(c) A suitable marking shall appear on the case and cassette indicating that they contain the official SMPTE subjective reference tape.

NOTE – A reference tape made in accordance with this practice is available from the Society of Motion Picture and Television Engineers.

Annex A (informative)
Additional data

A.1 Instructions for setup and playback

With the video tape reproducer set for playback, and the operator controls adjusted in accordance with the instruction book furnished with the equipment, listen to the voice of the commentator as he describes each scene and what it is intended to check. As you view the tape, observe the following:

(a) Look for an excessive amount of noise or snow — it may indicate clogged or excessively worn video heads;

(b) Note picture stability at the top and sides;

(c) Note picture sharpness and color fidelity;

(d) Listen for smooth, even music; quaver may indicate flutter;

(e) Listen for natural sound of voice;

(f) Look for excessive overscanning or underscanning.

A.2 Narration script

The following descriptive narration script is suggested for use with the subjective reference tape, and is used on tapes available from the SMPTE:

SMPTE, the Society of Motion Picture and Television Engineers, presents receiver-monitor setup video cassette No. 3. Before using this video tape further, be sure that this SMPTE identification appears both on the case and on the video cassette. Absence of this identification indicates that it is an unauthorized duplicate, and cannot be relied upon for its intended use.

Potentially hazardous voltages exist within the receiver-monitor. Any adjustment requiring removal of any portion of the cabinet should be referred to a qualified service technician.

This recording of split-field SMPTE color bars is provided for an initial check-out of the overall playback system. Please note, however, that the purpose of this tape is to verify that your video cassette playback system is operating normally and to supply reference signals for adjusting operating controls on your receiver or monitor. It is not intended for video tape recorder alignment.

First, adjust the tracking control and, if available, the skew controls for best picture clarity and stability. Now disable any receiver or monitor automatic controls and adjust the picture controls for best color pictures, according to your normal operating procedures.

If you are experienced in color monitor setup using color bars, and this was a routine playback system check-out before use, you need not view the remaining tape segments. However, if you are still dissatisfied with the colorimetry or geometry or noise in this picture, you will find guidance for possible improvements in one of the following tape segments:

(2) brightness and contrast adjustment; (3) colorimetry adjustment; (4) subjective quality touchup; (5) raster geometry and convergence check-out.

If you set all the picture and adjustment controls properly during tape segment 1, you are now viewing a picture with a light gray background, and seven bars with clearly discernible adjacent bar brightness differences. The top row of bars should range from full white on the left to black on the right. The bottom row has the reverse arrangement. If there is color visible anywhere in the picture, the cause may be either color-control misadjustment, or a problem analyzed in segment 5 which will require technician servicing. Disable any automatic color adjustment circuits and turn off all color controls to remove color from the picture.

If you are using a receiver, adjust its fine-tuning control to minimize picture noise. The black in the top row right bar should match the long horizontal black bar dividing the upper and lower rows, and the seven white-to-black bars should all be clearly visible. If they are not, sequentially adjust and touch up the settings of the contrast (picture) and brightness (intensity) controls. In most receivers and monitors there is interaction between these two controls. If your experimentation does not achieve the proper results, have a technician familiar with the receiver-monitor check out both its circuits and your adjustment procedures. There may also be a problem in the VCR playback electronics requiring adjustment or servicing.

If your picture is now properly adjusted for brightness and contrast, on the upper half of the screen you are now seeing six vertical bars decreasing in light intensity from left to right. If you do not, repeat the segment 2 adjustment or consult a service technician. Now bring up the color intensity control sufficiently to color all the bars, but not so much as to add picture noise. If you cannot achieve satisfactory or uniform color, there may be a color subcarrier problem in the VCR playback electronics. Consult its manual or your technician for advice.

Now take the blue filter supplied with the cassette and view the picture through it while you make the remainder of the segment 3 adjustments. If you are using a professional monitor, you may obtain the same results by switching off the red and green guns. In either case, you should now see four light blue bars and three dark bars in the upper two-thirds of your screen. To adjust color intensity, turn up the color control until the two outermost light blue bars exactly match the color and the intensity of the short bars directly below them.

Now adjust the tint control, sometimes called hue or phase until the two innermost light blue bars exactly match the color and intensity of the short bars directly below them. You may need to repeat this procedure several times to obtain the proper match. When you have achieved the proper settings, set aside the blue filter or, if you have turned off the red and green guns, return them to the on position. If your picture contrast, brightness, and color adjustments have been made correctly, all the values in this interior scene should be acceptable for all viewers. Only minor touch up to satisfy personal preferences should be necessary.

The following interior and exterior scenes contain brightness values throughout the full contrast range. Highlights on the ceramic cat should be bright, showing good detail. You should be seeing detail in the low-light areas; on the slats in the background shutters, for example. You should also be seeing fine detail in the woman's hair. Should major adjustments be required on one or more controls, either the adjustment procedure must be repeated, or your equipment needs service.

If you have not been hearing music in the background, and your VCR has two audio channels, set your audio channel output selector switch to the mix position. Music level should be heard under the voice. For the next 15 seconds, the music channel playback will be set at peak operating level, to permit further check-out of the distortion and tone quality of your sound system.

Skin tones should appear natural. With the white railing and black-and-white building facades and blue sky, this scene contains the full contrast range.

Segment 5 is a series of test signals and patterns which enable you to check the raster geometry and convergence of your receiver or monitor. This picture should appear uniformly red, the same hue as the red bar in the segment 3 colorimetry adjustment. If other stationary colors appear

on any portion of the screen, screen demagnetization, convergence, or electronics adjustment are required. These dots should appear white in all areas of the screen. If you see significant colored fringes on any dots, convergence adjustment may be required.

The vertical and horizontal lines of the crosshatch pattern should appear sharp and straight and uniformly spaced out to the edges of the screen. Servicing may be required if they are not. However, some sets cannot be adjusted perfectly. A common problem in monitor and receiver performance is horizontal and/or vertical overscanning. The outline surrounding the words “safe title area” should be centered symmetrically on the screen and well within its edges.

If your picture is properly scanned, you are now seeing all four sides of a larger “safe action area” rectangle. However, some sets do not have adjustment controls for both horizontal and vertical picture size.

This concludes SMPTE receiver-monitor setup video cassette No. 3. Duplication in prohibited. For additional copies of this reference tape, call or write SMPTE headquarters.